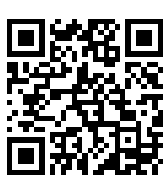

U. S. DEPARTMENT OF COMMERCE
COAST AND GEODETIC SURVEY

TRIANGULATION IN ARIZONA

(1927 DATUM)

PART 1

First- and Second-Order Triangulation
in South Central Part of State

By CLEMENT L. GARNER

SPECIAL PUBLICATION NO. 224

U. S. DEPARTMENT OF COMMERCE
JESSE H. JONES, Secretary
COAST AND GEODETIC SURVEY
LEO OTIS COLBERT, Director

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CLEMENT L. GARNER
CHIEF, DIVISION OF GEODESY

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TRIANGULATION IN ARIZONA (1927 DATUM)

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GENERAL STATEMENT

Publications of the United States Coast and Geodetic Survey containing the results of triangulation have until recently included the control data of an entire State in one volume. If there are a thousand or more stations in a State, as is frequently the case, such a volume becomes bulky and very inconvenient for an engineer to handle in the field. On this account, a new policy has recently been adopted to publish the control data of a State in several volumes, including in each volume data for less than 500 points. With this method of publication the engineer need obtain data for only that part of the State in which he is particularly interested.

Following this policy the triangulation of Arizona will be published in several parts, this publication being part I of the series. In dividing the State into parts, the division was made along parallels and meridians. This publication contains complete data for all the control triangulation of the counties in the south central part of the State as shown on the index sketch on page 178 of this volume. On this sketch is also shown the location of the various arcs of triangulation included in the publication.

The geographic positions and plane coordinates are based on the North American datum of 1927. On page 4 are given instructions on how to find data for a given station or stations in a particular region.

This volume is the twenty-second of a series of publications, each of which contains the geographic positions of the stations on the new datum, and the descriptions and other data for the available first-order (and, in some cases, the second-order) triangulation and traverse of a State, or occasionally of two States. The following volumes have already 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

A more detailed explanation than here given of the triangulation of this Bureau, and a discussion of the uses of triangulation, will be found in a pamphlet now in press entitled "Use of horizontal control data," Special Publication No. 227.

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.

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.

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

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 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 of triangulation, or parts of arcs and areas, that lie between the 111th and 113th meridians and between the 34th parallel and the Mexican boundary. The following list shows the various arcs and areas of triangulation, the chiefs of parties 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	J. S. Hill-O. W. Ferguson	1909–10
United States-Mexico boundary	G. D. Cowie	1920
Maricopa-Yavapai county line	William Mussetter	1924
Yuma to Stewart Dam	E. B. Latham	1934–35
Ajo to Tucson to Phoenix to Winkelman	----do	1935
Second order		
Nogales	C. H. Sinclair-W. B. Fairfield	1892–93
Southern Arizona	G. D. Cowie	1919–20
Papago Indian Reservation	J. Bowie, Jr.	1936
Queen Creek	F. G. Johnson	1938

COMPUTATIONS

The Texas-California arc and the Maricopa-Yavapai County line arc were included in the original net readjustment of the western part of the United States. The other first-order arcs were then fitted to these arcs. The four second-order areas were adjusted by using the first-order triangulation stations as control points.

In this volume are included several stations established by other agencies, namely: United States Geological Survey (U. S. G. S.); Arizona Geodetic Survey (Ariz. Geod. S.); International Boundary Commission (I. B. C.); United States Bureau of Reclamation (U. S. B. of R.); United States General Land Office (G. L. O.); and the United States Army (U. S. A.).[2] These stations have been occupied or observed by the United States Coast and Geodetic Survey.

CLASSIFICATION OF TRIANGULATION

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

To secure the accuracy indicated above, certain standards are adopted for the field work, the most important 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 appreciably exceed 1 second and the maximum triangle closure must not exceed 3 seconds; in second-order triangulation the average closing error must not exceed 3 seconds, and the maximum 5 seconds; and in third-order triangulation the average closing error must not exceed 5 seconds, and the maximum 10 seconds. In recent second-order triangulation by the Coast and Geodetic Survey, it has been found possible to hold the average closing error to approximately 1½ seconds without increasing the unit costs. The engineer should *always* use adjusted data with which to connect his work and should evaluate these data according to the class of triangulation by which they were determined.

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 over, whether in one or both directions. No lengths and azimuths are repeated, and for a given line the length and azimuth will be

[2] For additional stations by these organizations, application should be made directly to the organizations concerned.

found opposite the position of one or the other of the two stations involved.

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

The rule 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—observed from two stations only). Points whose positions are derived from measured distances and azimuths are listed to thousandths of a second and are marked as being without check.

Points, the positions of which are marked as being without check, should be used by the surveyor with extreme caution. Many such positions are of sufficiently high order of accuracy to serve as control for ordinary mapping, but the engineer should by his own observations determine if the position used is free from blunder. When he does this, the accidental errors which remain because of lack of adjustment will not be of consequence in ordinary cases. When positive accuracy of a definite order is desired, the engineer should use only adjusted data, evaluating them according to the class of triangulation by which they were determined.

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 the station is marked but not described the letter "m." is 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. r.," probably recovered; and "p. l.," probably lost.

The tables may be conveniently consulted by using as finders the sketches and the index at the end of this publication. In the second column of the index will be found for each point a reference to the page on which its geographic position is given, in the third column the page on which the description and/or plane coordinates are given, and in the fourth column the figure number of the sketch on which the station appears. (For explanation of plane coordinates see p. 65.)

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 9, the azimuth from Growler to Sauceda is 263°08′51″.75, while the back azimuth, or azimuth from Sauceda to Growler is 83°25′18″.48.

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. In no case is an azimuth mark listed where the distance is less than one hundred meters from the station mark.

TEXAS–CALIFORNIA ARC

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points	° ′ ″	° ′ ″	° ′ ″				
Baldy (U. S. G. S.), 1910, l. 1935 (d. m.)	31 41 45.737 110 50 50.723						
Catalina, 1910, r. 1936 (d. m.)	32 26 33.722 110 47 16.962	3 53 23.71	183 51 30.21	Baldy (U. S. G. S.)	4.9189883	82,982.85	272,252.9
Table, 1910, r. 1936 (d. m.)	32 45 11.782 112 07 28.670	284 59 16.64 313 53 44.69	105 42 29.00 134 34 36.68	Catalina Baldy (U. S. G. S.)	5.1143240 5.2254135	130,113.98 168,040.31	426,882.3 551,312.2
Superstition (U. S. G. S.), 1910, r. 1938 (d. m.)	33 24 39.480 111 24 00.285	331 46 15.18 344 35 01.90 43 02 36.96	152 06 12.88 164 52 52.58 222 38 53.16	Catalina Baldy (U. S. G. S.) Table	5.0852387 5.2947508 4.9977444	121,685.46 197,129.14 99,481.98	399,229.7 646,747.9 326,383.8
Whitetank, 1910, r. 1936 (d. m.)	33 34 01.652 112 33 27.501	278 49 33.90 335 46 17.20 350 34 07	99 27 53.33 156 00 29.87	Superstition (U. S. G. S.) Table Azimuth mark.	5.0372828 4.9951328	108,963.93 98,885.55	357,492.5 324,427.0
Maricopa, 1910, l. 1936 (d. m.)	32 45 08.130 112 22 44.807	169 36 25.91 231 06 11.49 269 39 39.39	349 30 34.37 51 38 15.36 89 47 55.04	Whitetank Superstition (U. S. G. S.) Table	4.9632853 5.0682405 4.3774716	91,893.60 117,014.72 23,849.08	301,487.6 383,905.8 78,244.9
Harquahalla, 1910, r. 1924 (d. m.)	33 48 42.226 113 20 46.130	290 08 22.46 322 15 25.48	110 34 37.04 142 47 16.00	Whitetank Maricopa	4.8919991 5.1704357	77,982.85 148,059.32	255,848.7 485,757.9
Mohawk, 1910, r. 1934 (d. m.)	32 35 22.230 113 38 49.403	191 36 44.71 222 52 41.39 261 01 45.57	11 46 37.92 43 28 22.03 81 42 49.67	Harquahalla Whitetank Maricopa	5.1412087 5.1722114 5.0802465	138,423.15 148,665.92 120,294.71	454,143.3 487,748.1 394,666.9
Mazatzal, 1919, r. 1924 (d. m.)	34 03 45.290 111 27 39.008	61 53 09.19	241 16 31.75	Whitetank	5.0624475	115,464.23	378,818.9

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points	° ′ ″	° ′ ″	° ′ ″				
Maricopa astronomical station eccentric, 1910 (d.)	33 03 33.987 112 03 00.229	11 37 49.5 42 11 31.2	191 35 23.7 222 00 47.7	Table Maricopa	4.539867 4.661952	34,663.1 45,914.7	113,724 150,638
Maricopa east pier, 1910, r. 1923 (d. m.) [1]	33 03 33.463 112 02 59.671	138 07 18	318 07 18	Maricopa astronomical station eccentric.	1.335919	21.673	71.11
Maricopa west pier, 1910 (d. m.) [1]	33 03 33.462 112 02 59.741	141 54 58	321 54 58	Maricopa astronomical station eccentric.	1.312685	20.544	67.40
Maricopa northwest base (U. S. G. S.), 1910 (d. m.)	33 03 00.130 112 02 14.116	13 58 23.6 131 05 09.5	193 55 32.8 311 04 44.4	Table Maricopa astronomical station eccentric.	4.530340 3.200625	33,911.0 1,587.2	111,256 5,207
Comobabi Peak, 1910 (n. d.)	31 46 15.504 111 35 42.556	155 31 55.6 276 29 26.9	335 14 58.1 96 53 02.8	Table Baldy (U. S. G. S.)	5.078480 4.853369	119,806.4 71,345.9	393,065 234,074
Desert Peak, 1910 (n. d.)	32 43 07.390 111 23 58.763	93 25 24.3 179 58 14.4	273 01 52.9 359 58 13.5	Table Superstition (U. S. G. S.)	4.832901 4.885201	68,061.4 76,771.7	223,298 251,875
Gila Peak, 1910 (n. d.)	33 10 02.733 112 53 04.268	214 22 13.0 314 07 04.5	34 33 00.3 134 23 34.4	Whitetank Maricopa	4.730492 4.819385	53,764.0 65,975.8	176,391 216,456
Mare, 1910 (n. d.)	33 16 24.120 112 16 48.061	345 49 41.3 141 40 40.3	165 54 46.1 321 31 29.8	Table Whitetank	4.774360 4.618801	59,478.5 41,572.0	195,139 136,391
Four Peaks, 1910 (n. d.)	33 40 50.926 111 19 36.812	36 05 04.3 84 02 25.5	215 38 51.0 263 21 32.0	Table Whitetank	5.103582 5.060307	126,935.2 114,896.6	416,453 376,957
Flat Top (center), 1910 (n. d.)	32 38 07.271 112 44 29.210	189 22 38.6 249 01 05.7	9 28 40.0 69 12 50.3	Whitetank Maricopa	5.020157 4.560715	104,750.7 36,367.6	343,670 119,316
Needles, 1910 (n. d.)	33 24 12.085 113 18 13.645	175 03 04.7 255 07 01.8	355 01 40.3 75 31 43.7	Harquahalla Whitetank	4.657664 4.855438	45,463.6 71,686.6	149,158 235,192

UNITED STATES-MEXICO BOUNDARY ARC

Principal points	°	′	″	°	′	″	°	′	″				
Kitts, 1920, r. 1938 (d. m.)	31	57	53.425	235	02	57.22	55	28	52.36	Catalina	4.9684663	92,996.43	305,105.8
	111	35	54.985	292	32	27.42	112	56	13.68	Baldy (U. S. G. S.)	4.8870913	77,106.55	252,973.7
				211	24	15				Azimuth mark.			
Silver Bell, 1919, r. 1936 (d. m.)	32	25	03.500	267	26	50.85	87	49	54.83	Catalina	4.8291714	67,479.43	221,388.8
	111	30	17.684	322	00	48.49	142	21	44.81	Baldy (U. S. G. S.)	5.0055197	101,279.07	332,279.7
				10	00	18.27	189	57	18.57	Kitts	4.7074059	50,980.72	167,259.2
				96	40	41				Azimuth mark.			
Sierra Prieta, 1920 (d. m.)	32	32	44.665	291	23	25.56	111	35	47.53	Silver Bell	4.5885013	38,770.49	127,199.5
	111	53	19.288	336	55	40.07	157	04	57.42	Kitts	4.8449409	69,974.68	229,575.3
South Mountain, 1920, r. 1936 (d. m.)	31	59	58.557	201	46	04.42	21	54	19.54	Sierra Prieta	4.8145246	65,241.60	214,046.8
	112	08	46.558	232	21	18.35	52	41	49.01	Silver Bell	4.8819024	76,190.77	249,969.2
				274	06	48.12	94	24	12.38	Kitts	4.7152040	51,904.38	170,289.6
				278	22	03				Azimuth mark.			
Sauceda, 1920, r. 1936 (d. m.)	32	27	40.775	261	43	28.65	82	06	04.77	Sierra Prieta	4.8230860	66,540.49	218,308.3
	112	35	22.977	320	39	13.67	140	53	25.09	South Mountain	4.8201668	66,094.73	216,845.8
				307	12	06				Azimuth mark.			
Sierra del Ajo, 1920, r. 1936 (d. m.)	32	01	36.116	191	02	52.27	11	06	04.52	Sauceda	4.6911633	49,109.25	161,119.3
	112	41	23.312	232	27	17.29	52	52	57.82	Sierra Prieta	4.9773046	94,908.39	311,378.6
				273	12	16.57	93	29	33.88	South Mountain	4.7113231	51,442.62	168,774.7
				314	27	18				Azimuth mark.			
Growler, 1920 (d. m.)	32	24	37.069	263	08	51.75	83	25	18.48	Sauceda	4.6847676	48,391.33	158,763.9
	113	06	02.659	317	33	55.77	137	47	04.49	Sierra del Ajo	4.7599124	57,532.39	188,754.2
Quitovaguita, 1920 (d. m.)	32	01	32.108	185	32	37.36	5	34	01.84	Growler	4.6320608	42,860.85	140,619.3
	113	08	41.112	227	07	24.61	47	25	10.67	Sauceda	4.8525416	71,210.10	233,628.5
				269	42	53.16	89	57	21.70	Sierra del Ajo	4.6332461	42,977.99	141,003.6

MARICOPA-YAVAPAI COUNTY-LINE ARC

Principal points	°	′	″	°	′	″	°	′	″				
Forepaugh, 1924 (d. m.)	33	59	45.236	315	06	10.88	135	23	09.92	Whitetank	4.8258845	66,970.65	219,719.5
	113	04	00.205	51	45	16.76	231	35	55.65	Harquahalla	4.5177556	32,942.43	108,078.6
Initial Monument, 1924, r. 1936 (d. m.)	34	00	01.019	271	03	29.37	91	12	25.33	Forepaugh	4.3909938	24,603.32	80,719.4
	113	19	58.704	3	20	16.72	183	19	50.26	Harquahalla	4.3211706	20,949.35	68,731.3

[1] No check on this position.

MARICOPA-YAVAPAI COUNTY-LINE ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Pioneer, 1924 (d. m.)	33 53 30.791	41 25 53.15	221 23 03.26	Harquahalla	4.0738631	11,853.95	38,890.8
	113 15 41.147	151 12 18.26	331 09 54.44	Initial Monument	4.1374253	13,722.25	45,020.4
		237 17 18.55	57 23 49.95	Forepaugh	4.3300066	21,379.95	70,144.1
Castle, 1924, r. 1935 (d. m.)	33 56 55.861	4 41 45.01	184 40 30.08	Whitetank	4.6281933	42,480.86	139,372.6
	112 31 12.666	78 58 25.80	258 30 48.19	Harquahalla	4.8916128	77,913.52	255,621.3
		96 03 05.28	275 44 45.83	Forepaugh	4.7056767	50,778.13	166,594.6
McDowell, 1924, r. 1935 (d. m.)	33 39 36.536	81 35 39.85	261 11 16.38	Whitetank	4.8383773	68,925.08	226,131.7
	111 49 23.890	116 35 07.41	296 11 51.63	Castle	4.8575605	72,037.82	236,344.1
		216 49 18.61	37 01 25.69	Mazatzal	4.7468980	55,833.91	183,181.7
		327 41 58		Azimuth mark (cairn).			
Bilby, 1924 (d. m.)	34 01 18.273	264 47 23.88	85 06 01.53	Mazatzal	4.7110525	51,410.58	168,669.5
	112 00 55.499	336 02 08.52	156 08 33.66	McDowell	4.6421846	43,871.72	143,935.8
		45 01 54.75	224 43 49.01	Whitetank	4.8522491	71,162.16	233,471.2
		80 18 25.20	260 01 29.44	Castle	4.6752058	47,337.55	155,306.6
Buford, 1924 (d. m.)	33 54 48.705	7 31 19.13	187 29 59.03	McDowell	4.4525060	28,346.93	93,001.5
	111 46 59.865	119 17 29.70	299 09 42.81	Bilby	4.3906268	24,582.54	80,651.2
		240 53 06.70	61 03 55.65	Mazatzal	4.5324318	34,074.68	111,793.3
Verde, 1924 (d. m.)	33 59 53.250	252 57 06.11	73 05 36.96	Mazatzal	4.3888954	24,484.73	80,330.3
	111 42 51.840	34 11 01.96	214 08 43.42	Buford	4.0546218	11,340.23	37,205.4
Table, 1924 (d. m.)	33 57 49.970	235 17 00.29	55 20 22.46	Bilby	4.0525742	11,286.89	37,030.4
	112 06 57.107	321 06 43.31	141 16 29.38	McDowell	4.6357245	43,223.95	141,810.6
Agua Fria, 1924 (d. m.)	34 02 52.078	282 07 42.30	102 12 34.73	Bilby	4.1370696	13,711.02	44,983.6
	112 09 37.978	336 04 58.98	156 06 28.95	Table	4.0080736	10,187.64	33,423.9
Malpai, 1924 (d. m.)	33 56 33.010	203 42 48.95	23 44 40.80	Agua Fria	4.1057824	12,757.99	41,856.8
	112 12 58.021	244 35 13.41	64 41 57.26	Bilby	4.3122454	20,523.22	67,333.3
		255 39 07.00	75 42 28.58	Table	3.9806572	9,564.39	31,379.2
		310 37 03.40	130 50 10.10	McDowell	4.6812339	47,999.19	157,477.3
Cactus, 1924 (d. m.)	34 00 02.282	346 08 09.71	166 09 14.40	Pioneer	4.0942462	12,423.56	40,759.6
	113 17 37.000	89 23 52.09	269 22 32.85	Initial Monument	3.5607129	3,636.75	11,931.6

Rabbit, 1924 (d. m.)	34	00	00.604	273	56	42.51	93	59	11.33	Forepaugh	3.8354669	6,846.47	22,462.1
	113	08	26.344	42	56	44.51	222	52	41.71	Pioneer	4.2148077	16,398.63	53,801.2
				90	05	42.24	269	59	15.08	Initial Monument	4.2496386	17,768.00	58,293.8
Fence, 1924 (d. m.)	34	00	01.286	270	05	43.15	90	09	13.77	Rabbit	3.9852293	9,665.61	31,711.3
	113	14	42.980	7	04	53.25	187	04	20.77	Pioneer	4.0836371	12,123.75	39,776.0
				90	24	27.03	270	22	49.72	Cactus	3.6499142	4,465.95	14,652.0
Aguila, 1924 (d. m.)	33	54	49.839	77	42	35.39	257	38	33.36	Pioneer	4.0573182	11,410.86	37,437.1
	113	08	27.244	134	52	33.20	314	49	03.32	Fence	4.1337655	13,607.10	44,642.6
				180	08	17.44	0	08	17.94	Rabbit	3.9811349	9,574.92	31,413.7
				216	58	20.26	37	00	49.41	Forepaugh	4.0567184	11,395.11	37,385.5
Palo, 1924 (d. m.)	33	54	59.281	88	42	49.59	268	38	16.25	Aguila	4.0999553	12,587.96	41,299.0
	113	00	17.351	126	31	09.23	306	26	36.08	Rabbit	4.1935383	15,614.87	51,229.8
				147	00	54.88	326	58	50.40	Forepaugh	4.0214179	10,505.53	34,466.9
Corral, 1924 (d. m.)	33	59	57.623	31	54	24.68	211	52	20.25	Palo	4.0344731	10,826.13	35,518.7
	112	56	34.600	88	07	23.56	268	03	14.39	Forepaugh	4.0585108	11,442.23	37,540.0
Quartz, 1924 (d. m.)	33	55	27.715	82	14	56.37	262	12	36.90	Palo	3.8115419	6,479.51	21,258.2
	112	56	07.417	123	12	25.06	303	08	00.95	Forepaugh	4.1614253	14,501.91	47,578.3
				175	12	17.98	355	12	02.80	Corral	3.9214419	8,345.30	27,379.5
Pack, 1924 (d. m.)	34	00	20.800	45	43	20.70	225	39	59.37	Quartz	4.1115383	12,928.21	42,415.3
	112	50	07.055	85	55	23.51	265	51	46.79	Corral	3.9987325	9,970.86	32,712.7
Spur, 1924 (d. m.)	33	55	18.340	91	44	18.02	271	40	47.70	Quartz	3.9860866	9,684.71	31,773.9
	112	49	50.544	129	42	20.96	309	38	35.26	Corral	4.1296365	13,478.34	44,220.2
				177	23	48.41	357	23	39.19	Pack	3.9698186	9,328.65	30,605.7
Road, 1924 (d. m.)	33	59	58.151	36	39	45.53	216	37	26.00	Spur	4.0311925	10,744.66	35,251.4
	112	45	40.776	95	51	06.54	275	48	37.63	Pack	3.8368837	6,868.84	22,535.5
Burg, 1924 (d. m.)	33	55	52.327	83	55	51.48	263	52	18.51	Spur	3.9937233	9,856.51	32,337.6
	112	43	28.971	129	01	02.69	308	57	20.27	Pack	4.1188572	13,147.92	43,136.1
				155	56	10.41	335	54	56.77	Road	3.9188454	8,295.55	27,216.3
Dusty, 1924 (d. m.)	33	59	15.750	25	24	22.11	205	23	17.37	Burg	3.8412421	6,938.12	22,762.8
	112	41	33.073	101	37	53.99	281	35	35.50	Road	3.8122527	6,490.12	21,293.0
Googie, 1924 (d. m.)	33	58	34.652	54	54	02.90	234	51	28.23	Burg	3.9391901	8,693.41	28,521.6
	112	38	52.041	103	48	37.73	283	44	49.24	Road	4.0334923	10,801.70	35,438.6
				107	02	41.71	287	01	11.70	Dusty	3.6357911	4,323.06	14,183.2
Quince, 1924 (d. m.)	33	57	05.385	82	07	44.06	262	01	52.26	Burg	4.2131512	16,336.21	53,596.4
	112	32	58.909	106	54	11.61	286	50	54.32	Googie	3.9765452	9,474.26	31,083.5
				276	07	51.24	96	08	50.57	Castle	3.4383600	2,743.85	9,002.1
Selin, 1924 (d. m.)	33	56	27.144	106	46	46.63	286	45	21.60	Quince	3.6110914	4,084.05	13,399.1
	112	30	26.630	126	48	57.74	306	48	32.03	Castle	3.1692691	1,476.62	4,844.5

MARICOPA-YAVAPAI COUNTY-LINE ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Citrus, 1924 (d. m.)	33 59 59.097	2 06 25.85	182 06 18.93	Spur	3.9373259	8,656.17	28,399.5
	112 49 38.153	132 02 21.03	312 02 04.87	Pack	2.9994017	998.62	3,276.3
		270 15 21.15	90 17 33.89	Road	3.7847525	6,091.90	19,986.5
		308 42 25.87	128 45 52.13	Burg	4.0846070	12,150.86	39,864.9
Rail, 1924 (d. m.)	33 59 59.569	12 44 04.10	192 43 21.52	Spur	3.9485676	8,883.16	29,144.2
	112 48 34.312	89 29 48.28	269 29 12.58	Citrus	3.2144284	1,638.43	5,375.4
		105 22 32.63	285 21 40.77	Pack	3.3923912	2,468.26	8,097.9
Hass, 1924 (d. m.)	33 59 57.968	348 47 39.60	168 48 12.22	Burg	3.8873540	7,715.32	25,312.7
	112 44 27.348	90 10 38.72	270 09 57.66	Road	3.2751770	1,884.42	6,182.5
Divide, 1924 (d. m.)	33 59 57.772	264 45 00.37	84 47 49.40	Pack	3.8914871	7,789.10	25,554.7
	112 55 09.317	10 10 05.94	190 09 33.48	Quartz	3.9270257	8,453.29	27,733.8
Prince, 1924 (d. m.)	33 46 30.490	143 27 53.43	323 22 43.49	Castle	4.3800920	23,993.41	78,718.4
	112 21 56.415	216 39 49.30	36 44 49.25	Malpai	4.3646420	23,154.85	75,967.2
Mill, 1924 (d. m.)	33 54 44.563	109 19 15.16	289 15 03.91	Castle	4.0880701	12,248.14	40,184.1
	112 23 42.547	258 32 20.58	78 38 20.30	Malpai	4.2275884	16,888.40	55,408.0
		349 49 45.47	169 50 44.58	Prince	4.1893513	15,465.05	50,738.3
Nada, 1924 (d. m.)	33 48 12.029	167 27 04.35	347 25 46.36	Castle	4.2184060	16,535.07	54,248.8
	112 28 52.759	213 22 29.70	33 25 22.53	Mill	4.1609581	14,486.32	47,527.2
		286 14 58.33	106 18 49.87	Prince	4.0476052	11,158.48	36,609.1
Morgan, 1924 (d. m.)	33 55 32.904	110 08 52.23	290 06 20.62	Castle	3.8708672	7,427.92	24,369.8
	112 26 41.100	287 58 36.16	108 00 15.89	Mill	3.6832559	4,822.32	15,821.2
		336 19 40.04	156 22 18.62	Prince	4.2611233	18,244.13	59,855.9
		13 59 59.40	193 58 46.04	Nada	4.1460864	13,998.66	45,927.3
Orion, 1924 (d. m.)	33 52 43.917	113 26 56.32	293 22 05.18	Burg	4.1646994	14,611.65	47,938.4
	112 34 47.046	149 48 22.54	329 46 05.80	Googie	4.0970818	12,504.95	41,026.7
		199 01 01.15	19 02 01.49	Quince	3.9305129	8,521.44	27,957.4
		215 20 15.19	35 22 14.80	Castle	3.9785299	9,517.65	31,225.8
		224 11 15.41	44 13 40.69	Selin	3.9820372	9,594.83	31,479.0
		312 34 30.47	132 37 47.77	Nada	4.0925520	12,375.19	40,600.9

Black, 1924 (d. m.)	33	52	14.591	45	50	33.94	225	46	37.90	Prince	4.1821179	15,209.60	49,900.2
	112	14	52.333	108	46	32.34	288	41	36.70	Mill	4.1579533	14,386.44	47,199.5
				200	14	15.84	20	15	19.61	Malpai	3.9287213	8,486.36	27,842.3
New, 1924 (d. m.)	33	53	38.275	75	08	26.36	255	04	55.98	Black	4.0015068	10,034.76	32,922.4
	112	08	34.960	128	33	53.89	308	31	27.10	Malpai	3.9365043	8,639.81	28,345.8
				197	57	41.53	17	58	36.15	Table	3.9109808	8,146.68	26,727.9
Barry, 1924 (d. m.)	33	53	02.358	222	52	55.01	42	55	06.00	Malpai	3.9474323	8,859.97	29,068.1
	112	16	52.797	295	24	56.84	115	26	03.99	Black	3.5350295	3,427.91	11,246.4
Cholla, 1924 (d. m.)	33	53	26.82	235	04	10	55	07	08	Malpai	4.001078	10,024.9	32,890
	112	18	18.06	288	58	39	108	59	26	Barry	3.364955	2,317.2	7,602
				292	48	42	112	50	37	Black	3.758637	5,736.4	18,820
Traverse point A, 1924 (n. d.)[1]	33	52	59.14	111	29	44	291	29	39	Barry	2.431701	270.210	886.51
	112	16	43.01										
Barry Monument, 1924 (m.)[1]	33	52	58.70	101	00	35	281	00	34	Traverse point A	1.811582	64.801	212.60
	112	16	40.54										
Mesa, 1924 (d. m.)	33	55	25.363	162	30	29.11	342	29	14.47	Bilby	4.0569521	11,401.24	37,405.6
	111	58	41.931	273	31	45.07	93	38	16.83	Buford	4.2569497	18,069.65	59,283.5
Cook, 1924 (d. m.)	34	00	53.551	317	24	09.65	137	27	54.32	Buford	4.1836391	15,262.97	50,075.3
	111	53	42.006	37	18	41.36	217	15	53.78	Mesa	4.1041303	12,709.55	41,697.9
				93	57	05.39	273	53	02.87	Bilby	4.0472132	11,148.42	36,576.1
Rover, 1924 (d. m.)	34	00	39.440	340	27	13.39	160	28	36.81	Buford	4.0594265	11,466.39	37,619.3
	111	49	29.201	55	45	03.78	235	39	54.96	Mesa	4.2349139	17,175.68	56,350.5
				93	51	14.76	273	48	53.34	Cook	3.8130021	6,501.33	21,329.8
Burro, 1924 (d. m.)	34	02	33.264	39	09	01.43	219	04	48.03	Buford	4.2659486	18,447.97	60,524.7
	111	39	26.470	77	16	05.92	257	10	28.64	Rover	4.2001870	15,855.76	52,020.1
Sears, 1924 (d. m.)	33	58	28.301	65	10	14.79	245	04	57.46	Buford	4.2064391	16,085.67	52,774.4
	111	37	31.576	102	25	45.15	282	19	03.93	Rover	4.2754489	18,855.97	61,863.3
				158	40	20.53	338	39	16.27	Burro	3.9086423	8,102.93	26,584.4
Club, 1924 (d. m.)	34	03	05.101	28	26	54.53	208	25	13.85	Sears	3.9867033	9,698.47	31,819.1
	111	34	31.602	82	37	58.69	262	35	13.60	Burro	3.8823170	7,626.35	25,020.8
				263	17	36.50	83	21	27.56	Mazatzal	4.0274937	10,653.53	34,952.5
Ridge, 1924 (d. m.)	34	00	00.733	49	29	01.56	229	27	49.00	Sears	3.6417481	4,382.76	14,379.1
	111	35	21.783	126	50	16.65	306	47	59.75	Burro	3.8944292	7,842.04	25,728.4
				192	45	55.65	12	46	23.73	Club	3.7652673	5,824.62	19,109.6
				239	43	50.83	59	48	09.82	Mazatzal	4.1380124	13,740.81	45,081.3
Tonto, 1924 (d. m.)	34	00	06.591	88	56	30.67	268	53	03.36	Ridge	3.9784293	9,515.45	31,218.6
	111	29	11.061	123	48	01.42	303	45	02.05	Club	3.9953392	9,893.25	32,458.1
				199	18	21.59	19	19	13.11	Mazatzal	3.8537043	7,140.10	23,425.5

[1]No check on this position. Because of its close relationship to the main scheme, this station was included with the "principal points."

250900°—41——2

MARICOPA-YAVAPAI COUNTY-LINE ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Deadman, 1924 (d. m.)	34 00 00.148	212 01 54.43	32 02 58.82	Burro	3.7454986	5,565.43	18,259.2
	111 41 21.550	269 51 37.09	89 54 58.27	Ridge	3.9653294	9,232.71	30,291.0
		295 35 46.70	115 37 55.26	Sears	3.8159770	6,546.02	21,476.4
Lime, 1924 (d. m.)	34 00 10.527	12 31 48.13	192 31 00.21	Buford	4.0067745	10,157.21	33,324.1
	111 45 34.084	98 25 02.43	278 22 50.93	Rover	3.7852386	6,098.72	20,008.9
		284 13 55.56	104 18 25.30	Sears	4.1064803	12,778.51	41,924.2
Rock, 1924 (d. m.)	34 02 46.042	342 43 37.97	162 44 39.79	Table	3.9803875	9,558.45	31,359.7
	112 08 47.651	98 12 06.11	278 11 37.93	Agua Fria	3.1153277	1,304.15	4,278.7
Moore, 1924 (d. m.)	34 02 18.566	52 13 30.52	232 08 31.72	Malpai	4.2396667	17,364.68	56,970.6
	112 04 03.547	96 53 22.78	276 50 15.56	Agua Fria	3.9365190	8,640.10	28,346.7
		291 02 45.58	111 04 30.82	Bilby	3.7134470	5,169.48	16,960.2
Summit, 1924 (d. m.)	34 01 54.621	51 39 46.76	231 36 19.14	Table	4.0847017	12,153.51	39,873.6
	112 00 45.799	97 25 49.87	277 20 51.97	Agua Fria	4.1387844	13,765.26	45,161.5
		12 31 43.52	192 31 38.09	Bilby	3.0596509	1,147.23	3,763.9
Supplementary points							
Barlow boundary monument No. 1, 1924 (d. m.) [1]	34 00 01.02	272 56	92 56	Initial Monument	0.36173	2.30	7.5
	113 19 58.79						
Thompson boundary monument No. 2, 1924 (d. m.).[1]	34 00 01.29	89 20	269 20	Fence	1.167908	14.72	48.3
	113 14 42.41						
Thompson boundary monument No. 3, 1924 (d. m.).[1]	34 00 00.43	168 36	348 36	Rabbit	0.73640	5.45	17.9
	113 08 26.30						
T. 8 N., R. 9 W., sec. 25, southwest corner, 1924 (d. m.).[1]	34 00 03.44	14 00 46	194 00 46	Rabbit	1.955086	90.175	295.85
	113 08 25.49						
T. 7 N., R. 9 W., sec. 25, southwest corner, 1924 (d. m.).[1]	33 54 49.77	182 25	2 25	Aguila	0.30103	2.00	6.6
	113 08 27.25						
Thompson boundary monument No. 4, 1924 (d. m.).[1]	33 59 59.72	270 17 02	90 21 14	Corral	4.063856	11,583.9	38,005
	113 04 05.98	341 37 38	161 37 41	Forepaugh	2.672150	470.1	1,542
Thompson boundary monument No. 10, 1924 (d. m.).[1]	33 59 58.14	98 45	278 45	Road	0.20276	1.595	5.23
	112 45 40.72						

Thompson boundary monument No. 11, 1924 (d. m.).[1]	33 59 58.14 112 44 29.44	275 43 45	95 43 46	Hass	1.731226	53.855	176.69
Bullard Peak, 1924 (n. d.) [1]	34 03 55.26 113 21 18.63	305 21 15 344 08 02	125 24 56 164 08 47	Fence Initial Monument	4.095147 3.875226	12,449.4 7,502.8	40,844 24,615
Aguila, water tank, 1924 (n. d.)	33 56 36.576 113 10 24.494	317 30 34.4 54 53 23.3 205 44 52.2	137 31 39.8 234 50 26.6 25 45 58.2	Aguila Pioneer Rabbit	3.649254 3.997662 3.843839	4,459.2 9,946.3 6,979.7	14,630 32,632 22,899
Eagle Eye Peak, summit, 1924 (n. d.)	33 53 26.575 113 10 04.344	90 53 09.8 128 34 29.4 149 33 03.0	270 50 02.0 308 28 57.4 329 30 27.4	Pioneer Initial Monument Fence	3.937284 4.290273 4.149529	8,655.3 19,510.7 14,110.1	28,397 64,011 46,293
Seven Mile Peak, 1924 (n. d.)	33 55 44.949 113 02 58.810	272 50 43.3 288 43 41.2 78 38 45.1 133 09 15.3	92 54 31.2 108 45 11.2 258 35 41.8 313 06 12.2	Quartz Palo Aguila Rabbit	4.024486 3.641418 3.934778 4.061530	10,580.0 4,379.4 8,605.5 11,522.1	34,711 14,368 28,233 37,802
Vulture Picacho, 1924 (n. d.)	33 52 46.282 112 47 39.830	327 35 14.5 105 12 24.4 192 55 53.6	147 43 07.8 284 54 22.0 12 57 00.1	Whitetank Initial Monument Road	4.612927 4.712334 4.135225	41,013.5 51,562.5 13,652.9	134,558 169,168 44,793
Wickenburg, church belfry, 1924 (n. d.) [1]	33 58 09.87 112 43 41.86	60 51 28 112 13 39	240 48 03 292 10 04	Spur Pack	4.035134 4.028489	10,842.6 10,678.0	35,573 35,033
Faith (U. S. G. S.), 1924 (m.)	34 01 39.247 112 42 10.631	347 41 59.4 10 39 38.4 60 00 08.8	167 42 20.4 190 38 54.7 239 58 11.2	Dusty Burg Road	3.655627 4.036484 3.794287	4,525.1 10,876.4 6,227.1	14,846 35,684 20,430
Square Rock (U. S. G. S.), 1924 (m.) [1]	33 57 45.14 112 30 50.98	5 15 34 93 23 45	185 14 07 272 56 17	Whitetank Initial Monument	4.643866 4.879551	44,041.9 75,779.4	144,494 248,620
Morristown magnetic station, 1924 (n. d.) [1]	33 51 12.94 112 37 20.57	221 47 20 234 36 02	41 50 45 54 37 28	Castle Orion	4.151573 3.684861	14,176.6 4,840.2	46,511 15,880
Morristown, railroad station, southeast corner, 1924 (n. d.).[1]	33 51 06.85 112 37 18.93	221 09 41 232 31 58	41 13 05 52 33 23	Castle Orion	4.155015 3.691775	14,289.4 4,917.8	46,881 16,134
Nada, schoolhouse, 1924 (n. d.) [1]	33 46 53.00 112 31 28.94	154 47 14 272 39 03	334 45 23 92 44 22	Orion Prince	4.077436 4.168705	11,951.9 14,747.0	39,212 48,382
Syenite (U. S. G. S.), 1924 (m.)	33 50 57.521 112 23 18.015	148 25 16.9 174 51 07.3 345 40 59.1	328 23 23.7 354 50 53.6 165 41 44.5	Morgan Mill Prince	3.998306 3.846557 3.928943	9,961.1 7,023.6 8,490.7	32,681 23,043 27,857
Estrella Mountains, highest summit, 1924 (n. d.)	33 16 24.200 112 16 48.137	141 40 40.1 212 51 51.6 220 43 52.7	321 31 29.7 33 08 21.0 41 11 07.7	Whitetank Buford Mazatzal	4.618768 4.927667 5.064103	41,568.8 84,657.8 115,905.2	136,380 277,748 380,266

[1] No check on this position.

MARICOPA-YAVAPAI COUNTY-LINE ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Pyramid Peak (U. S. G. S.), 1924 (n. d.) [1]	33 44 49.26	144 07 46	324 03 36	Cholla	4.294178	19,686.9	64,589
	112 10 49.13	155 30 40	335 28 24	Black	4.178381	15,079.3	49,473
Rock Pinnacle (U. S. G. S.), 1924 (n. d.) [1]	33 43 39.04	154 04 36	334 00 47	Mesa	4.383868	24,202.9	79,406
	111 51 50.00	199 51 35	19 54 16	Buford	4.341238	21,940.1	71,982
Weaver's Needle, 1924 (n. d.) [1]	33 25 58.42	134 08 46	313 48 31	Mesa	4.894306	78,398.2	257,211
	111 22 11.80	144 23 42	324 09 57	Buford	4.817303	65,660.3	215,420
Davenport Peak, 1924 (n. d.) [1]	34 00 16.36	284 56 26	104 57 05	Ridge	3.271072	1,866.7	6,124
	111 36 32.06	57 59 25	237 53 34	Buford	4.279196	19,019.4	62,399
Saddle Mountain, 1924 (n. d.) [1]	33 57 25.44	78 47 39	258 38 53	Buford	4.392535	24,690.8	81,006
	111 31 17.05	205 32 00	25 34 02	Mazatzal	4.113009	12,972.1	42,559

YUMA TO STEWART DAM ARC

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points	° ′ ″	° ′ ″	° ′ ″				
Tartron, 1934 (d. m.)	32 53 03.549	347 17 27		Azimuth mark.			
	113 08 28.559						
Painted, 1934 (d. m.)	33 00 55.210	37 02 34.62	216 58 45.26	Tartron	4.2599741	18,195.92	59,697.8
	113 01 26.861	111 14 59		Azimuth mark.			
Monte, 1934 (d. m.)	33 08 13.745	312 00 25.94	132 05 41.08	Painted	4.3047025	20,169.84	66,173.9
	113 11 04.292	351 47 04.77	171 48 29.62	Tartron	4.4522355	28,329.28	92,943.6
Rock, 1934 (d. m.)	33 06 59.820	18 56 57.11	198 55 36.05	Painted	4.0746340	11,875.01	38,959.9
	112 58 58.291	96 57 17.56	276 50 40.80	Monte	4.2777720	18,957.10	62,195.1
		165 47 19		Airway beacon near station Rose.			
Saddle, 1934 (d. m.)	33 14 45.387	318 12 10.77	138 16 41.29	Rock	4.2839194	19,227.35	63,081.7
	113 07 12.586	340 39 45.64	160 42 54.60	Painted	4.4329616	27,099.52	88,909.0
		26 27 58.53	206 25 51.68	Monte	4.1295505	13,475.67	44,211.4
Webb, 1934 (d. m.)	33 13 24.948	37 53 52.23	217 50 37.39	Rock	4.1769539	15,029.82	49,310.3
	112 53 02.189	96 29 11.12	276 21 25.04	Saddle	4.3455010	22,156.49	72,691.8
		156 01 39		Azimuth mark.			

Rose, 1934 (d. m.)	33	20	12.385	321	54	53.08	141	58	21.45	Webb	4.2025150	15,940.98	52,299.7
	112	59	21.924	358	33	44.90	178	33	57.84	Rock	4.3878201	24,424.19	80,131.7
				50	26	14.90	230	21	56.55	Saddle	4.1987842	15,804.63	51,852.4
Powers Butte, 1934 (d. m.)	33	18	24.383	56	34	09.65	236	29	13.97	Webb	4.2233879	16,725.84	54,874.7
	112	44	03.124	98	02	24.59	277	53	59.86	Rose	4.3801516	23,996.70	78,729.2
				21	59	06				Azimuth mark.			
Wintersburg, 1934 (d. m.)	33	24	58.901	312	51	50.46	132	56	28.64	Powers Butte	4.2517347	17,853.97	58,575.9
	112	52	28.985	2	18	10.70	182	17	52.46	Webb	4.3303357	21,396.15	70,197.2
				50	26	33.19	230	22	46.02	Rose	4.1414801	13,850.97	45,442.7
				282	03	11				B. M. H 13, 1927.			
"C" (G. L. O.), 1934 (d. m.)	33	27	00.321	344	43	59.57	164	45	31.83	Powers Butte	4.2168341	16,475.33	54,052.8
	112	46	50.818	57	08	14.18	237	01	20.79	Rose	4.3640767	23,124.73	75,868.4
				66	50	40.38	246	47	34.06	Wintersburg	3.9778524	9,502.82	31,177.2
				359	23	55				Azimuth mark.			
Buckeye, 1934, r. 1936 (d. m.)	33	19	39.127	81	43	21.60	261	37	47.40	Powers Butte	4.2015610	15,906.00	52,184.9
	112	33	54.676	124	10	49.67	304	03	42.55	"C" (G. L. O.)	4.3843703	24,230.94	79,497.7
				64	37	38				Azimuth mark.			
White, 1934 (d. m.)	33	28	22.082	354	23	50.78	174	24	24.42	Buckeye	4.2092016	16,188.31	53,111.1
	112	34	55.782	37	34	28.43	217	29	27.21	Powers Butte	4.3658662	23,220.21	76,181.6
				82	17	12.40	262	10	38.15	"C" (G. L. O.)	4.2703523	18,635.98	61,141.5
Brown, 1934, r. 1936 (d. m.)	33	28	45.027	32	17	53.38	212	14	07.16	Buckeye	4.2986238	19,889.50	65,254.1
	112	27	03.770	86	42	59.56	266	38	39.20	White	4.0866307	12,207.61	40,051.1
				203	18	17				Azimuth mark (1936).			
Bradley, 1934, r. 1936 (d. m.)	33	22	23.426	70	27	45.20	250	22	42.62	Buckeye	4.1790986	15,104.23	49,554.5
	112	24	44.302	125	01	01.20	304	55	24.38	White	4.2850723	19,278.46	63,249.4
				162	58	17.57	342	57	00.74	Brown	4.0897674	12,296.10	40,341.5
Litchfield, 1935, r. 1936 (d. m.)	33	31	12.922	16	14	03.73	196	12	22.46	Bradley	4.2301679	16,989.00	55,738.1
	112	21	40.566	61	23	00.46	241	20	02.07	Brown	3.9779910	9,505.85	31,187.1
				329	51	02				Azimuth mark.			
Initial Monument, 1935 (d. m.)	33	22	37.716	87	29	40.05	267	26	08.42	Bradley	3.9979902	9,953.83	32,656.9
	112	18	19.608	129	55	31.03	309	50	42.27	Brown	4.2466690	17,646.92	57,896.6
				161	54	28.07	341	52	37.30	Litchfield	4.2227051	16,699.56	54,788.5
Glendale, 1935 (d. m.)	33	32	09.776	32	27	24.32	212	23	25.34	Initial Monument	4.3197087	20,878.95	68,500.4
	112	11	06.127	83	56	30.18	263	50	39.75	Litchfield	4.2165486	16,464.50	54,017.3
				95	47	28.21	275	35	06.85	Whitetank	4.5412643	34,774.78	114,090.3
				247	36	33.22	67	48	33.82	McDowell	4.5597580	36,287.58	119,053.5
				196	20	45				B. M. Q 23.			
Salt, 1935 (d. m.)	33	19	54.941	106	35	40.83	286	29	41.86	Initial Monument	4.2457606	17,610.05	57,775.6
	112	07	26.711	133	30	09.87	313	22	19.51	Litchfield	4.4825687	30,378.66	99,667.3
				165	57	39.29	345	55	38.40	Glendale	4.3680555	23,337.56	76,566.6

[1] No check on this position.

YUMA TO STEWART DAM ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
River, 1935 (d. m.)	33 21 22.401	73 57 57.80	253 54 38.87	Salt	3.9885056	9,738.80	31,951.4
	112 01 24.794	115 22 20.74	295 04 40.60	Whitetank	4.7391570	54,885.42	180,069.9
		143 04 14.46	322 58 54.06	Glendale	4.3973223	24,964.47	81,904.3
		208 50 33.63	28 57 11.61	McDowell	4.5854923	38,502.80	126,321.3
Court House, 1935, r. 1936 (d. m.)	33 26 51.622	334 41 53.73	154 43 35.81	River	4.0498968	11,217.52	36,802.8
	112 04 30.221	19 34 30.65	199 32 53.53	Salt	4.1342842	13,623.36	44,696.0
		133 49 58.93	313 46 20.47	Glendale	4.1510877	14,160.80	46,459.2
		83 58 43		Azimuth mark.			
Camels Back, 1935, r. 1936 (d. m.)	33 30 52.865	18 21 31.38	198 19 27.10	River	4.2675354	18,515.50	60,746.3
	111 57 39.239	55 01 19.96	234 57 33.24	Court House	4.1124298	12,954.77	42,502.4
		96 33 15.25	276 25 49.61	Glendale	4.3213089	20,956.02	68,753.2
		218 19 52.12	38 24 26.15	McDowell	4.3134014	20,577.91	67,512.7
		270 04 36		Azimuth mark.			
Mesa, 1935 (d. m.)	33 25 16.501	68 14 16.64	248 07 53.00	River	4.2879661	19,407.34	63,672.2
	111 49 47.667	130 26 04.50	310 21 44.44	Camels Back	4.2038346	15,989.49	52,458.9
		263 57 58		Azimuth mark.			
"D" (G. L. O.), 1935 (d. m.)	33 32 31.052	337 05 03.92	157 07 04.75	Mesa	4.1623574	14,533.07	47,680.6
	111 53 26.697	30 58 34.06	210 54 10.53	River	4.3805234	24,017.26	78,796.6
		65 07 07.56	245 04 48.06	Camels Back	3.8563945	7,184.47	23,571.0
		0 12 25		Azimuth mark.			
Val Vista, 1935 (d. m.)	33 28 28.834	51 02 43.37	231 00 07.08	Mesa	3.9740686	9,420.38	30,906.7
	111 45 04.118	119 56 59.26	299 52 21.81	"D" (G. L. O.)	4.1750730	14,964.87	49,097.2
		225 02 49		Azimuth mark.			
Verde, 1935, r. 1938 (d. m.)	33 34 29.057	346 49 51.24	166 50 46.78	Val Vista	4.0568025	11,397.31	37,392.7
	111 46 44.684	15 31 17.03	195 29 36.03	Mesa	4.2471500	17,666.48	57,960.8
		70 42 39.08	250 38 56.85	"D" (G. L. O.)	4.0409499	10,988.79	36,052.4
Usery (U. S. G. S.), 1935, r. 1938 (d. m.)	33 30 01.313	74 37 05.00	254 33 24.12	Val Vista	4.0302080	10,720.33	35,171.6
	111 38 23.795	122 35 15.20	302 30 38.47	Verde	4.1855906	15,331.71	50,300.8
Sawik, 1935 (d. m.)	33 32 11.914	158 28 48.55	338 28 12.84	Verde	3.6572426	4,541.95	14,901.4
	111 45 40.082	289 37 53.35	109 41 54.27	Usery (U. S. G. S.)	4.0776068	11,956.58	39,227.5
		352 18 18.85	172 18 38.70	Val Vista	3.8410557	6,935.15	22,753.1

Fort (B. M. 1812 U. S. G. S.), 1935 (d. m.)	33	39	55.145	341	36	21.01	161	38	31.37	Usery (U. S. G. S.)	4.2850680	19,278.27	63,248.8
	111	42	19.469	19	56	12.62	199	54	21.60	Sawik	4.1812707	15,179.96	49,802.9
				34	15	17.45	214	12	50.61	Verde	4.0846409	12,151.81	39,868.1
Stewart Mountain, 1935 (d. m.)	33	34	55.678	40	13	44.25	220	11	00.09	Usery (U. S. G. S.)	4.0746191	11,874.60	38,958.6
	111	33	26.683	123	56	08.36	303	51	13.34	Fort (B. M. 1812 U. S. G. S.)	4.2186504	16,544.38	54,279.4
Adams, 1935 (d. m.)	33	38	39.260	335	55	34.83	155	56	40.89	Stewart Mountain	3.8776018	7,544.00	24,750.6
	111	35	26.013	16	02	42.39	196	01	04.08	Usery (U. S. G. S.)	4.2201857	16,602.97	54,471.6
				102	24	34.63	282	20	45.50	Fort (B. M. 1812 U. S. G. S.)	4.0376969	10,906.79	35,783.4
				322	19	32				Azimuth mark.			
Supplementary points													
Saddle, water tank, 1934 (n. d.)[1]	33	09	28.70	76	47	17	256	43	50	Monte	4.003550	10,082.1	33,078
	113	04	45.61	158	41	45	338	40	25	Saddle	4.020045	10,472.4	34,358
Mid, 1934 (d. m.)	32	54	32.471	80	15	54.3	260	10	22.3	Tartron	4.207486	16,124.5	52,902
	112	58	17.166	157	20	13.9	337	18	30.7	Painted	4.106476	12,778.4	41,924
Crossing, 1934 (d. m.)	32	55	04.406	134	08	10.8	314	04	17.1	Painted	4.191110	15,527.8	50,944
	112	54	17.504	161	43	24.4	341	40	51.4	Rock	4.365725	23,212.7	76,157
				83	00	56				Azimuth mark.			
"B" (G. L. O.), 1934 (d. m.)	33	20	54.006	19	10	19.3	199	08	37.3	Webb	4.165699	14,645.3	48,049
	112	49	56.448	85	01	54.6	264	56	43.8	Rose	4.166690	14,678.8	48,159
				90	53	10				Azimuth mark.			
Gillespie, 1934 (d. m.)	33	13	42.759	87	01	13.1	266	57	32.3	Webb	4.019040	10,448.2	34,279
	112	46	19.239	155	22	03.4	335	18	40.2	Wintersburg	4.360227	22,920.7	75,199
				260	15	49				Azimuth mark.			
Hassayampa Airport, air beacon, 1934 (n. d.)[1]	33	21	43.98	117	40	44	297	36	40	Wintersburg	4.112002	12,942.0	42,461
	112	45	05.40	232	02	47	52	08	23	White	4.300215	19,962.5	65,494
Arches, 1934 (d. m.)	33	22	12.113	55	45	24.5	235	41	45.7	Powers Butte	4.095457	12,458.2	40,873
	112	37	25.024	198	40	42.8	18	42	05.0	White	4.080355	12,032.5	39,477
				310	53	39.4	130	55	35.0	Buckeye	3.857151	7,197.0	23,612
				267	46	45				Azimuth mark.			
Lane, 1934 (d. m.)	33	22	32.906	58	03	40.5	238	00	38.1	Buckeye	4.004882	10,113.0	33,179
	112	28	22.854	136	41	26.1	316	37	49.7	White	4.169993	14,790.8	48,526
				272	56	34.3	92	58	34.6	Bradley	3.752587	5,657.0	18,560
				100	37	32				Azimuth mark.			
Cotton, 1935 (d. m.)	33	26	07.695	303	34	43.9	123	38	11.3	Initial Monument	4.067718	11,687.4	38,344
	112	24	36.302	1	42	51.7	181	42	47.3	Bradley	3.839626	6,912.4	22,678
				270	04	03				Azimuth mark.			
Cashion, 1935 (d. m.)	33	26	07.858	306	30	03.8	126	35	33.7	Salt	4.285405	19,293.2	63,298
	112	17	26.383	11	59	51.4	191	59	22.1	Initial Monument	3.820760	6,618.5	21,714
				88	13	22				Azimuth mark.			

[1] No check on this position.

YUMA TO STEWART DAM ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Power plant west of Phoenix, chimney, 1934 (n.d.)[1]	33 26 35.56 112 09 15.52	164 30 35 308 22 54	344 29 34 128 27 13	Glendale River	4.028786 4.191058	10,685.3 15,525.9	35,057 50,938
Phoenix, Westward Ho Hotel, flagpole, 1934 (n. d.)[1]	33 27 18.13 112 04 24.69	337 00 05 130 57 31	157 01 44 310 53 49	River Glendale	4.075702 4.137217	11,904.2 13,715.7	39,056 44,999
Phoenix, east radio tower, 1934 (n. d.)[1]	33 26 56.65 112 04 22.69	335 55 45 132 50 22	155 57 23 312 46 40	River Glendale	4.052194 4.152166	11,277.0 14,196.0	36,998 46,575
Phoenix, west radio tower, 1934 (n. d.)[1]	33 27 00.93 112 04 26.50	335 44 52 132 43 03	155 46 32 312 39 23	River Glendale	4.058331 4.147190	11,437.5 14,034.3	37,525 46,044
Phoenix, 1935 (d. m.)	33 25 19.409 112 04 46.721	227 01 24.9 324 25 46.6	47 05 20.6 144 27 37.7	Camels Back River	4.178379 3.953036	15,079.2 8,975.0	49,472 29,445
Whitem, 1935 (d. m.)	33 24 53.918 111 53 16.592	62 43 27.8 148 29 55.9 86 49 31	242 38 59.2 328 27 31.1	River Camels Back B. M. M 22.	4.152334 4.113029	14,201.5 12,972.7	46,593 42,561
Tempe Butte, airway beacon, 1935 (n. d.)	33 25 41.532 111 56 06.364	274 28 40.6 288 28 43.7 45 53 41.5	94 32 09.2 108 30 17.2 225 50 46.3	Mesa Whitem River	3.991841 3.665110 4.059395	9,813.9 4,625.0 11,465.6	32,198 15,174 37,617
Landing, 1935 (d. m.)	33 30 10.894 111 48 41.082	200 40 36.5 231 23 19.1 299 17 31.2 84 50 12	20 41 40.8 51 24 59.0 119 19 30.9	Verde Sawik Val Vista Azimuth mark.	3.929508 3.776452 3.807757	8,501.7 5,976.6 6,423.3	27,893 19,608 21,074
Granite Reef, 1935 (d. m.)	33 30 51.226 111 41 26.109	110 47 29.6 238 37 31.5 288 04 58.7 165 44 03	290 45 09.4 58 41 56.4 108 06 39.4	Sawik Stewart Mountain Usery (U. S. G. S.) No. 9 (U. S. B. of R.).	3.845677 4.160792 3.694646	7,009.3 14,480.8 4,950.5	22,996 47,509 16,242
Stewart Dam, 1935 (d. m.)	33 33 54.935 111 31 49.029	54 47 05.2 126 37 18.0 108 30 51	234 43 27.2 306 36 24.0	Usery (U. S. G. S.) Stewart Mountain Azimuth mark.	4.095948 3.496612	12,472.3 3,137.7	40,920 10,294

Principal points	°	′	″	°	′	″	°	′	″				
Ajo, 1920, r. 1936 (d. m.)	32	19	24.841	237	10	59.88	57	19	06.69	Sauceda	4.4508470	28,238.85	92,647.0
	112	50	31.685	336	22	53.68	156	27	45.69	Sierra del Ajo	4.5553005	35,917.03	117,837.8
				192	27	37				Azimuth mark.			
Nine Mile Peak, 1920, r. 1936 (d. m.)	32	12	05.265	37	58	46.27	217	53	39.95	Sierra del Ajo	4.3904191	24,570.79	80,612.7
	112	31	47.103	114	47	09.33	294	37	09.03	Ajo	4.5105347	32,399.23	106,296.5
				168	55	49.70	348	53	54.25	Sauceda	4.4678147	29,363.97	96,338.3
				257	10	45				Azimuth mark.			
Grande, 1935, r. 1936 (d. m.)	32	17	18.678	49	52	38.75	229	48	45.56	Nine Mile Peak	4.1752336	14,970.41	49,115.4
	112	24	30.032	138	21	19.47	318	15	29.85	Sauceda	4.4092906	25,662.01	84,192.8
				81	09	39				Azimuth mark.			
Redondo, 1920, r. 1936 (d. m.)	32	17	50.952	3	53	04.81	183	52	50.08	Nine Mile Peak	4.0282611	10,672.38	35,014.3
	112	31	19.497	160	42	43.16	340	40	32.77	Sauceda	4.2844474	19,250.74	63,158.5
				275	16	15.10	95	19	53.85	Grande	4.0317968	10,759.62	35,300.5
				138	11	05				Azimuth mark.			
Llano, 1935, r. 1936 (d. m.)	32	06	56.359	138	11	09.88	318	08	16.85	Nine Mile Peak	4.1062241	12,770.98	41,899.5
	112	26	22.009	188	41	25.70	8	42	25.37	Grande	4.2876148	19,391.65	63,620.8
				341	54	38				Azimuth mark.			
Blanco, 1935, r. 1936 (d. m.)	32	09	46.281	73	07	36.88	253	01	47.69	Llano	4.2548353	17,981.89	58,995.6
	112	15	25.616	99	31	31.94	279	22	49.19	Nine Mile Peak	4.4160679	26,065.61	85,516.9
				134	23	21.22	314	18	30.90	Grande	4.2996051	19,934.49	65,401.7
				186	26	00				Azimuth mark.			
Comeva, 1935, r. 1936 (d. m.)	32	00	02.407	152	23	58.82	332	21	43.84	Llano	4.1580597	14,389.96	47,211.1
	112	22	07.700	210	21	18.55	30	24	52.11	Blanco	4.3190546	20,847.53	68,397.3
				270	15	50.87	90	22	55.42	South Mountain	4.3228226	21,029.19	68,993.3
				298	20	07				Azimuth mark.			
Black Butte, 1935 (d. m.)	32	03	32.716	314	54	39.58	134	56	53.23	South Mountain	3.9703522	9,340.12	30,643.4
	112	12	58.559	65	50	03.67	245	45	12.42	Comeva	4.1986187	15,798.60	51,832.6
				106	38	15.91	286	31	09.10	Llano	4.3420931	21,983.31	72,123.6
				161	29	11.57	341	27	53.40	Blanco	4.0840420	12,135.06	39,813.1
Kopeka, 1935, r. 1936 (d. m.)	31	55	10.907	139	29	15.24	319	26	40.48	Comeva	4.0723727	11,813.34	38,757.6
	112	17	15.336	203	32	39.88	23	34	55.91	Black Butte	4.2269122	16,862.12	55,321.8
				236	24	47.00	56	29	16.31	South Mountain	4.2049677	16,031.26	52,595.9
				235	19	42				Azimuth mark.			
Plain, 1935, r. 1936 (d. m.)	31	52	55.068	103	35	56.21	283	30	07.09	Kopeka	4.2518045	17,856.84	58,585.3
	112	06	14.687	163	00	24.29	342	59	03.95	South Mountain	4.1348145	13,640.00	44,750.6
				105	31	50				Azimuth mark.			

[1] No check on this position.

AJO TO TUCSON TO PHOENIX TO WINKELMAN ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Lesna, 1935 (d. m.)	31 44 43.819	162 40 07.72	342 38 06.70	Kopeka	4.3060988	20,234.80	66,387.0
	112 13 25.892	216 49 21.59	36 53 08.90	Plain	4.2766728	18,909.18	62,037.9
Alvarez, 1935 (d. m.)	31 45 08.301	88 03 02.21	267 55 52.47	Lesna	4.3326098	21,508.49	70,565.8
	111 59 49.201	144 50 09.48	324 46 46.24	Plain	4.2453100	17,591.79	57,715.7
Indian Oasis, 1920, r. 1936 (d. m.)	31 52 40.323	22 34 04.50	202 32 08.62	Alvarez	4.1782574	15,075.00	49,458.6
	111 56 09.380	91 40 46.36	271 35 26.67	Plain	4.2018244	15,915.65	52,216.6
		124 13 11.72	304 06 31.17	South Mountain	4.3808617	24,035.97	78,858.0
		231 44 35		Azimuth mark.			
Boundary monument No. 150 eccentric, 1935, r. 1936 (d. m.).	31 39 00.651	126 53 15.18	306 48 33.78	Lesna	4.2461142	17,624.39	57,822.7
	112 04 30.339	213 09 23.02	33 11 50.76	Alvarez	4.1312595	13,528.81	44,385.8
Rocky Point, 1920, r. 1936 (d. m.)	31 43 00.666	45 40 23.93	225 37 53.12	Boundary monument No. 150 eccentric	4.0242969	10,575.40	34,696.1
	111 59 43.207	98 24 20.59	278 17 07.91	Lesna	4.3402248	21,888.94	71,814.0
		177 42 06.92	357 42 03.77	Alvarez	3.5948632	3,934.26	12,907.7
		4 19 26		Azimuth mark.			
Union, 1935 (d. m.)	31 35 42.943	107 59 06.79	287 52 52.47	Boundary monument No. 150 eccentric	4.2961401	19,776.07	64,882.0
	111 52 36.437	146 49 12.19	326 45 24.96	Alvarez	4.3183183	20,812.22	68,281.4
		228 22 04		Azimuth mark (cairn).			
Comely, 1935, r. 1936 (d. m.)	31 43 34.395	20 13 37.36	200 11 50.85	Union	4.1895804	15,473.21	50,765.0
	111 49 13.514	70 49 10.07	250 41 08.46	Boundary monument No. 150 eccentric	4.4078342	25,576.09	83,910.9
		99 51 11.06	279 45 36.66	Alvarez	4.2299655	16,981.09	55,712.1
		230 52 50		Azimuth mark.			
Boundary monument No. 144 (I. B. C.) (U. S.-Mex.), 1935, r. 1936 (d. m.).	31 33 06.223	113 45 31.93	293 41 53.89	Union	4.0789961	11,994.88	39,353.2
	111 45 40.013	163 48 05.94	343 46 13.94	Comely	4.3042436	20,148.54	66,104.0
		112 40 22		Azimuth mark.			
Choulic, 1935, r. 1936 (d. m.)	31 40 46.438	37 19 57.75	217 16 22.97	Boundary monument No. 144 (I. B. C.)	4.2508886	17,819.22	58,461.9
	111 38 50.303	66 49 22.09	246 42 08.74	Union	4.3745965	23,691.72	77,728.6
		107 32 27.92	287 27 00.41	Comely	4.2357042	17,206.96	56,453.2
		221 45 54		Azimuth mark.			
Presumido, 1935 (d. m.)	31 33 59.868	82 58 59.42	262 54 34.43	Boundary monument No. 144 (I. B. C.)	4.1288701	13,454.58	44,142.2
	111 37 13.718	168 30 58.15	348 30 07.51	Choulic	4.1064661	12,778.09	41,922.8

Pozora, 1935, r. 1936 (d. m.)	31	31	27.717	101	16	22.96	281	11	20.00	Boundary monument No. 144 (I. B. C.)	4.1924827	15,576.96	51,105.4
	111	36	00.824	157	41	46.52	337	41	08.38	Presumido	3.7045941	5,065.17	16,618.0
				165	27	28.73	345	25	59.92	Choulic	4.2498960	17,778.54	58,328.4
Altar, 1935 (d. m.)	31	39	28.716	31	38	42.99	211	35	41.76	Pozora	4.2404727	17,396.93	57,076.4
	111	30	14.868	47	29	51.46	227	26	11.91	Presumido	4.1755770	14,982.25	49,154.3
				100	02	09.79	279	57	39.18	Choulic	4.1394791	13,787.30	45,233.8
				284	32	00				Azimuth mark.			
Puertecito (U. S. A.), 1935 (d. m.)	31	37	00.125	45	22	40.64	225	19	14.89	Pozora	4.1633846	14,567.49	47,793.5
	111	29	27.829	164	50	54.01	344	50	29.34	Altar	3.6759038	4,741.37	15,555.6
				352	03	16				Azimuth mark.			
Cumero, 1935, r. 1936 (d. m.)	31	28	50.380	107	12	04.21	287	06	53.44	Pozora	4.2155267	16,425.81	53,890.3
	111	26	06.086	160	34	57.09	340	33	11.53	Puertecito (U. S. A.)	4.2039741	15,994.63	52,475.7
				161	33	51.27	341	31	41.03	Altar	4.3165097	20,725.72	67,997.6
Las Gijas, 1935, r. 1936 (d. m.)	31	37	35.051	22	07	43.65	202	05	33.39	Cumero	4.2415936	17,441.89	57,223.9
	111	21	57.174	84	51	28.70	264	47	32.41	Puertecito (U. S. A.)	4.0764960	11,926.03	39,127.3
				104	58	57.31	284	54	36.21	Altar	4.1326921	13,573.51	44,532.4
				332	21	38				Azimuth mark.			
Fraguita (U. S. A.), 1935 (d. m.)	31	30	24.264	73	33	37.20	253	30	23.56	Cumero	4.0086351	10,200.82	33,467.2
	111	19	55.425	166	24	18.89	346	23	15.16	Las Gijas	4.1351536	13,650.66	44,785.5
Jalisco, 1935, r. 1936 (d. m.)	31	34	48.230	36	35	36.64	216	33	36.99	Fraguita (U. S. A.)	4.0053321	10,123.53	33,213.6
	111	16	06.725	119	06	23.78	299	03	20.13	Las Gijas	4.0241091	10,570.83	34,681.1
				84	01	01				Azimuth mark.			
Montana (U. S. A.), 1935, r. 1936 (d. m.)	31	26	37.890	101	43	13.51	281	36	42.80	Cumero	4.3049087	20,179.42	66,205.3
	111	13	37.524	124	58	38.71	304	55	21.39	Fraguita (U. S. A.)	4.0853040	12,170.38	39,929.0
				146	57	44.89	326	53	23.56	Las Gijas	4.3529753	24,153.23	79,242.7
				165	23	57.60	345	22	39.62	Jalisco	4.1933044	15,606.46	51,202.2
				191	22	33				Azimuth mark.			
Tumac, 1935, r. 1936 (d. m.)	31	33	01.553	41	53	04.49	221	49	34.92	Montana (U. S. A.)	4.2004210	15,864.30	52,048.1
	111	06	56.419	102	47	46.37	282	42	58.30	Jalisco	4.1725971	14,879.80	48,818.1
				257	41	01				Azimuth mark.			
Tubac (U. S. A.), 1935 (d.m.)	31	39	00.833	356	22	06.97	176	22	20.92	Tumac	4.0448407	11,087.68	36,376.8
	111	07	23.044	60	37	50.94	240	33	16.42	Jalisco	4.1998810	15,844.59	51,983.5
Slope, 1935 (d. m.)	31	37	45.635	59	15	51.95	239	11	00.05	Tumac	4.2329767	17,099.24	56,099.8
	110	57	39.191	98	36	12.33	278	31	06.05	Tubac (U. S. A.)	4.1919625	15,558.31	51,044.2
Cayetano (U. S. G. S.), 1935, r. 1936 (d. m.)	31	32	01.171	97	17	18.83	277	12	28.85	Tumac	4.1684866	14,739.63	48,358.3
	110	57	42.105	130	12	11.35	310	07	07.01	Tubac (U. S. A.)	4.3019180	20,040.94	65,751.0
				180	24	53.04	0	24	54.56	Slope	4.0256905	10,609.39	34,807.6
				71	41	24				Azimuth mark.			

AJO TO TUCSON TO PHOENIX TO WINKELMAN ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Atacosa, 1935, r. 1936 (d. m.)	31 25 16.927	107 58 28.26	287 55 56.29	Montana (U. S. A.)	3.9079152	8,089.38	26,539.9
	111 08 46.127	191 25 54.13	11 26 51.43	Tumac	4.1643455	14,599.75	47,899.3
		234 33 56.29	54 39 43.02	Cayetano (U. S. G. S.)	4.3324276	21,499.46	70,536.1
		179 25 53		Azimuth mark (cairn).			
Adobe, 1935 (d. m.)	31 26 40.076	81 21 33.06	261 16 02.08	Atacosa	4.2293061	16,955.32	55,627.6
	110 58 11.461	184 28 40.29	4 28 55.62	Cayetano (U. S. G. S.)	3.9964907	9,919.52	32,544.3
		309 11 16		Azimuth mark.			
Benedict (U. S. G. S.), 1910, r. 1935 (d. m.)	31 23 46.389	97 31 00.45	277 24 00.25	Atacosa	4.3320549	21,481.02	70,475.6
	110 55 19.815	139 43 48.57	319 42 19.09	Adobe	3.8458392	7,011.96	23,005.1
		145 56 02.62	325 49 44.48	Tubac (U. S. A.)	4.5317196	34,018.85	11,610.2
		166 09 44.49	346 08 30.22	Cayetano (U. S. G. S.)	4.1957499	15,694.59	51,491.3
		124 06 57		Azimuth mark.			
Boundary monument No. 128 eccentric (Sonora, Mex.), 1935 (d. m.).	31 20 00.478	146 28 16.03	326 26 08.70	Atacosa	4.0679505	11,693.66	38,364.9
	111 04 41.578	219 55 09.10	39 58 32.29	Adobe	4.2055549	16,052.95	52,667.1
		244 50 59.12	64 55 51.51	Benedict (U. S. G. S.)	4.2147296	16,395.69	53,791.5
Baldy 2, 1935 (d. m.)	31 41 45.154	12 03 14.72	192 00 54.23	Benedict (U. S. G. S.)	4.5311101	33,971.14	111,453.6
	110 50 51.286	22 38 21.96	202 34 31.51	Adobe	4.4799425	30,195.52	99,066.5
		31 04 45.82	211 01 10.47	Cayetano (U. S. G. S.)	4.3220970	20,994.09	68,878.1
		55 33 38.13	235 30 04.01	Slope	4.1150917	13,034.42	42,763.8
		79 06 30.31	258 57 49.56	Tubac (U. S. A.)	4.4250443	26,609.96	87,302.8
Yoas, 1935 (d. m.)	31 42 50.190	2 05 08.03	182 05 01.23	Slope	3.9724938	9,386.29	30,794.9
	110 57 26.229	65 50 42.43	245 45 28.98	Tubac (U. S. A.)	4.2363783	17,233.69	56,540.9
		16 58 06		Azimuth mark.			
Sopori, 1935 (d. m.)	31 43 48.694	276 51 04.11	96 56 01.81	Yoas	4.1765258	15,015.02	49,261.8
	111 06 52.424	307 27 39.92	127 32 30.46	Slope	4.2640570	18,367.79	60,261.7
		5 11 57.85	185 11 41.76	Tubac (U. S. A.)	3.9495149	8,902.56	29,207.8
		83 37 54		Azimuth mark.			
Esperanza, 1935 (d. m.)	31 49 33.932	317 33 36.05	137 37 23.31	Yoas	4.2263849	16,841.66	55,254.7
	111 04 37.871	18 25 29.69	198 24 18.83	Sopori	4.0494944	11,207.13	36,768.7
		301 39 06		Azimuth mark, railroad water tank.			

Reserve, 1935 (d. m.)	31	49	09.076	17	38	41.98	197	37	27.76	Yoos	4.0879591	12,245.01	40,173.8
	110	55	05.261	62	06	51.24	242	00	38.86	Sopori	4.3234977	21,061.91	69,100.6
				92	57	07.89	272	52	05.96	Esperanza	4.1783598	15,078.56	49,470.2
				120	53	42				Azimuth mark.			
Rita, 1935 (d .m.)	31	55	03.885	2	25	27.18	182	25	17.89	Reserve	4.0389367	10,937.97	35,885.7
	110	54	47.670	56	48	54.67	236	43	43.03	Esperanza	4.2682460	18,545.82	60,845.7
				320	05	59				Azimuth mark.			
Helmet Peak 2, 1935 (d. m.)	31	58	00.329	288	55	36.37	109	00	54.82	Rita	4.2231641	16,717.22	54,846.4
	111	04	49.579	358	52	08.97	178	52	15.16	Esperanza	4.1931318	15,600.26	51,181.9
				162	23	11				Azimuth mark.			
Twin Buttes (U. S. G. S.), 1935 (d. m.)	31	54	42.021	18	02	33.95	198	01	31.90	Esperanza	3.9991078	9,979.48	32,741.0
	111	02	40.337	150	56	44.13	330	55	35.76	Helmet Peak 2	3.8443497	6,987.95	22,926.3
				266	51	40.78	86	55	50.66	Rita	4.0947022	12,436.62	40,802.5
				310	34	15.88	130	38	16.13	Reserve	4.1974562	15,756.37	51,694.0
				138	32	28				Azimuth mark.			
Flato, 1935 (d. m.)	32	02	48.884	359	35	35.37	179	35	37.43	Rita	4.1560253	14,322.71	46,990.4
	110	54	51.541	60	31	28.04	240	26	11.07	Helmet Peak 2	4.2561908	18,038.10	59,180.0
				114	11	16				Azimuth mark.			
Beach, 1935, r. 1936 (d. m.)	31	54	43.204	92	19	45.74	272	14	24.48	Rita	4.2035301	15,978.28	52,422.1
	110	44	39.987	133	01	11.34	312	55	47.44	Flato	4.3413335	21,944.89	71,997.5
Vail, 1935, r. 1936 (d. m.)	32	02	51.065	357	43	29.51	177	43	41.54	Beach	4.1772003	15,038.35	49,338.3
	110	45	02.709	46	54	23.40	226	49	13.56	Rita	4.3231557	21,045.33	69,046.2
				89	47	39.33	269	42	26.87	Flato	4.1888797	15,448.26	50,683.2
				297	11	43				Azimuth mark.			
Black Hills 2, 1935 (d. m.)	32	05	11.590	287	51	28.39	107	56	03.90	Flato	4.1554585	14,304.03	46,929.1
	111	03	30.494	8	53	07.91	188	52	25.97	Helmet Peak 2	4.1285420	13,444.42	44,108.9
				211	39	57				Azimuth mark.			
Lava Knoll, 1935 (d. m.)	32	01	50.346	40	35	43.97	220	33	41.48	Helmet Peak 2	3.9697864	9,327.95	30,603.4
	111	00	58.419	147	14	49.07	327	13	28.35	Black Hills 2	3.8675440	7,371.30	24,184.0
				259	21	50.05	79	25	04.67	Flato	3.9909331	9,793.39	32,130.5
Samaniego (U. S. G. S.), 1920, r. 1936 (d. m.)	31	54	41.051	99	01	54.27	278	49	14.49	Kitts	4.5819166	38,187.10	125,285.5
	111	11	58.746	214	26	57.13	34	31	26.45	Black Hills 2	4.3722112	23,561.95	77,302.8
				241	24	00.78	61	27	47.81	Helmet Peak 2	4.1084030	12,835.21	42,110.2
				309	11	26.39	129	15	19.16	Esperanza	4.1749106	14,959.28	49,078.9
				208	28	32				Azimuth mark.			
Roskruge, 1920, r. 1936 (d. m.)	32	10	15.254	287	02	33.36	107	12	49.15	Black Hills 2	4.5018655	31,758.91	104,195.7
	111	22	48.378	329	18	43.37	149	24	28.02	Samaniego (U. S. G. S.)	4.5243138	33,443.66	109,723.1
				42	08	20.81	222	01	23.18	Kitts	4.4883521	30,785.91	101,003.4
				156	46	53.13	336	42	53.06	Silver Bell	4.4739060	29,778.72	97,699.0
				358	41	43				Azimuth mark.			

AJO TO TUCSON TO PHOENIX TO WINKELMAN ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Wasson, 1920, r. 1935 (d. m.)	32 16 23.431	338 07 46.55	158 10 35.22	Black Hills 2	4.3482093	22,295.09	73,146.5
	111 08 47.193	62 49 13.14	242 41 44.62	Roskruge	4.3940061	24,774.57	81,281.2
		115 29 23.32	295 17 52.86	Silver Bell	4.5723523	37,355.31	122,556.5
		57 49 51		Azimuth mark.			
Warner (Ariz. Geod. S.) 1935 (d. m.)	32 12 36.689	24 43 07.19	204 40 59.15	Black Hills 2	4.1787045	15,090.53	49,509.5
	110 59 29.863	115 37 13.21	295 32 15.88	Wasson	4.2088726	16,176.06	53,071.0
		172 54 06		Azimuth mark.			
Graze, 1935, r. 1936 (d. m.)	32 05 58.731	0 04 20.03	180 04 19.87	Flato	3.7669723	5,847.53	19,184.8
	110 54 51.260	83 57 03.93	263 52 28.06	Black Hills 2	4.1364858	13,692.60	44,923.1
		149 14 34.59	329 12 06.31	Warner (Ariz. Geod. S.)	4.1543379	14,267.17	46,808.2
		335 13 30		Azimuth mark.			
St. Johns, 1935, r. 1936 (d. m.)	33 14 35.495	145 28 45.34	325 25 08.17	Initial Monument	4.2561730	18,037.36	59,177.6
	112 11 44.160	214 04 28.18	34 06 49.47	Salt	4.0749580	11,883.87	38,989.0
		252 01 03		Azimuth mark.			
Cruz, 1935 (d. m.)	33 17 38.912	142 43 45.15	322 41 16.19	Initial Monument	4.0633693	11,570.96	37,962.4
	112 13 48.524	246 58 45.08	67 02 14.78	Salt	4.0305567	10,728.94	35,199.9
		330 19 25.90	150 20 34.13	St. Johns	3.8131112	6,502.96	21,335.1
		272 07 50		Azimuth mark.			
Pima Butte, 1935 (d. m.)	33 08 49.895	122 51 44.43	302 45 55.42	St. Johns	4.2932926	19,646.84	64,458.0
	112 01 06.696	154 22 43.11	334 19 14.80	Salt	4.3565586	22,727.86	74,566.3
		304 56 56		Azimuth mark.			
Telegraph Pass (U. S. G. S.), 1935 (d. m.)	33 20 00.852	348 45 21.66	168 46 48.57	Pima Butte	4.3237441	21,073.86	69,139.8
	112 03 45.248	51 04 05.66	230 59 42.81	St. Johns	4.2024390	15,938.19	52,290.5
		88 11 44.21	268 09 42.51	Salt	3.7581816	5,730.36	18,800.4
Goodyear, 1935 (d. m.)	33 15 56.113	40 53 49.68	220 49 49.48	Pima Butte	4.2396046	17,362.19	56,962.5
	111 53 48.094	116 03 33.38	295 58 05.54	Telegraph Pass (U. S. G. S.)	4.2353021	17,191.04	56,400.9
Jackson, 1935, r. 1936 (d. m.)	33 15 43.085	354 27 18.00	174 27 44.11	Pima Butte	4.1068325	12,788.88	41,958.2
	112 01 54.378	160 08 52.62	340 07 51.75	Telegraph Pass (U. S. G. S.)	3.9265124	8,443.30	27,701.1
		268 08 11.42	88 12 38.14	Goodyear	4.1001131	12,592.53	41,314.0
		343 47 21		Azimuth mark.			

Sacaton Butte, 1935 (d. m.)	33	04	17.560	126	06	47.17	306	02	44.60	Pima Butte	4.1536974	14,246.15	46,739.2
	111	53	42.625	179	37	23.23	359	37	20.24	Goodyear	4.3328539	21,520.58	70,605.4
				202	32	02				Azimuth mark.			
Gila Butte, 1935, r. 1936 (d. m.)	33	09	20.520	18	43	45.84	198	42	39.20	Sacaton Butte	3.9936319	9,854.44	32,330.8
	111	51	40.636	86	21	47.23	266	16	37.68	Pima Butte	4.1673161	14,699.96	48,228.1
				164	51	16.13	344	50	06.32	Goodyear	4.1012698	12,626.12	41,424.2
				242	50	47				Azimuth mark.			
Santan, 1935, r. 1938 (d. m.)	33	10	24,861	57	02	29.14	236	56	22.01	Sacaton Butte	4.3174427	20,770.30	68,143.9
	111	42	30.751	82	07	19.42	262	02	18.61	Gila Butte	4.1579259	14,385.53	47,196.5
				120	14	33.42	300	08	22.34	Goodyear	4.3073384	20,292.63	66,576.7
				130	27	32				Azimuth mark.			
Signal Peak (U. S. G. S), 1935, r. 1936 (d. m.)	32	57	40.780	119	00	30.20	298	52	46.21	Sacaton Butte	4.4023803	25,256.91	82,863.7
	111	39	31.067	168	48	46.65	348	47	08.61	Santan	4.3801293	23,995.47	78,725.1
				50	24	50				Azimuth mark.			
Sweet, 1935 (d. m.)	33	01	41.365	113	52	23.44	293	48	34.57	Sacaton Butte	4.0757008	11,904.22	39,055.8
	111	46	42.955	202	03	14.67	22	05	32.40	Santan	4.2406120	17,402.51	57,094.7
				303	25	55.88	123	29	51.07	Signal Peak (U. S. G. S.)	4.1284156	13,440.50	44,096.0
Mineral Butte, 1935, r. 1938 (d. m.)	33	07	06.955	21	33	44.24	201	31	19.57	Signal Peak (U. S. G. S.)	4.2730349	18,751.45	61,520.4
	111	35	05.719	61	02	22.93	240	56	02.44	Sweet	4.3155572	20,680.32	67,848.7
				117	53	41.13	297	49	37.80	Santan	4.1154814	13,046.12	42,802.11
				152	52	45				Azimuth mark.			
Randolph, 1935, r. 1936 (d. m.)	32	53	21.908	120	34	01.05	300	29	18.14	Signal Peak (U. S. G. S.)	4.1958878	15,699.57	51,507.7
	111	30	50.570	165	24	47.64	345	22	28.66	Mineral Butte	4.4193792	26,265.11	86,171.4
				174	28	28				Azimuth mark.			
Posten, 1935, r. 1936 (d. m.)	33	03	18.486	28	19	03.74	208	15	36.45	Randolph	4.3195350	20,870.60	68,473.0
	111	24	29.679	66	05	48.49	245	57	37.46	Signal Peak (U. S. G. S.)	4.4083462	25,606.26	84,009.9
				113	09	19.38	293	03	32.16	Mineral Butte	4.2536792	17,934.08	58,838.7
				271	37	25				Azimuth mark.			
Casa Grande, 1935, r. 1936 (d. m.)	32	49	11.381	197	47	36.98	17	49	22.29	Signal Peak (U. S. G. S.)	4.2170075	16,481.91	54,074.4
	111	42	45.001	247	23	10.90	67	29	38.48	Randolph	4.3035445	20,116.13	65,997.7
				194	51	40				Azimuth mark.			
Peak, 1935 (d. m.)	32	47	15.371	100	47	40.70	280	41	08.38	Casa Grande	4.2827713	19,176.59	62,915.2
	111	30	40.837	144	27	26.64	324	22	28.83	Signal Peak (U. S. G. S.)	4.3745489	23,689.12	77,720.1
				178	42	59.43	358	42	54.15	Randolph	4.0528483	11,294.01	37,053.8
				47	34	42				Azimuth mark.			
Eloy, 1935 (d. m.)	32	40	07.717	137	06	56.87	317	01	33.21	Casa Grande	4.3593173	22,872.69	75,041.5
	111	32	46.622	193	57	09.88	13	58	17.88	Peak	4.1327809	13,574.72	44,536.4
				90	58	06				Azimuth mark.			
Newman, 1935 (d. m.)	32	43	06.753	68	09	14.31	248	04	29.63	Eloy	4.1701297	14,795.50	48,541.6
	111	23	59.572	111	03	51.88	290	53	42.74	Casa Grande	4.4965346	31,371.45	102,924.5
				126	16	41.90	306	13	04.81	Peak	4.1123518	12,952.45	42,494.8

AJO TO TUCSON TO PHOENIX TO WINKELMAN ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Sasco, 1935 (d. m.)	32 31 24.154	144 48 35.36	324 44 40.14	Eloy	4.2953970	19,742.27	64,771.1
	111 25 29.980	186 12 30.10	6 13 18.84	Newman	4.3378745	21,770.80	71,426.4
Picacho, 1935 (d. m.)	32 38 00.154	109 58 44.93	289 55 00.80	Eloy	4.0613652	11,517.68	37,787.6
	111 25 51.195	197 06 24.24	17 07 24.50	Newman	3.9948525	9,882.18	32,421.8
		357 24 04.07	177 24 15.49	Sasco	4.0867456	12,210.84	40,061.7
Red Rock, 1935 (d. m.)	32 35 39.935	64 59 14.84	244 53 27.25	Sasco	4.2695357	18,600.97	61,026.7
	111 14 44.099	103 59 47.67	283 53 48.13	Picacho	4.2533620	17,920.99	58,795.8
		133 35 52.21	313 30 52.48	Newman	4.3004785	19,974.62	65,533.4
G. L. O. Station E, 1935 (d. m.)	32 27 03.827	127 07 30.87	307 03 52.71	Sasco	4.1236989	13,295.32	43,619.7
	111 18 43.803	201 27 43.41	21 29 52.28	Red Rock	4.2326026	17,084.51	56,051.4
Tortollita, 1935, r. 1936 (d. m.)	32 29 43.522	3 01 21.68	183 00 55.04	Wasson	4.3923327	24,679.29	80,968.6
	111 07 57.466	73 47 56.78	253 42 09.76	G. L. O. Station E	4.2450190	17,580.00	57,677.0
		136 00 32.69	315 56 53.94	Red Rock	4.1837762	15,267.79	50,091.1
		50 21 26		Azimuth mark.			
Center, 1935 (d. m.)	32 22 57.650	139 47 09.20	319 42 37.83	Sasco	4.3105318	20,442.40	67,068.1
	111 17 04.260	161 04 30.81	341 03 37.45	G. L. O. Station E	3.9039932	8,016.66	26,301.3
		188 50 51.05	8 52 06.34	Red Rock	4.3759257	23,764.34	77,966.8
		228 45 52.98	48 50 46.28	Tortollita	4.2783496	18,982.33	62,277.9
		313 00 33.17	133 04 58.98	Wasson	4.2501652	17,789.56	58,364.6
		230 27 12		Azimuth mark.			
Rillito, 1935, r. 1936 (d. m.)	32 23 58.664	81 50 13.93	261 45 46.62	Center	4.1198199	13,177.10	43,231.9
	111 08 45.251	186 41 52.63	6 42 18.27	Tortollita	4.0292121	10,695.77	35,091.0
		0 12 27.37	180 12 26.33	Wasson	4.1468236	14,022.44	46,005.3
		222 27 50		Azimuth mark.			
Pusch (U. S. G. S.), 1935, r. 1936 (d. m.)	32 22 18.960	15 37 09.69	195 35 27.41	Warner (Ariz. Geod. S.)	4.2700197	18,621.72	61,094.8
	110 56 18.413	60 50 37.72	240 43 57.36	Wasson	4.3510055	22,439.10	73,618.9
		98 59 47.11	278 53 07.10	Rillito	4.2958106	19,761.08	64,832.8
		126 54 58.25	306 48 43.34	Tortollita	4.3584328	22,826.16	74,888.8
		34 50 10		Azimuth mark.			
Sahuaro, 1935, r. 1936 (d. m.)	32 16 50.454	17 06 59.36	197 04 53.77	Graze	4.3222733	21,002.61	68,906.1
	110 50 55.511	59 54 09.79	239 49 35.35	Warner (Ariz. Geod. S.)	4.1922680	15,569.26	51,080.1
		140 10 27.19	320 07 34.52	Pusch (U. S. G. S.)	4.1199226	13,180.22	43,242.1
		38 54 42		Azimuth mark.			

Stack (G. L. O.), 1935, r. 1936 (d. m.)	32	55	19.888	77	05	28.33	256	59	58.05	Randolph	4.2098388	16,212.08	53,189.1
	111	20	42.603	158	13	18.86	338	11	15.22	Posten	4.2008134	15,878.64	52,095.2
				179	58	19				Azimuth mark.			
Hole, 1935 (d. m.)	32	55	51.991	56	48	39.45	236	46	11.79	Randolph	3.9264132	8,441.38	27,694.8
	111	26	18.783	191	37	41.46	11	38	40.87	Posten	4.1474685	14,043.28	46,073.7
				276	26	03.57	96	29	06.31	Stack (G. L. O.)	3.9439980	8,790.18	28,839.1
				192	54	07				Azimuth mark.			
Picture, 1935 (d. m.)	33	00	26.538	28	11	23.72	208	09	37.71	Stack (G. L. O.)	4.0300466	10,716.34	35,158.5
	111	17	27.766	115	50	58.13	295	47	08.15	Posten	4.0850385	12,162.94	39,904.6
North Butte, 1935, r. 1936 (d. m.)	33	06	22.352	34	29	46.89	214	24	52.96	Stack (G. L. O.)	4.3935709	24,749.75	81,199.8
	111	11	43.122	39	13	49.58	219	10	41.59	Picture	4.1506168	14,145.45	46,408.9
				74	09	21.41	254	02	23.01	Posten	4.3153963	20,672.66	67,823.6
				176	31	03				Azimuth mark.			
Loma, 1935, r. 1936, (d. m.)	32	56	13.079	84	40	46.22	264	34	41.57	Stack (G. L. O.)	4.2431571	17,504.80	57,430.4
	111	09	31.792	122	19	00.94	302	14	41.90	Picture	4.1649388	14,619.71	47,964.8
				169	43	02.15	349	41	50.58	North Butte	4.2804922	19,076.21	62,585.9
				110	05	46				Azimuth mark.			
Donelley, 1935, r. 1936 (d. m.)	33	01	38.426	49	20	01.10	229	15	56.80	Loma	4.1866622	15,369.59	50,425.1
	111	02	03.028	120	12	42.31	300	07	25.80	North Butte	4.2406781	17,405.16	57,103.4
				195	00	36				Azimuth mark.			
Ripsey Hill, 1935 (d. m.)	33	00	24.945	66	12	14.24	246	06	06.38	Loma	4.2830986	19,191.04	62,962.6
	110	58	15.858	111	01	11.65	290	59	07.87	Donelley	3.8004247	6,315.75	20,720.9
				117	47	35.83	297	40	15.49	North Butte	4.3740309	23,660.88	77,627.4
				12	30	14				Azimuth mark.			
Granite Mountain, 1935, r. 1936 (d. m.)	33	09	44.171	343	20	03.01	163	21	51.46	Ripsey Hill	4.2548294	17,981.64	58,994.8
	111	01	34.524	2	49	48.11	182	49	32.55	Donelley	4.1755775	14,982.27	49,154.3
				68	32	08.47	248	26	35.81	North Butte	4.2293256	16,956.09	55,630.1
				148	12	50				Azimuth mark.			
Manhattan, 1935, r. 1938 (d. m.)	33	08	03.400	33	49	29.50	213	46	10.63	Ripsey Hill	4.2303271	16,995.23	55,758.5
	110	52	11.401	102	03	05.84	281	57	57.92	Granite Mountain	4.1737864	14,920.60	48,952.0
Dudley, 1935 (d. m.)	32	58	17.492	114	04	39.53	294	01	35.04	Ripsey Hill	3.9837853	9,633.53	31,606.0
	110	52	37.025	146	39	04.80	326	34	11.53	Granite Mountain	4.4037310	25,335.59	83,121.8
				182	06	26.75	2	06	40.72	Manhattan	4.2567603	18,061.77	59,257.7
				248	03	46				Azimuth mark, Hayden, largest brick stack.			
Supplementary points													
Flite, 1935, r. 1936 (d. m.)	32	23	10.152	252	29	30.1	72	38	34.9	Sauceda	4.444437	27,825.1	91,290
	112	52	19.047	337	58	09.5	157	59	07.0	Ajo	3.874273	7,486.4	24,562
				220	44	00				Azimuth mark.			

250900°—41——3

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Tracy, 1935 (d. m.)	32 11 06.384	282 56 01.7	102 59 39.5	Blanco	4.041319	10,998.1	36,083
	112 22 14.708	40 05 58.6	220 03 47.0	Llano	4.002821	10,065.2	33,022
		96 56 22.7	276 51 17.8	Nine Mile Peak	4.179043	15,102.3	49,548
		100 32 36		Azimuth mark.			
Pisinemo, 1935 (d. m.)	32 02 14.948	50 15 44.6	230 14 05.4	Comeva	3.805104	6,384.2	20,945
	112 19 00.669	202 03 43.9	22 05 38.2	Blanco	4.176141	15,001.7	49,218
		255 49 17.2	75 52 29.4	Black Butte	3.991104	9,797.2	32,143
		248 13 42		Azimuth mark.			
Harle, 1935 (d. m.)	32 00 06.904	88 56 54.5	268 54 25.1	Comeva	3.869365	7,402.3	24,286
	112 17 25.740	227 51 36.6	47 53 58.4	Black Butte	3.975516	9,451.8	31,010
		358 16 58.3	178 17 03.8	Kopeka	3.960043	9,121.0	29,924
		328 19 34		Azimuth mark.			
Camino, 1935 (d. m.)	31 56 02.851	77 58 05.9	257 55 35.1	Kopeka	3.884337	7,661.9	25,137
	112 12 30.099	218 56 22.8	38 58 21.2	South Mountain	3.970160	9,336.0	30,630
Boundary monument No. 156 (I. B. C.) (U. S.-Mex.), 1935, r. 1936 (d. m.).	31 44 36.626	202 32 02.6	22 34 45.4	Kopeka	4.325396	21,154.2	69,403
	112 22 23.920	269 03 52.0	89 08 35.1	Lesna	4.151163	14,163.3	46,467
		285 27 32		Azimuth mark.			
Cowlic, 1935 (d. m.)	31 48 25.006	299 27 35.5	119 32 52.0	Comely	4.259469	18,174.8	59,628
	111 59 14.615	8 32 41.0	188 32 22.8	Alvarez	3.787207	6,126.4	20,100
		256 35 45		Azimuth mark.			
Boundary monument No. 153 (I. B. C.) (U. S.-Mex.), 1935 (m.).	31 41 31.734	251 29 51.9	71 36 31.3	Alvarez	4.323866	21,079.8	69,159
	112 12 28.736	262 12 22.8	82 19 05.1	Rocky Point	4.308426	20,343.5	66,744
		290 13 54.6	110 18 05.8	Boundary monument No. 150, eccentric.	4.128191	13,433.6	44,073
Boundary monument No. 147 (I. B. C.) (U. S.-Mex.), 1935 (d. m.).	31 36 41.380	109 58 57.4	289 55 02.3	Boundary monument No. 150, eccentric.	4.099390	12,571.6	41,245
	111 57 01.925	224 05 38.0	44 09 44.0	Comely	4.248511	17,721.9	58,143
		284 24 10.4	104 26 29.5	Union	3.858913	7,226.2	23,708
Vamori, 1935 (d. m.)	31 43 11.731	265 16 15.6	85 19 05.0	Comely	3.929894	8,509.3	27,918
	111 54 35.638	347 11 27.6	167 12 30.1	Union	4.151510	14,174.6	46,505
San Miguel, 1935 (d. m.)	31 38 16.812	60 57 59.4	240 55 09.7	Union	3.989336	9,757.4	32,012
	111 47 12.833	162 00 23.1	341 59 19.8	Comely	4.012198	10,284.9	33,743
		250 46 16.5	70 50 40.3	Choulic	4.146700	14,018.4	45,992
		338 30 23		Azimuth mark.			

Sasabe, 1935 (d. m.)	31	31	41.198	193	38	43.3	13	39	52.8	Altar	4.170785	14,817.8	48,615
	111	32	27.555	205	44	38.0	25	46	12.1	Puertecito (U. S. A.)	4.037671	10,906.1	35,781
				297	33	53.1	117	37	12.5	Cumero	4.055316	11,358.4	37,265
				2	13	00				Azimuth mark.			
Arivaca, 1935 (d. m.)	31	34	47.708	10	11	26.6	190	10	57.7	Fraguita (U. S. A.)	3.916120	8,243.7	27,046
	111	19	00.154	137	51	18.2	317	49	45.4	Las Gijas	3.842150	6,952.6	22,810
				269	47	09.9	89	48	40.7	Jalisco	3.660194	4,572.9	15,003
				168	59	19				Azimuth mark.			
Boundary monument No. 134, eccentric, 1935 (d. m.).	31	24	57.854	180	35	43.9	0	35	45.9	Fraguita (U. S. A.)	4.002313	10,053.4	32,984
	111	19	59.385	252	59	04.0	73	02	23.1	Montana (U. S. A.)	4.023045	10,545.0	34,596
Boundary monument No. 136 (I. B. C.) (U. S.-Mex.), 1935 (m.).	31	26	34.568	159	46	35.7	339	46	05.3	Cumero	3.649114	4,457.7	14,625
	111	25	07.707	229	20	30.4	49	23	13.4	Fraguita (U. S. A.)	4.035938	10,862.7	35,639
				290	04	11.9	110	06	52.7	Boundary monument No. 134, eccentric	3.938040	8,670.4	28,446
Nogales No. 7 (I. B. C.), 1893, r. 1935 (d. m.)	31	21	37.318	255	39	26.1	75	44	33.4	Benedict (U. S. G. S.)	4.206651	16,093.5	52,800
	111	05	09.989	345	51	52.1	165	52	06.9	Boundary monument No. 128, eccentric	3.487921	3,075.5	10,090
Boundary monument No. 129 (I. B. C.) (U. S.-Mex.), 1935 (m.).	31	21	05.135	171	16	50.9	351	16	27.5	Atacosa	3.894615	7,845.4	25,739
	111	08	01.099	257	37	32.8	77	39	01.8	Nogales No. 7 (I. B. C.)	3.665567	4,629.9	15,190
				290	40	10.3	110	41	54.1	Boundary monument No. 128, eccentric	3.751091	5,637.6	18,496
Boundary monument No. 130, eccentric, 1935 (d. m.).	31	21	46.776	148	40	24.1	328	38	36.4	Montana (U. S. A.)	4.021086	10,497.5	34,441
	111	10	10.834	199	04	05.7	19	04	49.9	Atacosa	3.835578	6,848.2	22,468
				290	29	48.5	110	30	56.0	Boundary monument No. 129 (I. B. C.)	3.563585	3,660.9	12,011
Cori, 1935 (d. m.)	31	36	45.327	41	19	33.4	221	17	33.1	Tumac	3.962614	9,175.2	30,102
	111	03	06.711	121	43	37.6	301	41	23.2	Tubac (U. S. A.)	3.899842	7,940.4	26,051
				257	49	57.4	77	52	49.1	Slope	3.945947	8,829.7	28,969
				349	32	24				Azimuth mark.			
Kinsley, 1935 (d. m.)	31	43	51.973	233	38	56.1	53	43	22.0	Reserve	4.217272	16,492.0	54,108
	111	03	30.302	281	12	06.9	101	15	18.3	Yoas	3.989989	9,772.1	32,061
				23	43	27				Azimuth mark.			
Cut, 1935 (d. m.)	31	40	12.395	183	14	20.9	3	14	28.6	Kinsley	3.830826	6,773.7	22,223
	111	03	44.840	243	59	14.2	64	02	33.1	Yoas	4.045028	11,092.5	36,393
				295	06	28.6	115	09	40.4	Slope	4.027013	10,641.7	34,914
Baboquivari Peak, lookout house, center, 1935 (n. d.).	31	46	15.675	325	24	24.2	145	27	16.6	Altar	4.182462	15,221.7	49,940
	111	35	42.894	25	57	33.3	205	55	54.7	Choulic	4.052192	11,277.0	36,998
				76	57	11.1	256	50	04.4	Comely	4.340566	21,906.1	71,870
Boundary monument No. 142A (I. B. C.) (U. S.-Mex.), 1935 (d. m.).	31	32	13.401	202	01	59.2	22	04	06.5	Choulic	4.231674	17,048.0	55,932
	111	42	53.111	249	51	26.5	69	54	24.1	Presumido	3.979244	9,533.3	31,277
				277	20	27.2	97	24	02.8	Pozora	4.040102	10,967.4	35,982
Boundary monument No. 139 (I. B. C.) (U. S.-Mex.), 1935 (m.).[1]	31	28	54.88	180	01	49	0	01	49	Sasabe	3.709469	5,122.3	16,805
	111	32	27.66	197	35	43	17	37	17	Puertecito (U. S. A.)	4.195334	15,679.6	51,442

[1]No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Arivaca, water tank, apex, 1935 (n. d.) [1]	31 34 29.32 111 19 16.92	217 59 10 263 21 47	37 59 18 83 23 26	Arivaca Jalisco	2.856416 3.703199	718.5 5,048.9	2,357 16,565
Boundary monument No. 127 (I. B. C.) (U. S.-Mex.), 1935 (m.).[1]	31 19 56.07 111 04 27.60	110 10 57 160 14 17	290 10 49 340 13 55	Boundary monument No. 128, eccentric. Nogales No. 7 (I. B. C.)	2.595194 3.520284	393.7 3,313.5	1,292 10,871
Boundary monument No. 126 (I. B. C.) (U. S.-Mex.), 1935 (m.).	31 19 56.079 111 04 18.931	102 41 48.1 156 33 25.2 243 29 28.6	282 41 36.3 336 32 58.6 63 34 09.2	Boundary monument No. 128, eccentric. Nogales No. 7 (I. B. C.) Benedict (U. S. G. S.)	2.789874 3.531290 4.201763	616.4 3,398.5 15,913.4	2,022 11,150 52,209
Nogales, courthouse, dome, 1935 (n. d.)	31 20 10.696 110 56 13.945	88 41 36.2 115 26 21.2 192 08 56.5	268 37 12.2 295 19 49.6 12 09 24.7	Boundary monument No. 128, eccentric. Atacosa Benedict (U. S. G. S.)	4.127871 4.342119 3.832199	13,423.7 21,999.8 6,795.1	44,041 72,178 22,294
Tumacacori National Monument, 1935 (n. d.) [1]	31 34 07.00 111 03 00.96	142 39 43 231 31 58	322 37 25 51 34 46	Tubac (U. S. A.) Slope	4.056343 4.034644	11,385.3 10,830.4	37,353 35,533
Boundary monument No. 128 (I. B. C.) (U. S.-Mex.), 1910, r. 1935 (d. m.).	31 20 00.591 111 04 41.569	219 55 35.5 3 44	39 58 58.7 183 44	Adobe Boundary monument No. 128, eccentric.	4.205479 0.541579	16,050.1 3.480	52,658 11.42
Boundary monument No. 150 (I. B. C.) (U. S.-Mex.), 1920, r. 1935 (d. m.).[1]	31 39 02.534 112 04 30.944	344 37 08	164 37 08	Boundary monument No. 150, eccentric.	1.779163	60.14	197.3
Boundary monument No. 130 (I. B. C.) (U. S.-Mex.), 1935 (d. m.).[1]	31 21 46.918 111 10 10.797	12 37	192 37	Boundary monument No. 130, eccentric.	0.652730	4.495	14.75
U. S. Army mark, 1935 (d. m.) [1]	31 25 16.835 111 08 46.227	223 05	43 05	Atacosa	0.588272	3.875	12.71
Baldy lookout house, center, 1935 (d.) [1]	31 41 45.759 110 50 50.781	35 32 29	215 32 29	Baldy 2	1.359836	22.9	75
Continental, 1935 (d. m.)	31 51 03.941 110 59 30.985	143 28 43.8 225 11 38.7 296 50 04.4 258 30 54	323 27 03.8 45 14 08.4 116 52 24.6	Twin Buttes (U. S. G. S.) Rita Reserve Azimuth mark.	3.922188 4.020814 3.893871	8,359.6 10,490.9 7,832.0	27,426 34,419 25,695
K-49 (U. S. G. S.), 1935 (d. m.) [1]	31 51 34.89 111 03 00.24	34 34 38 185 10 59	214 33 47 5 11 09	Esperanza Twin Buttes (U. S. G. S.)	3.655549 3.762487	4,524.3 5,787.4	14,843 18,987

Snyder's Hill, 1920, r. 1935 (d. m.)	32	09	28.946	93	19	00.0	273	10	28.9	Roskruge	4.401281	25,193.1	82,654
	111	06	48.415	166	18	59.0	346	17	55.6	Wasson	4.118608	13,140.4	43,111
				326	46	49.3	146	48	34.5	Black Hills 2	3.976528	9,473.9	31,082
				358	06	43				Azimuth mark.			
K-23 (U. S. G. S.), 1935 (d. m.)	32	06	12.056	121	36	01.9	301	31	54.5	Roskruge	4.155630	14,309.7	46,948
	111	15	03.189	207	34	57.0	27	38	17.3	Wasson	4.327391	21,251.6	69,723
				244	54	05.1	64	58	28.3	Snyder's Hill	4.155840	14,316.6	46,970
				275	48	12.2	95	54	20.3	Black Hills 2	4.261472	18,258.8	59,904
				21	07	09				Azimuth mark.			
Sahuarita, 1935 (d. m.)	31	57	54.376	323	10	32.2	143	11	51.4	Rita	3.816849	6,559.2	21,520
	110	57	17.309	55	05	54.0	235	03	03.1	Twin Buttes (U. S. G. S.)	4.014878	10,348.5	33,952
				184	37	00				Azimuth mark.			
Xavier, 1935 (d. m.)	32	05	38.258	85	01	34.2	264	58	24.0	Black Hills 2	3.974238	9,424.1	30,919
	110	57	32.479	166	35	05.8	346	34	03.3	Warner (Ariz. Geod. S.)	4.122228	13,250.4	43,472
				261	30	13.8	81	31	39.5	Graze	3.630844	4,274.1	14,023
				321	00	39.1	141	02	04.6	Flato	3.826773	6,710.8	22,017
				122	41	31				Azimuth mark, white water tank, apex.			
Wilmot, 1935 (d. m.)	32	06	53.525	72	32	09.4	252	30	20.7	Graze	3.749662	5,619.0	18,435
	110	51	26.836	129	54	10.4	309	49	53.2	Warner (Ariz. Geod. S.)	4.217212	16,489.7	54,100
				182	33	09.9	2	33	26.6	Sahuaro	4.264932	18,404.8	60,383
				311	01	29				Azimuth mark.			
Magnetic, 1935 (d. m.)	32	14	45.986	74	44	55.1	254	39	58.5	Warner (Ariz. Geod. S.)	4.178978	15,100.0	49,541
	110	50	13.581	145	39	13.3	325	35	58.3	Pusch	4.228006	16,904.6	55,461
				164	01	45.6	344	01	23.2	Sahuaro	3.600738	3,987.8	13,083
				268	40	49				Azimuth mark.			
Jaynes, 1935 (d. m.)	32	19	24.862	243	00	03.7	63	03	39.3	Pusch	4.072795	11,824.8	38,795
	111	03	01.444	336	12	48.2	156	14	41.1	Warner (Ariz. Geod. S.)	4.137927	13,738.1	45,072
				58	19	05.4	238	16	00.6	Wasson	4.026655	10,633.0	34,885
				315	11	00				Azimuth mark.			
University, 1935 (d. m.)	32	13	53.757	58	55	56.3	238	54	36.1	Warner (Ariz. Geod. S.)	3.662619	4,598.5	15,087
	110	56	59.457	104	01	36.7	283	55	19.0	Wasson	4.280830	19,091.1	62,635
				183	56	39.7	3	57	01.6	Pusch	4.193082	15,598.5	51,176
				182	34	08				Azimuth mark.			
Station "A" (Univ. of Ariz.), 1935 (n. d.) [1]	32	13	58.113	2	23	56.0	182	23	55.9	University	2.128050	134.292	440.59
	110	56	59.242										
Tucson, University of Arizona, western radio mast, 1935 (n. d.) [1]	32	13	57.83	268	18	13	88	18	19	Station "A" (Univ. of Ariz.)	2.466710	292.9	961
	110	57	10.42	293	36	32	113	36	38	University	2.496067	313.4	1,028
Tucson, University of Arizona, observatory dome, 1935 (n. d.) [1]	32	13	59.19	40	16	47	220	16	44	University	2.341555	219.6	720
	110	56	54.04	76	15	44	256	15	41	Station "A" (Univ. of Ariz.)	2.147188	140.3	460

[1] No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Golden Gate Mountain, 1935 (n. d.)	32 12 32.434	341 55 29.6	161 56 59.5	Black Hills 2	4.154806	14,282.6	46,859
	111 06 19.475	151 29 10.4	331 27 51.6	Wasson	3.908389	8,098.2	26,569
		260 15 54.4	80 20 53.0	University	4.172511	14,876.8	48,808
Cat Mountain (U. S. G. S.), 1935 (n. d.)	32 11 02.580	245 48 07.9	65 50 19.2	Warner (Ariz. Geod. S.)	3.849849	7,077.0	23,218
	111 03 36.351	359 11 09.7	179 11 12.8	Black Hills 2	4.033912	10,812.1	35,473
		60 11 42.5	240 10 00.3	Snyder's Hill	3.763424	5,799.9	19,029
E 4 (Ariz. Geod. S.), 1935 (d. m.)	32 10 49.694	313 47 16.2	133 49 50.1	Wilmot	4.021528	10,508.2	34,476
	110 56 16.201	123 01 34.9	302 59 51.7	Warner (Ariz. Geod. S.)	3.781694	6,049.1	19,846
		217 03 06.0	37 05 57.0	Sahuaro	4.143880	13,927.7	45,694
		200 00 22		Azimuth mark, black water tank.			
Tucson, Consolidated National Bank bldg., north radio mast, 1935 (n. d.).	32 13 18.026	326 02 44.0	146 03 46.6	E 4 (Ariz. Geod. S.)	3.740962	5,507.6	18,070
	110 58 13.626	29 01 05.4	208 58 16.7	Black Hills 2	4.233758	17,130.0	56,201
		57 28 37.8	237 27 57.2	Warner (Ariz. Geod. S.)	3.374360	2,367.9	7,769
Tucson, Consolidated National Bank bldg., south radio mast, 1935 (n. d.).	32 13 17.007	325 58 11.5	145 59 13.8	E 4 (Ariz. Geod. S.)	3.738354	5,474.6	17,961
	110 58 13.151	29 06 20.2	209 03 31.2	Black Hills 2	4.233215	17,108.6	56,130
		58 16 53.4	238 16 12.5	Warner (Ariz. Geod. S.)	3.373225	2,361.7	7,748
Santa Cruz, Catholic Church, north spire, 1935 (n. d.).	32 13 09.932	29 24 57.8	209 22 09.2	Black Hills 2	4.228156	16,910.5	55,481
	110 58 13.778	62 48 23.6	242 47 43.0	Warner (Ariz. Geod. S.)	3.350277	2,240.1	7,349
		109 49 03.3	289 43 25.3	Wasson	4.246014	17,620.3	57,809
Santa Cruz, Catholic Church, south spire, 1935 (n. d.).[1]	32 13 09.38	29 27 00	209 24 12	Black Hills 2	4.227802	16,896.7	55,435
	110 58 13.70	109 52 02	289 46 24	Wasson	4.246201	17,627.9	57,834
San Xavier Mission, 1920, r. 1935 (n. d.)	32 06 25.030	64 53 15.6	244 51 37.8	Black Hills 2	3.726512	5,327.4	17,478
	111 00 26.547	144 36 20.0	324 31 53.3	Wasson	4.354513	22,621.1	74,216
		187 23 18.7	7 23 48.9	Warner (Ariz. Geod. S.)	4.062345	11,543.7	37,873
C. W. A. (Ariz. Geod. S.), 1935 (d. m.)	32 08 01.715	124 21 10.0	304 18 36.1	E 4 (Ariz. Geod. S.)	3.962566	9,174.2	30,099
	110 51 27.086	182 54 15.6	2 54 32.4	Sahuaro	4.212379	16,307.2	53,501
		359 49 18.6	179 49 18.7	Wilmot	3.322298	2,100.4	6,891
		354 47 20		Azimuth mark.			
C. W. A. No. 2 (Ariz. Geod. S.), 1935 (d. m.)	32 08 40.862	57 21 05.5	237 17 41.7	Black Hills 2	4.076970	11,939.1	39,170
	110 57 07.156	152 46 34.7	332 45 18.7	Warner (Ariz. Geod. S.)	3.912198	8,169.5	26,803
		260 42 53		Azimuth mark.			

Tucson, Veterans Hospital No. 51, water tank, 1935 (n. d.).	32	11	03.766	280	57	02.7	100	57	48.3	E 4 (Ariz. Geod. S.)	3.358028	2,280.5	7,482
	110	57	41.667	334	33	50.5	154	35	21.1	Graze	4.017159	10,403.0	34,131
				348	23	18.9	168	23	37.3	C. W. A. No. 2 (Ariz. Geod. S.)	3.652595	4,493.6	14,743
				40	09	04.5	220	05	59.0	Black Hills 2	4.151878	14,186.6	46,544
Marana, 1935 (d. m.)	32	25	53.488	208	01	57.1	28	03	14.7	Tortollita	3.904627	8,028.4	26,340
	111	10	21.994	286	37	22.8	106	44	54.8	Pusch	4.362008	23,014.8	75,508
				351	57	27.5	171	58	18.2	Wasson	4.248791	17,733.4	58,180
				304	25	23				Azimuth mark.			
Naviska, 1935 (d. m.)	32	30	09.633	98	36	38.3	278	31	24.5	Sasco	4.187783	15,409.3	50,555
	111	15	46.205	189	02	40.2	9	03	13.6	Red Rock	4.012952	10,302.7	33,801
				273	43	32.1	93	47	44.0	Tortollita	4.088600	12,263.1	40,233
Airway beacon on Picacho Peak, 1935 (n. d.)	32	38	06.274	287	14	51.9	107	19	51.3	Red Rock	4.180918	15,167.6	49,762
	111	23	59.573	337	59	19.5	158	02	09.4	G. L. O. Station E	4.342548	22,006.4	72,199
				10	47	05.8	190	46	17.1	Sasco	4.100689	12,609.2	41,369
				105	16	29.3	285	11	44.9	Eloy	4.153384	14,235.9	46,706
Airport No. 38, 1935 (d. m.)	32	36	07.215	159	24	56.8	339	23	16.2	Newman	4.140072	13,806.1	45,296
	111	20	53.179	274	57	44.1	95	01	02.9	Red Rock	3.985024	9,661.0	31,696
				320	51	10				Azimuth mark, railroad water tank.			
Airway beacon west of Airport No. 38, 1935 (n.d.)	32	34	00.007	31	02	17.8	211	01	18.3	Sasco	3.748389	5,602.6	18,381
	111	23	39.293	155	04	24.0	335	03	13.0	Picacho	3.911582	8,158.0	26,765
				257	31	27.7	77	36	15.9	Red Rock	4.155161	14,294.2	46,897
				328	56	40.1	148	59	19.0	G. L. O. Station E	4.174967	14,961.2	49,085
Over, 1935 (d. m.)	32	46	19.633	106	01	01.5	285	54	36.5	Casa Grande	4.284134	19,236.9	63,113
	111	30	54.184	191	26	07.8	11	26	15.0	Peak	3.243478	1,751.8	5,747
				298	47	57.9	118	51	42.1	Newman	4.090656	12,321.3	40,424
Dip, 1935 (d. m.)	32	50	08.490	84	37	21.5	264	30	55.8	Casa Grande	4.269220	18,587.5	60,982
	111	30	53.584	136	03	04.9	315	58	23.8	Signal Peak (U. S. G. S.)	4.287019	19,365.1	63,534
				183	59	24				Azimuth mark.			
Junction, 1935 (d. m.)	33	00	08.531	70	26	20.9	250	21	52.9	Signal Peak (U. S. G. S.)	4.132574	13,569.8	44,520
	111	31	18.725	155	27	51.6	335	25	47.7	Mineral Butte	4.151414	14,171.4	46,494
				241	06	11.1	61	09	54.0	Posten	4.083552	12,121.4	39,768
				267	24	13				Azimuth mark.			
Airways, 1935 (d. m.)	33	03	46.675	45	33	31.2	225	32	08.5	Sweet	3.741320	5,512.1	18,084
	111	44	11.307	191	59	25.7	12	00	20.6	Santan	4.098321	12,540.7	41,144
				246	23	52.9	66	28	50.7	Mineral Butte	4.188523	15,435.6	50,642
				2	58	28				Azimuth mark.			
Airway beacon at Airport No. 34a, 1935 (n. d.)[1]	33	04	11.42	45	41	56	225	40	16	Sweet	3.820672	6,617.2	21,710
	111	43	40.47	188	55	24	8	56	02	Santan	4.066152	11,645.3	38,206

[1] No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Sacaton, water tank, 1935 (n. d.)	33 04 50.427	253 43 42.4	73 48 46.7	Mineral Butte	4.177508	15,049.0	49,373
	111 44 22.950	31 57 36.9	211 56 20.5	Sweet	3.836581	6,864.1	22,520
		86 03 09.6	265 58 04.2	Sacaton Butte	4.162918	14,551.8	47,742
Boswell, 1935 (d. m.)	33 12 53.297	290 19 05.2	110 23 25.7	Santan	4.118828	13,147.0	43,133
	111 50 26.613	16 18 42.8	196 18 02.3	Gila Butte	3.834402	6,829.7	22,407
		88 13 36		Azimuth mark.			
Chandler, water tank, 1935 (n. d.)	33 18 01.218	12 02 20.4	192 00 26.2	Sacaton Butte	4.414026	25,943.3	85,116
	111 50 14.011	44 54 27.9	224 48 30.4	Pima Butte	4.379497	23,960.6	78,611
		55 11 20.4	235 09 22.9	Goodyear	3.829211	6,748.6	22,141
Goodyear, water tank, 1935 (n. d.)[1]	33 14 29.59	9 11 28	189 10 24	Sacaton Butte	4.281015	19,099.2	62,661
	111 51 45.01	129 55 40	309 54 32	Goodyear	3.618471	4,154.0	13,629
Ray, 1935 (d. m.)	33 18 18.584	23 33 43.8	203 31 02.3	Pima Butte	4.281258	19,109.9	62,696
	111 56 11.941	105 04 30.1	285 00 21.1	Telegraph Pass (U. S. G. S.)	4.084258	12,141.1	39,833
		312 43 16		Azimuth mark.			
Catherine, 1935 (d. m.)	33 16 02.686	273 13 38.2	93 17 23.0	Jackson	4.026254	10,623.2	34,853
	112 08 44.160	318 20 25.7	138 24 36.3	Pima Butte	4.251308	17,836.4	58,518
Mission, 1935 (d. m.)	33 20 01.079	271 28 30.5	91 31 04.3	Salt	3.859864	7,242.1	23,760
	112 12 06.645	356 40 42.9	176 40 55.2	St. Johns	4.002047	10,047.2	32,963
		265 43 06		Azimuth mark.			
Dadams, 1935 (d. m.)	33 01 02.079	122 35 29.8	302 29 19.3	Mineral Butte	4.320089	20,897.2	68,560
	111 23 46.584	165 06 03.7	345 05 40.2	Posten	3.638332	4,348.4	14,266
		254 14 14		Azimuth mark.			
Florence, 1935 (d. m.)	33 01 47.529	114 49 49.2	294 47 41.8	Posten	3.824585	6,677.1	21,906
	111 20 36.103	238 28 39.6	58 33 30.4	North Butte	4.209830	16,211.8	53,188
		302 52 16		Azimuth mark.			
Florence, State Prison, aluminum water tank, 1935 (n. d.).	33 01 32.173	68 04 43.8	248 03 55.4	Dadams	3.394898	2,482.6	8,145
	111 22 17.850	133 45 51.3	313 44 39.4	Posten	3.675389	4,735.8	15,537
		259 50 08.0	79 51 03.4	Florence	3.428545	2,682.5	8,801

Florence, black water tank, 1935 (n. d.)	33	01	36.045	37	20	11.2	217	19	54.4	Dadams	3.119255	1,316.0	4,318
	111	23	15.832	148	44	24.3	328	43	44.0	Posten	3.567260	3,692.0	12,113
				265	06	36.0	85	08	03.0	Florence	3.619122	4,160.3	13,649
South Butte (U. S. G. S.), 1935 (m.)[1]	33	04	56.11	177	18	33	357	18	30	North Butte	3.424848	2,659.8	8,726
	111	11	38.31	292	09	12	112	14	26	Donelley	4.207351	16,119.5	52,885
Wolley, 1935 (d. m.)	33	02	29.639	116	01	15.8	295	56	06.3	North Butte	4.213958	16,366.6	53,696
	111	02	15.890	184	34	41.0	4	35	03.7	Granite Mountain	4.128051	13,429.2	44,059
				348	03	12.5	168	03	19.5	Donelley	3.207529	1,612.6	5,291
				348	41	40				Azimuth mark			
Kelvin, 1935, r. 1936 (d. m.)	33	05	41.306	343	56	58.3	163	58	20.9	Dudley	4.153080	14,225.9	46,673
	110	55	08.489	26	31	28.2	206	29	46.0	Ripsey Hill	4.037067	10,891.0	35,732
				126	48	48.8	306	45	17.9	Granite Mountain	4.096722	12,494.6	40,993
				281	17	13				Azimuth mark.			
Beacon tower, center, 1935 (d.)[1]	32	43	06.965	29	03		209	03		Newman	0.873204	7.468	24.50
	111	23	59.433										
Airport beacon, center of tower, 1935 (d.)[1]	32	36	07.351	316	08		136	08		Airport No. 38	0.765221	5.824	19.11
	111	20	53.334										
G. L. O. section corner, 1935 (d. m.)[1]	32	06	12.037	94	08		274	08		K-23 (U. S. G. S.)	0.909021	8.11	26.6
	111	15	02.880										
Helmet Peak (U. S. G. S.), 1935 (d. m.)[1]	31	58	00.316	240	34		60	34		Helmet Peak 2	$\bar{9}$.806180	0.640	2.10
	111	04	49.598										
Santan Peak (U. S. G. S.), 1935 (d. m.)[1]	33	10	24.843	116	51		296	51		Santan	0.079181	1.200	3.94
	111	42	30.710										
U. S. G. S. cross in rock, 1935 (d. m.)[1]	33	10	24.832	110	35		290	35		Santan	0.401400	2.520	8.27
	111	42	30.660										

NOGALES AREA

Principal points													
Boundary monument No. 121 (I. B. C.) (U. S.-Mex.), 1910 (d. m.).	31	19	57.563	90	26	15.6	270	21	53.7	Boundary monument No. 128 (I. B. C.)	4.124300	13,313.7	43,680
	110	56	17.976	102	21	43.0	282	17	06.2	Nogales No. 7 (I. B. C.)	4.158194	14,394.4	47,226
				192	17	59.4	12	18	29.7	Benedict (U. S. G. S.)	3.858116	7,213.0	23,665
Nogales, Mexican Customhouse, flagstaff (I. B. C.) (Mex.), 1893 (n. d.).	31	19	52.024	103	28	05.6	283	23	38.3	Nogales No. 7 (I. B. C.)	4.144920	13,961.1	45,804
	110	56	36.270	195	38	00.3	15	38	40.1	Benedict (U. S. G. S.)	3.874796	7,495.4	24,591
				250	34	02.6	70	34	12.1	Boundary monument No. 121 (I. B. C.)	2.709991	512.9	1,683

[1] No check on this position.

NOGALES AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Boundary monument No. 120 (I. B. C.) (U. S.-Mex.), 1910 (d. m.).	31 19 57.988 110 55 37.366	89 18 18.3 101 28 02.5 183 46 16.4	269 17 57.2 281 23 04.6 3 46 25.6	Boundary monument No. 121 (I. B. C.) Nogales No. 7 (I. B. C.) Benedict (U. S. G. S.	3.030884 4.188710 3.848159	1,073.7 15,442.2 7,049.5	3,523 50,663 23,128
Nogales No. 5 (I. B. C.), 1893 (d. m.)	31 20 08.28 110 59 12.53	106 12 34.3	286 09 28.3	Nogales No. 7 (I. B. C.)	3.992926	9,838.4	32,278
Nogales No. 8 (I. B. C.) (Mex.), 1893 (d. m.)	31 19 35.42 111 04 28.38	163 40 20.6 263 04 00.6	343 39 58.9 83 06 44.8	Nogales No. 7 (I. B. C.) Nogales No. 5 (I. B. C.)	3.592397 3.924860	3,912.0 8,411.2	12,835 27,596
Nogales No. 6 (I. B. C.) (Mex.), 1893 (d. m.)	31 18 31.77 110 59 20.17	103 32 52.6 121 44 15.7 183 52 57.9	283 30 12.4 301 41 13.7 3 53 01.8	Nogales No. 8 (I. B. C.) Nogales No. 7 (I. B. C.) Nogales No. 5 (I. B. C.)	3.923349 4.036280 3.474107	8,382.0 10,871.3 2,979.3	27,500 35,667 9,775
Nogales No. 4 (I. B. C.) (Mex.), 1893 (d. m.)	31 18 56.59 110 55 27.19	82 56 39.4 110 21 05.3	262 54 38.3 290 19 08.1	Nogales No. 6 (I. B. C.) Nogales No. 5 (I. B. C.)	3.792939 3.803043	6,207.8 6,353.9	20,367 20,846
Nogales No. 3 (I. B. C.) (Mex.), 1893 (d. m.)	31 19 52.76 110 55 34.35	353 45 11.5 67 20 35.6 94 45 14.5	173 45 15.2 247 18 38.2 274 43 21.0	Nogales No. 4 (I. B. C.) Nogales No. 6 (I. B. C.) Nogales No. 5 (I. B. C.)	3.240624 3.810957 3.762521	1,740.3 6,470.8 5,787.9	5,710 21,230 18,989
Nogales No. 1 (I. B. C.) (Mex.), 1893 (d. m.)	31 19 48.49 110 56 50.26	253 37 22.1 266 14 51.8 306 02 37.6	73 37 29.4 86 15 31.3 126 03 20.8	Nogales, Mexican Customhouse, flagstaff (I. B. C.). Nogales No. 3 (I. B. C.) Nogales No. 4 (I. B. C.)	2.586157 3.303411 3.433991	385.6 2,011.0 2,716.4	1,265 6,598 8,912
Nogales azimuth station (I. B. C.) (Mex.), 1893 (d. m.).	31 19 57.10 110 56 17.89	276 36 53.9 324 16 14.5 72 10 31.2 72 48 01.2	96 37 16.6 144 16 40.9 252 10 21.7 252 47 44.4	Nogales No. 3 (I. B. C.) Nogales No. 4 (I. B. C.) Nogales, Mexican Customhouse, flagstaff (I. B. C.). Nogales No. 1 (I. B. C.)	3.063934 3.360868 2.707841 2.952242	1,158.6 2,295.5 510.3 895.9	3,801 7,531 1,674 2,939
Nogales astronomic station (I. B. C.), 1893, l. 1923 (d. m.).	31 20 01.47 110 56 21.17	327 13 44.8 53 54 54.9 62 32 45.5	147 13 46.5 233 54 47.1 242 32 30.4	Nogales azimuth station (I. B. C.) Nogales, Mexican Customhouse, flagstaff (I. B. C.). Nogales No. 1 (I. B. C.)	2.204561 2.693623 2.937877	160.2 493.9 866.7	526 1,620 2,843
Nogales No. 2 (I. B. C.) (Mex.), 1893 (d. m.)	31 19 23.31 110 56 54.57	188 21 17.0 246 50 26.3 289 36 14.4	8 21 19.2 66 51 08.0 109 36 59.8	Nogales No. 1 (I. B. C.) Nogales No. 3 (I. B. C.) Nogales No. 4 (I. B. C.)	2.894199 3.362941 3.389598	783.8 2,306.4 2,452.4	2,572 7,567 8,046

Nogales north base (I. B. C.) (Mex.), 1893 (d. m.)	31	19	47.55	30	52	55.6	210	52	46.9	Nogales No. 2 (I. B. C.)	2.939386	869.7	2,853
	110	56	37.68	94	59	28.4	274	59	21.9	Nogales No. 1 (I. B. C.)	2.523433	333.8	1,095
Nogales south base (I. B. C.) (Mex.), 1893 (d. m.)	31	19	24.17	85	47	10.3	265	47	03.4	Nogales No. 2 (I. B. C.)	2.558192	361.6	1,186
	110	56	40.93	161	46	06.8	341	46	02.0	Nogales No. 1 (I. B. C.)	2.896791	788.5	2,587
				186	47	52.7	6	47	54.4	Nogales north base (I. B. C.)	2.860314	725.0	2,379
Supplementary points													
Montezuma Hotel, flagpole (I. B. C.), 1893 (n. d.)	31	20	02.93	313	47	27.1	133	47	28.0	Nogales astronomic station (I. B. C.)	1.813834	65.1	214
	110	56	22.95	323	21	16.0	143	21	18.6	Nogales azimuth station (I. B. C.)	2.350304	224.0	735
				58	22	29.0	238	22	14.8	Nogales No. 1 (I. B. C.)	2.928405	848.0	2,782
Levy's Store, flagpole (I. B. C.), 1893 (n. d.)	31	19	58.97	63	35	22.1	243	35	09.4	Nogales No. 1 (I. B. C.)	2.860335	725.0	2,379
	110	56	25.70	237	13	26.1	57	13	28.5	Nogales astronomic station (I.B.C.)	2.153680	142.5	468
				285	34	30.9	105	34	35.0	Nogales azimuth station (I. B. C.)	2.331104	214.3	703
Nogales, Catholic Church (I. B. C.), 1893 (n. d.)[1]	31	20	14.96	194	37	56	14	38	29	Benedict (U. S. G. S.)	3.828008	6,729.9	22,080
	110	56	24.16	343	01	21	163	01	24	Boundary monument No. 121 (I. B. C.)	2.748384	560.3	1,838
Nogales, public school (I. B. C.), 1893 (n. d.)[1]	31	20	13.19	194	47	47	14	48	21	Benedict (U. S. G. S.)	3.831959	6,791.4	22,281
	110	56	25.46	337	38	22	157	38	26	Boundary monument No. 121 (I. B. C.)	2.716349	520.4	1,707

PAPAGO INDIAN RESERVATION AREA

[Not separated into principal and supplementary points]

	°	′	″	°	′	″	°	′	″				
Black Mountain, 1920, r. 1936 (d. m.)	32	46	43.831	336	12	46.3	156	18	25.2	Catalina	4.609828	40,721.9	133,602
	110	57	45.736	51	56	45.6	231	39	14.0	Silver Bell	4.811380	64,770.9	212,503
Rocky Butte, 1936 (d. m.)	32	37	56.234	209	49	26.9	29	52	40.3	Black Mountain	4.272734	18,738.5	61,478
	111	03	43.837	309	09	15.6	129	18	06.4	Catalina	4.521712	33,243.9	109,068
				20	13	10				Azimuth mark.			
Lit , 1936 (d. m.)	32	29	53.581	183	16	55.4	3	17	32.4	Black Mountain	4.493752	31,171.1	102,267
	110	58	54.309	288	37	35.9	108	43	50.3	Catalina	4.283817	19,222.8	63,067
				169	28	15				Azimuth mark.			
Big Wash, 1936 (d. m.)	32	30	03.533	86	40	46.6	266	38	58.3	Lita	3.721750	5,269.3	17,288
	110	55	32.805	173	35	39.3	353	34	27.6	Black Mountain	4.491466	31,007.4	101,730
				296	29	18.4	116	33	44.6	Catalina	4.160512	14,471.4	47,478
				356	56	54				Azimuth mark.			
Freeman, 1936 (d. m.)	32	47	28.429	290	36	11.7	110	37	27.7	Black Mountain	3.591308	3,902.2	12,802
	111	00	06.088	17	51	04.8	197	49	07.2	Rocky Butte	4.267546	18,515.9	60,748
				319	14	12				Azimuth mark.			

[1] No check on this position.

PAPAGO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Roll, 1936 (d. m.)	32 38 10.115 111 00 30.777	195 11 04.1 136 16 10	15 12 33.2	Black Mountain Azimuth mark.	4.214794	16,398.1	53,799
Boundary monument No. 140, eccentric, 1936 (d.m.)	31 29 46.602 111 35 09.930	156 40 34.4 276 50 20.7 110 13 20	336 40 07.8 96 55 04.8	Pozora Cumero Azimuth mark.	3.530381 4.160106	3,391.4 14,457.9	11,127 47,434
Boundary monument No. 138 (I. B. C.) (U. S.-Mex.), 1936 (d. m.).	31 28 14.267 111 30 20.174	123 33 30.3 260 33 57.9 116 47 14	303 30 32.3 80 36 10.6	Pozora Cumero Azimuth mark.	4.032823 3.832429	10,785.1 6,798.7	35,384 22,305
Boundary monument No. 140 (I. B. C.) (U. S.-Mex.), 1936 (d. m.).	31 29 46.447 111 35 09.910	156 42 00.4 173 51	336 41 33.8 353 51	Pozora Boundary monument No. 140, eccentric.	3.530967 0.681060	3,396.0 4.798	11,142 15.74
B. M. U 76, 1936 (d. m.)	31 25 02.535 110 51 06.958	70 40 20.8 141 03 20.6 184 01 45.1 233 29 54	250 38 09.0 320 59 54.2 4 02 11.0	Benedict (U. S. G. S.) Cayetano (U. S. G. S.) Squaw Azimuth mark.	3.849988 4.219694 4.269762	7,079.3 16,584.2 18,610.7	23,226 54,410 61,059
Boundary monument No. 119, eccentric, 1936 (d. m.).	31 20 01.133 110 54 03.473	165 25 19.6 87 46 19.9	345 23 25.5	Cayetano (U. S. G. S.) Azimuth mark, boundary monument No. 120 (I. B. C.).	4.360122	22,915.1	75,181
Boundary monument No. 132, eccentric, 1936 (d. m.).	31 23 50.860 111 16 43.149	223 36 37.2 258 05 09.4 289 50 32	43 38 13.9 78 09 18.0	Montana (U. S. A.) Atacosa Azimuth mark.	3.851648 4.109800	7,106.4 12,876.6	23,315 42,246
Boundary monument No. 119 (I. B. C.) (U. S.-Mex.), 1936 (d. m.).[1]	31 19 58.986 110 54 03.984	191 32 21.1	11 32 21.4	Boundary monument No. 119 eccentric.	1.829252	67.492	221.43
Boundary monument No. 132 (I. B. C.) (U. S.-Mex.), 1936 (d. m.).[1]	31 23 52.493 111 16 41.516	40 37 58	220 37 57	Boundary monument No. 132 eccentric.	1.821251	66.26	217.4
Gunsight, 1936 (d. m.)	32 12 01.550 112 41 04.373	1 28 40.1 132 38 33.5 269 30 34.5 173 48 33	181 28 30.1 312 33 30.6 89 35 31.4	Sierra Del Ajo Ajo Nine Mile Peak Azimuth mark.	4.284897 4.304757 4.164236	19,270.7 20,172.4 14,596.1	63,224 66,182 47,887

Del, 1936 (d. m.)	32	05	27.568	168	40	16.2	348	38	30.9	Ajo	4.420012	26,303.4	86,297
	112	47	14.139	218	34	53.3	38	38	10.0	Gunsight	4.191162	15,529.7	50,950
				307	44	14.5	127	47	20.7	Sierra Del Ajo	4.065994	11,641.1	38,193
				292	50	50				Azimuth mark.			
Cane, 1936 (d. m.)	32	06	06.415	69	24	31.3	249	23	26.8	Del	3.531570	3,400.7	11,157
	112	45	12.738	161	15	52.5	341	13	02.5	Ajo	4.414518	25,972.8	85,212
Sage, 1936 (d. m.)	32	14	40.316	9	50	58.5	189	49	58.5	Del	4.237541	17,279.9	56,692
	112	45	21.415	137	12	39.8	317	09	54.1	Ajo	4.077251	11,946.8	39,195
				305	58	56.0	126	01	13.0	Gunsight	3.920108	8,319.7	27,296
				303	01	57				Azimuth mark.			
Bat, 1936 (d. m.)	32	26	32.493	31	08	47.2	211	06	04.2	Ajo	4.187179	15,387.9	50,485
	112	45	27.395	59	56	27.8	239	52	47.1	Flite	4.094532	12,431.7	40,786
				74	52	38				Azimuth mark.			
Dust, 1936 (d. m.)	32	18	17.190	328	47	03.5	148	49	26.3	Gunsight	4.131183	13,526.4	44,378
	112	45	32.026	104	54	33.7	284	51	53.5	Ajo	3.909072	8,111.0	26,611
				180	27	15.5	0	27	18.0	Bat	4.183473	15,257.1	50,056
				329	13	28				Azimuth mark.			
Kerwo, 1936 (d. m.)	32	04	49.768	58	25	41.8	238	22	25.7	Sierra Del Ajo	4.056281	11,383.6	37,348
	112	35	13.712	145	22	50.2	325	19	43.6	Gunsight	4.208604	16,166.1	53,038
				201	58	03.1	21	59	53.0	Nine Mile Peak	4.160340	14,465.7	47,460
				63	24	02				Azimuth mark.			
Sweetwater, 1936 (d. m.)	31	57	50.147	118	00	59.4	297	56	35.0	Sierra Del Ajo	4.171292	14,835.2	48,672
	112	33	04.222	165	16	44.1	345	15	35.4	Kerwo	4.125936	13,364.0	43,845
				275	55	38				Azimuth mark.			
Poso, 1936 (d. m.)	32	18	00.668	313	13	06.9	133	17	04.1	Nine Mile Peak	4.203483	15,976.5	52,416
	112	39	11.637	14	56	46.8	194	55	46.7	Gunsight	4.058748	11,448.5	37,561
				90	49	08				Azimuth mark.			
Target No. 1, 1936 (d.)	32	13	22.358	19	18	54.7	199	18	37.0	Gunsight	3.421188	2,637.5	8,653
	112	40	31.066	193	37	33.3	13	38	15.7	Poso	3.945519	8,821.0	28,940
				279	46	46.0	99	51	25.3	Nine Mile Peak	4.143811	13,925.5	45,687
G. L. O. Station No. 6, 1936 (d. m.)	32	14	38.727	320	36	54.4	140	38	15.3	Gunsight	3.796777	6,262.9	20,548
	112	43	36.101	91	01	30.1	271	00	34.0	Sage	3.440504	2,757.4	9,047
				129	03	08.1	308	59	26.2	Ajo	4.146050	13,997.5	45,923
Target No. 2, 1936 (d.) [1]	32	15	25.84	56	21	39	236	20	56	Sage	3.403263	2,530.8	8,303
	112	44	00.93	125	47	02	305	43	33	Ajo	4.100335	12,599.0	41,335

[1] No check on this position.

PAPAGO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Ajo, Phelps and Dodge Corp., copper smelter, stack, 1936 (n. d.).	32 22 07.116 112 51 24.165	143 32 39.1 228 43 48.5 307 32 08.4	323 32 09.7 48 46 59.7 127 35 16.7	Flite Bat Dust	3.382774 4.093399 4.065116	2,414.2 12,399.4 11,617.6	7,921 40,680 38,115
J. C. Greenway Memorial, cross, 1935, r. 1936 (n. d.).	32 21 52.021 112 52 40.516	193 07 29.4 232 36 51.0 323 22 24.7	113 07 40.9 52 40 43.2 143 23 33.7	Flite Bat Ajo	3.392912 4.153484 3.751912	2,471.2 14,239.1 5,648.2	8,108 46,716 18,531
Kerwo, white chapel, cross, 1936 (n. d.) [1]	32 03 56.95 112 33 04.96	71 40 54 115 43 58	251 36 30 295 42 49	Sierra Del Ajo Kerwo	4.139098 3.573824	13,775.2 3,748.2	45,194 12,297
Poso Redondo, white cross, 1936 (d.) [1]	32 18 53.64 112 40 08.44	317 40 15 6 35 00	137 40 45 186 34 30	Poso Gunsight	3.343812 4.106445	2,207.0 12,777.5	7,241 41,921
G. L. O. ¼ corner secs. 16 and 21, 1936 (d. m.) [1]	32 12 01.727 112 41 04.356	4 35	184 35	Gunsight	0.738622	5.478	17.97
Boundary monument No. 168 (I. B. C.) (U. S.-Mex.), 1920, r. 1936 (d. m.).	31 53 16.199 112 50 33.113	118 12 30.6 223 07 03.3	298 02 54.8 43 11 54.3	Quitovaquita Sierra Del Ajo	4.510524 4.324450	32,398.4 21,108.1	106,294 69,252
Boundary monument No. 166 (I. B. C.) (U. S.-Mex.), 1936 (d. m.).	31 51 57.076 112 46 14.155	109 43 07.5 203 09 51.0 251 35 03	289 40 50.7 23 12 24.9	Boundary monument No. 168 (I. B. C.) Sierra Del Ajo Azimuth mark.	3.859109 4.287841	7,229.5 19,401.8	23,719 63,654
Shack, 1936 (d. m.)	31 51 55.608 112 45 17.125	91 43 53.6 106 39 46.6 198 56 15.9	271 43 23.5 286 36 59.7 18 58 19.6	Boundary monument No. 166 (I. B. C.) Boundary monument No. 168 (I. B. C.) Sierra Del Ajo	3.176041 3.937937 4.276580	1,499.8 8,668.4 18,905.1	4,921 28,440 62,024
Low Hill, 1936 (d. m.)	31 59 28.031 112 45 00.599	235 18 34.6 1 47 08.2 75 47 28	55 20 29.8 181 46 59.5	Sierra Del Ajo Shack Azimuth mark.	3.841015 4.144314	6,934.5 13,941.6	22,751 45,740
Gravel, 1936 (d. m.)	31 55 14.924 112 43 46.080	71 09 14.0 197 41 46.2 26 20 04	251 05 38.9 17 43 01.8	Boundary monument No. 168 (I. B. C.) Sierra Del Ajo Azimuth mark.	4.053194 4.090783	11,303.0 12,324.9	37,083 40,436
Boundary monument No. 164 (I. B. C.) (U. S.-Mex.), 1936 (d. m.).	31 50 18.164 112 40 51.293	109 46 00.2 177 41 44.9 112 00 52	289 40 53.1 357 41 28.0	Boundary monument No. 168 (I. B. C.) Sierra Del Ajo Azimuth mark.	4.210798 4.320109	16,247.9 20,898.2	53,307 68,564

Boundary monument No. 165 (I. B. C.) (U. S.-Mex.), 1936 (m.).[1]	31	51	24.97	109	41	54	289	40	58	Boundary monument No. 166 (I. B. C.)	3.467581	2,934.8	9,629
	112	44	29.04	126	44	50	306	44	24	Shack	3.197938	1,577.4	5,175
Boundary monument No. 168, eccentric, 1936 (d. m.).	31	53	16.362	3	46		183	46		Boundary monument No. 168 (I. B. C.)	0.701741	5.032	16.51
	112	50	33.100										
Colorado (U. S. A.) 1936 (d. m.)	31	42	42.979	194	47	13.0	14	49	10.1	Samaniego	4.359377	22,875.8	75,052
	111	15	40.963	2	39	35.7	182	39	22.2	Jalisco	4.165471	14,637.6	48,024
				46	17	12.6	226	13	55.1	Las Gijas	4.137264	13,717.2	45,004
				349	05	27				Azimuth mark.			
Baldy Peak, 1936 (d. m.)	31	50	44.463	240	15	44.7	60	20	01.3	Samaniego	4.167512	14,706.6	48,250
	111	20	04.774	334	53	52.7	154	56	11.6	Colorado (U. S. A.)	4.214147	16,373.7	53,719
				6	56	47.6	186	55	48.5	Las Gijas	4.389041	24,492.9	80,357
				3	49	24				Azimuth mark.			
Sycamore, 1936 (d. m.)	31	45	12.641	233	14	31.7	53	19	06.2	Baldy Peak	4.232825	17,093.3	56,080
	111	28	45.631	282	31	20.9	102	38	13.6	Colorado (U. S. A.)	4.325599	21,164.1	69,436
				322	36	58.3	142	40	32.9	Las Gijas	4.248705	17,729.8	58,169
				14	36	27				Azimuth mark.			
Leon, 1936 (d. m.)	31	55	42.679	274	01	44.2	94	10	36.7	Samaniego	4.423742	26,530.3	87,041
	111	28	46.010	303	48	16.1	123	52	51.4	Baldy Peak	4.217296	16,492.9	54,110
				359	58	14.2	179	58	14.4	Sycamore	4.287919	19,405.2	63,665
				218	38	44				Azimuth mark.			
King, 1936 (d. m.)	31	58	57.990	295	44	02.0	115	49	32.1	Samaniego	4.259987	18,196.5	59,700
	111	22	22.626	346	35	17.9	166	36	30.8	Baldy Peak	4.193858	15,626.4	51,268
				59	10	12.2	239	06	49.4	Leon	4.069241	11,728.5	38,479
				32	59	41				Azimuth mark.			
Vaca, 1936 (d. m.)	32	14	54.771	228	41	09.4	48	48	26.6	Silver Bell	4.453868	28,436.0	93,294
	111	43	55.102	284	27	18.7	104	38	33.9	Roskruge	4.534951	34,272.9	112,444
				338	09	23.2	158	13	38.4	Kitts	4.529992	33,883.8	111,167
				246	33	19				Azimuth mark.			
Como, 1936 (d. m.)	32	02	04.366	197	00	27.2	17	02	54.7	Vaca	4.394761	24,817.7	81,423
	111	48	32.404	249	24	21.9	69	38	02.4	Roskruge	4.635632	43,214.8	141,781
				291	11	19.4	111	18	00.8	Kitts	4.329008	21,330.8	69,983
				295	12	29				Azimuth mark.			
Artesia, 1936 (d. m.)	31	54	24.737	178	01	32.5	358	01	22.6	Como	4.151227	14,165.3	46,474
	111	48	13.805	251	37	12.6	71	43	43.4	Kitts	4.310550	20,443.3	67,071
				122	30	00				Azimuth mark.			
Topawa, 1936 (d. m.)	31	47	00.838	188	08	44.9	8	10	05.1	Como	4.448915	28,113.5	92,236
	111	51	04.219	198	07	57.2	18	09	27.1	Artesia	4.157990	14,387.7	47,204
				229	52	05.0	50	00	05.1	Kitts	4.494536	31,227.4	102,452
				300	46	38.7	120	53	04.6	Choulic	4.352179	22,499.8	73,818
				335	22	24.5	155	23	22.8	Comely	3.844733	6,994.1	22,946
				183	47	27				Azimuth mark.			

[1] No check on this position.

PAPAGO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Sells, 1936 (d. m.)	31 58 56.616	273 26 19.8	93 36 56.6	Kitts	4.500171	31,635.2	103,907
	111 55 57.572	304 28 26.5	124 32 31.9	Artesia	4.169717	14,781.4	48,495
		1 32 02.0	181 31 55.8	Indian Oasis	4.064240	11,594.2	38,039
		320 35 40		Azimuth mark.			
Wahoo, 1936 (d. m.)	31 55 10.488	45 12 14.4	225 10 40.8	Indian Oasis	3.817092	6,562.8	21,531
	111 53 12.191	148 03 51.3	328 02 23.8	Sells	3.914246	8,208.2	26,930
		280 10 05.0	100 12 42.8	Artesia	3.901199	7,965.2	26,132
		39 34 53		Azimuth mark.			
Aspass, 1936 (d. m.)	31 49 32.809	141 46 52.2	321 45 20.9	Indian Oasis	3.866432	7,352.4	24,122
	111 53 16.316	180 35 49.0	0 35 51.2	Wahoo	4.017082	10,401.2	34,125
		221 28 02.0	41 30 41.8	Artesia	4.079303	12,003.4	39,381
		323 24 07.7	143 25 17.4	Topawa	3.765627	5,829.4	19,125
		204 59 14		Azimuth mark.			
Fresnal, 1936 (d. m.)	31 47 28.304	336 18 25.8	156 20 14.2	Choulic	4.130816	13,515.0	44,340
	111 42 16.487	56 44 53.9	236 41 14.5	Comely	4.118208	13,128.3	43,072
		86 33 06.9	266 28 29.0	Topawa	4.143323	13,909.9	45,636
		159 55 24.4	339 52 05.7	Como	4.458394	28,733.9	94,271
		243 40 56		Azimuth mark.			
Babo, 1936 (d. m.)	31 45 39.248	146 36 12.3	326 35 39.2	Topawa	3.478581	3,010.1	9,876
	111 50 01.245	254 36 26.5	74 40 31.2	Fresnal	4.103179	12,681.7	41,607
		341 54 12.9	161 54 38.1	Comely	3.606968	4,045.5	13,273
		72 21 29.5	252 16 23.4	Rocky Point	4.206249	16,078.6	52,751
		57 06 14		Azimuth mark.			
Water, 1936 (d. m.)	32 17 49.412	358 44 40.1	178 44 46.4	Roskruge	4.145890	13,992.3	45,906
	111 23 00.080	80 47 30.2	260 36 20.1	Vaca	4.522214	33,282.4	109,194
		293 34 03		Azimuth mark.			
Avra, 1936 (d. m.)	32 14 57.804	355 02 45.1	175 03 50.8	Samaniego	4.575391	37,617.6	123,417
	111 14 02.390	57 45 14.6	237 40 34.2	Roskruge	4.212025	16,293.9	53,458
		110 37 41.6	290 32 54.4	Water	4.177008	15,031.7	49,317
		323 36 23		Azimuth mark.			
Chuapa, 1936 (d. m.)	31 53 08.498	60 36 22.1	240 29 39.8	Topawa	4.362333	23,032.1	75,564
	111 38 21.506	135 51 35.2	315 46 11.8	Como	4.362043	23,016.7	75,514
		10 24 29		Azimuth mark.			

B. M. A 121, 1936 (d. m.)	31	59	28.344	46	12	33.0	226	09	16.7	Artesia	4.130533	13,506.2	44,312
	111	42	02.742	115	11	52.6	295	08	26.0	Como	4.053059	11,299.5	37,072
				59	12	47				Azimuth mark.			
School, 1936 (d. m.)	32	07	08.080	161	25	47.4	341	24	09.1	Vaca	4.180862	15,165.7	49,756
	111	40	50.603	258	25	47.6	78	35	23.4	Roskruge	4.461532	28,942.2	94,955
				191	39	58				Azimuth mark.			
San Pedro, 1936 (d. m.)	32	04	29.564	133	47	46.5	313	40	57.7	Vaca	4.444881	27,853.6	91,383
	111	31	07.086	230	48	02.3	50	52	27.5	Roskruge	4.226870	16,860.5	55,316
				299	11	39				Azimuth mark.			
Hut, 1936 (d. m.)	32	13	41.068	97	04	09.1	276	57	53.3	Vaca	4.269124	18,583.4	60,969
	111	32	10.604	187	59	23.1	8	00	23.5	Silver Bell	4.326891	21,227.1	69,643
				306	24	56				Azimuth mark.			
B. M. A 113, 1936 (d. m.)	32	04	37.761	330	04	29.0	150	08	02.3	Samaniego	4.326341	21,200.2	69,554
	111	18	41.280	43	58	03.7	223	52	43.3	Leon	4.359488	22,881.7	75,071
				74	23	49				Azimuth mark.			
Pino Blanco, 1936 (d. m.)	31	59	58.081	358	21	45.4	178	21	51.0	Samaniego	3.989839	9,768.8	32,050
	111	12	09.370	73	20	35.7	253	11	48.1	Leon	4.436599	27,327.4	89,657
				344	58	43				Azimuth mark.			
Batamote, 1936 (d. m.)	31	47	12.423	18	51	58.0	198	51	01.4	Colorado (U. S. A.)	3.942975	8,769.5	28,771
	111	13	53.267	81	08	10.9	261	00	21.1	Sycamore	4.376023	23,769.7	77,984
				0	30	01				Azimuth mark.			
Brown, 1936 (d. m.)	31	45	23.444	189	03	05.3	9	04	06.3	Leon	4.285860	19,313.5	63,364
	111	30	41.675	276	12	33.7	96	13	34.7	Sycamore	3.487440	3,072.1	10,079
Boundary monument No. 151 (I. B. C.) (U. S.-Mex.), 1936 (d. m.).	31	39	42.746	240	53	56.3	60	57	35.0	Rocky Point	4.098495	12,545.7	41,160
	112	06	39.553	290	50	22.4	110	51	30.2	Boundary monument No. 150 eccentric.	3.561440	3,642.8	11,951
Boundary monument No. 149 (I. B. C) (U. S.-Mex.), 1936 (d. m.).	31	38	17.075	109	27	58.7	289	26	43.1	Boundary monument No. 150 eccentric.	3.605240	4,029.4	13,220
	112	02	06.150										
				203	18	31.9	23	19	47.0	Rocky Point	3.978244	9,511.4	31,205
Boundary monument No. 145 (I. B. C.) (U. S.-Mex.), 1936 (d. m.).	31	34	08.315	178	31	50.5	358	31	41.6	Comely	4.241560	17,440.5	57,219
	111	48	56.527	290	14	21.2	110	16	04.0	Boundary monument No. 144 (I. B. C.)	3.742273	5,524.2	18,124
Target on peak south of Baldy Peak, 1936 (n. d.)	31	49	30.860	298	47	07.0	118	49	42.3	Batamote	3.946882	8,848.8	29,031
	111	18	48.042	338	35	16.0	158	36	54.5	Colorado (U. S. A.)	4.130100	13,492.7	44,267
				63	12	37.0	243	07	22.2	Sycamore	4.245976	17,618.8	57,804
Palo Alto Ranch, well, 1936 (n. d.) [1]	31	52	58.90	305	17	59	125	19	56	Baldy Peak	3.855087	7,162.9	23,500
	111	23	47.12	28	41	14	208	38	37	Sycamore	4.213964	16,366.8	53,697
Palo Alto Ranch, wator tank 1936 (n. d.) [1]	31	52	54.81	29	53	27	209	50	43	Sycamore	4.215247	16,415.2	53,856
	111	23	34.80	122	19	41	302	16	56	Leon	3.985032	9,674.6	31,741

[1] No check on this position.

PAPAGO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Poso Nuevo Ranch, well 1936 (n. d.) [1]	31 47 15.15	68 56 22	248 53 06	Sycamore	4.020654	10,487.1	34,406
	111 22 33.78	211 17 04	31 18 22	Baldy Peak	3.877636	7,544.6	24,753
Dim, 1936 (d. m.)	32 32 21.384	297 59 11.4	118 04 45.5	Sauceda	4.264622	18,391.7	60,340
	112 45 44.845	17 24 58.5	197 22 24.7	Ajo	4.399089	25,066.2	82,238
		202 24 35		Azimuth mark.			
Hat Brim, 1936 (d. m.)	32 38 04.404	323 33 34.8	143 38 26.8	Sauceda	4.377788	23,866.5	78,302
	112 44 25.789	11 02 49.8	191 02 07.2	Dim	4.032038	10,765.6	35,320
		15 30 43.5	195 27 27.0	Ajo	4.553702	35,785.1	117,405
Moivavi, 1936 (d. m.)	32 31 55.493	57 06 45.0	237 02 35.6	Sauceda	4.159460	14,436.4	47,363
	112 27 38.791	113 28 21.4	293 19 19.1	Hat Brim	4.456619	28,616.7	93,887
		84 11 35		Azimuth mark.			
Maricopa 2, 1936 (d. m.)	32 45 08.164	17 26 31.8	197 23 53.2	Moivavi	4.408091	25,591.2	83,960
	112 22 44.846	31 33 08.3	211 26 19.7	Sauceda	4.577927	37,837.9	124,140
		69 01 52.6	248 50 09.9	Hat Brim	4.560094	36,315.7	119,146
		5 05 17		Azimuth mark.			
Bitter, 1936 (d. m.)	32 37 54.915	70 14 37.6	250 04 04.2	Moivavi	4.513415	32,614.8	107,004
	112 08 02.551	120 12 31.9	300 04 35.4	Maricopa 2	4.424510	26,577.2	87,195
		334 10 13		Azimuth mark.			
Kaka, 1936 (d. m.)	32 28 55.502	113 43 22.9	293 39 02.7	Moivavi	4.139904	13,800.8	45,278
	112 19 34.629	170 36 57.6	350 35 15.1	Maricopa 2	4.482437	30,369.5	99,637
		227 19 33.2	47 25 45.6	Bitter	4.389829	24,537.4	80,503
		265 11 08		Azimuth mark.			
Sheridan, 1936 (d. m.)	32 24 02.542	114 10 00.1	294 03 06.1	Kaka	4.344234	22,091.9	72,480
	112 06 42.684	175 21 28.6	355 20 45.7	Bitter	4.410348	25,724.6	84,398
		228 33 13		Azimuth mark.			
Komelih, 1936 (d. m.)	32 29 51.629	55 58 12.1	235 52 45.6	Sheridan	4.283120	19,192.0	62,966
	111 56 34.076	129 42 24.5	309 36 14.0	Bitter	4.367871	23,327.7	76,534
		153 06 41		Azimuth mark.			
Wind, 1936 (d. m.)	32 21 27.041	150 21 55.8	330 19 14.4	Kaka	4.201295	15,896.3	52,153
	112 14 33.594	248 42 11.6	68 46 23.7	Sheridan	4.120860	13,208.7	43,336
		223 44 29		Azimuth mark.			

Rosa, 1936 (d. m.)	32	20	04.006	300	46	23.9	120	51	50.0	Vaca	4.269329	18,592.1	60,998
	111	54	05.331	110	24	56.7	290	18	11.3	Sheridan	4.324676	21,119.1	69,288
				167	53	32.1	347	52	12.4	Komelih	4.267478	18,513.1	60,738
				82	35	06				Azimuth mark.			
Brownell, 1936 (d. m.)	32	12	15.933	152	19	03.3	332	16	01.4	Wind	4.282713	19,174.0	62,907
	112	08	52.908	188	53	12.3	8	54	21.9	Sheridan	4.343019	22,030.2	72,277
				238	06	27.8	58	14	21.6	Rosa	4.436797	27,339.9	89,698
				262	46	41.4	83	00	00.1	Vaca	4.596843	39,522.4	129,666
				300	23	50.7	120	34	39.6	Como	4.569706	37,128.4	121,812
				341	28	31				Azimuth mark.			
Bee, 1936 (d. m.)	32	13	57.345	80	01	24.5	259	55	24.9	Brownell	4.253859	17,941.5	58,863
	111	57	38.221	206	14	21.2	26	16	14.9	Rosa	4.100136	12,593.2	41,316
				265	14	47.1	85	22	06.3	Vaca	4.334889	21,621.7	70,937
				326	52	40.2	146	57	30.6	Como	4.418461	26,209.6	85,989
				172	01	53				Azimuth mark.			
Hat Brim azimuth, 1936 (d. m.)	32	37	55.426	251	25	10.0	71	25	27.0	Hat Brim	2.938543	868.0	2,848
	112	44	57.355	321	35	39.0	141	40	48.0	Sauceda	4.382861	24,146.9	79,222
Dry, 1936 (d. m.)	32	45	20.119	270	41	35.4	90	51	03.4	Maricopa 2	4.436621	27,328.8	89,661
	112	40	14.583	321	28	01.6	141	34	49.3	Moivavi	4.500514	31,660.2	103,872
				171	30	36				Azimuth mark.			
Desolate, 1936 (d. m.)	32	44	56.176	268	21	18.5	88	25	52.1	Maricopa 2	4.119560	13,169.2	43,206
	112	31	10.522	347	03	34.0	167	05	28.2	Moivavi	4.392227	24,673.3	80,949
				186	23	06				Azimuth mark.			
Saw, 1936 (d. m.)	32	36	20.325	231	20	36.7	51	27	38.8	Maricopa 2	4.416031	26,063.4	85,510
	112	35	46.690	302	37	22.2	122	41	44.8	Moivavi	4.179468	15,117.1	49,597
				285	31	59				Azimuth mark.			
Noroad, 1936 (d. m.)	32	40	05.153	4	15	25.7	184	15	02.5	Moivavi	4.179698	15,125.1	49,623
	112	26	55.766	82	20	17.7	262	10	51.2	Hat Brim	4.441172	27,616.7	90,606
				34	11	08				Azimuth mark.			
Peri, 1936 (d. m.)	32	22	37.166	120	35	34.9	300	30	09.7	Sauceda	4.264823	18,400.2	60,368
	112	25	16.500	167	49	00.8	347	47	44.4	Moivavi	4.245395	17,595.2	57,727
				40	42	17				Azimuth mark.			
Quajote, 1936 (d. m.)	32	37	16.094	339	42	49.0	159	44	33.3	Komelih	4.164210	14,595.2	47,884
	111	59	47.915	95	20	07.7	275	15	41.1	Bitter	4.112264	12,949.8	42,486
				334	13	26				Azimuth mark.			
Osity, 1936 (d. m.)	32	30	24.246	188	51	00.3	8	51	45.0	Bitter	4.147669	14,049.8	46,095
	112	09	25.474	272	47	55.6	92	54	50.1	Komelih	4.304535	20,162.1	66,148
				270	37	57				Azimuth mark.			

[1] No check on this position.

PAPAGO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distanec		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Stanley, 1936 (d. m.)	32 17 45.187	230 21 50.1	50 26 37.6	Sheridan	4.260943	18,236.6	59,831
	112 15 40.078	313 32 47.3	133 36 24.5	Brownell	4.167688	14,712.6	48,270
		181 53 19		Azimuth mark.			
B. M. A 85, 1936 (d. m.)	32 20 17.023	97 10 59.3	277 05 06.8	Wind	4.239698	17,365.9	56,975
	112 03 34.623	144 43 30.2	324 41 49.5	Sheridan	3.929949	8,510.4	27,921
		212 11 10		Azimuth mark.			
Santa, 1936 (d. m.)	32 19 28.511	37 35 05.9	217 31 36.9	Brownell	4.225504	16,807.5	55,143
	112 02 21.483	100 51 03.5	280 44 31.9	Wind	4.289822	19,490.5	63,945
		30 53 10		Azimuth mark.			
Covered, 1936 (d. m.)	32 10 00.759	153 39 03.8	333 38 21.9	Brownell	3.667131	4,646.6	15,245
	112 07 34.165	256 12 00.6	76 24 37.0	Vaca	4.582651	38,251.7	125,497
		124 33 01		Azimuth mark.			
Lorenzo, 1936 (d. m.)	32 08 54.306	104 10 35.7	284 02 13.4	Brownell	4.406214	25,480.9	83,599
	111 53 09.624	175 57 36.5	355 57 06.7	Rosa	4.315543	20,679.6	67,846
		313 02 35		Azimuth mark.			
Cababi, 1936 (d. m.)	32 03 57.602	136 50 34.5	316 45 42.0	Brownell	4.323365	21,055.5	69,080
	111 59 43.011	228 25 38.8	48 29 07.9	Lorenzo	4.139256	13,780.2	45,211
		141 17 08		Azimuth mark.			
G. L. O. Station No. 16, 1936 (d. m.)	32 30 23.630	342 46 00.9	162 46 07.1	Komelih	3.013713	1,032.1	3,386
	111 56 45.786	90 06 41.5	269 59 53.2	Osity	4.297331	19,830.4	65,060
		128 16 09.2	308 10 04.9	Bitter	4.351599	22,469.8	73,720
G. L. O. Station No. 19, 1936 (d. m.)	32 19 50.659	58 14 21.1	238 06 40.7	Brownell	4.424254	26,561.6	87,144
	111 54 30.599	93 18 25.2	273 13 34.2	B. M. A 85	4.153843	14,250.9	46,755
		112 07 14.5	292 00 42.6	Sheridan	4.314969	20,652.3	67,757
G. L. O. Station No. 15, 1936 (d. m.)	32 04 17.964	188 02 33.0	8 03 56.8	Rosa	4.468793	29,430.2	96,556
	111 56 42.769	287 42 08.6	107 46 28.8	Como	4.130531	13,506.1	44,311
		353 09 50.0	173 10 14.0	Sells	3.998636	9,968.6	32,705
G. L. O. Station No. 21, 1936 (d. m.)	31 56 37.784	36 38 09.8	216 36 20.5	Indian Oasis	3.959649	9,112.7	29,897
	111 52 42.487	129 52 02.0	309 50 18.7	Sells	3.824317	6,672.9	21,893
		300 07 07.8	120 09 29.9	Artesia	3.911776	8,161.6	26,777

Mica, 1936 (d. m.)	33	17	52.789	127	53	08.7	307	51	39.3	Buckeye	3.727233	5,336.2	17,507
	112	31	11.839	230	12	45.2	50	16	18.2	Bradley	4.115172	13,036.8	42,772
				180	33	37				Azimuth mark.			
Spur, 1936 (d. m.)	33	17	17.755	93	36	15.2	273	30	06.4	Mica	4.240955	17,416.3	57,140
	112	20	00.005	101	28	03.2	281	20	24.9	Buckeye	4.342959	22,027.2	72,268
				142	02	21.9	321	59	45.7	Bradley	4.077274	11,947.4	39,197
				357	41	11				Azimuth mark.			
Ora, 1936 (d. m.)	33	10	35.132	158	46	36.2	338	44	45.3	Mica	4.160331	14,465.4	47,459
	112	27	49.440	224	22	58.3	44	27	15.6	Spur	4.239700	17,366.0	56,975
				212	36	33				Azimuth mark.			
Section, 1936 (d. m.)	33	10	28.009	90	53	39.7	270	48	27.6	Ora	4.169555	14,775.9	48,477
	112	18	19.186	124	28	07.6	304	21	04.1	Mica	4.384662	24,247.2	79,551
				168	19	25.5	348	18	30.2	Spur	4.110258	12,890.2	42,291
				87	59	42				Azimuth mark.			
Enid, 1936 (d. m.)	33	04	51.047	113	26	04.9	293	17	27.5	Ora	4.427008	26,730.6	87,699
	112	12	02.796	136	48	09.4	316	44	43.7	Section	4.153700	14,246.2	46,739
				346	04	36				Azimuth mark.			
Estrella, 1936 (d. m.)	33	01	56.691	184	05	46.1	4	06	10.2	Ora	4.204453	16,012.3	52,534
	112	28	33.587	258	07	19.9	78	16	20.4	Enid	4.419286	26,259.5	86,153
				304	13	38				Azimuth mark.			
Big Horn, 1936 (d. m.)	32	54	33.776	156	04	50.8	336	02	43.8	Estrella	4.174009	14,928.3	48,977
	112	24	40.348	225	54	27.3	46	01	19.8	Enid	4.437061	27,356.5	89,752
				350	12	31.8	170	13	34.4	Maricopa 2	4.247500	17,680.7	58,007
				48	48	26				Azimuth mark.			
Ham, 1936 (d. m.)	32	53	04.550	52	22	56.2	232	16	20.2	Maricopa 2	4.380430	24,012.1	78,780
	112	10	34.210	97	11	17.5	277	03	37.9	Big Horn	4.345612	22,162.2	72,710
				120	23	56.4	300	14	09.1	Estrella	4.511545	32,474.7	106,544
				173	58	25.9	353	57	37.6	Enid	4.340154	21,885.4	71,802
				292	56	00				Azimuth mark.			
Bench, 1936 (d. m.)	32	45	28.176	348	46	37.7	168	47	35.1	Bitter	4.153333	14,234.2	46,700
	112	09	48.829	88	18	37.4	268	11	37.5	Maricopa 2	4.305569	20,210.1	66,306
				126	00	13.4	305	52	10.0	Big Horn	4.456938	28,637.7	93,956
				175	12	13.4	355	11	48.8	Ham	4.149466	14,108.0	46,286
				68	10	45				Azimuth mark.			
Lorue, 1936 (d. m.)	32	38	14.480	143	56	28.7	323	53	16.1	Maricopa 2	4.197794	15,768.6	51,734
	112	16	48.301	219	14	49.1	39	18	35.7	Bench	4.237012	17,258.9	56,624
				272	28	43.4	92	33	26.9	Bitter	4.137277	13,717.6	45,005
				271	36	20				Azimuth mark.			
Liberty, 1936 (d. m.)	33	22	39.431	273	19	56.5	93	22	55.4	Bradley	3.925314	8,420.0	27,625
	112	30	09.479	46	21	59.6	226	19	55.8	Buckeye	3.905650	8,047.3	26,402
				10	01	47				Azimuth mark.			

PAPAGO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Rain, 1936 (d. m.)	33 14 48.531	159 50 07.2	339 49 23.0	Mica	3.781566	6,047.4	19,841
	112 29 51.264	253 14 01.3	73 19 25.7	Spur	4.203525	15,978.1	52,421
		97 34 55		Azimuth mark.			
Bow, 1936 (d. m.)	33 08 10.356	211 27 59.7	31 28 57.3	Ora	3.718460	5,229.5	17,157
	112 29 34.805	282 36 22.1	102 45 56.7	Enid	4.446521	27,959.0	91,729
		41 25 45		Azimuth mark.			
Pile, 1936 (d. m.)	33 06 19.278	201 01 14.0	21 02 16.1	Section	3.914307	8,209.3	26,933
	112 20 12.843	282 02 08.2	102 06 35.7	Enid	4.113796	12,995.6	42,636
		302 04 30		Azimuth mark.			
Oco, 1936 (d. m.)	32 53 45.861	259 55 59.0	79 58 53.2	Big Horn	3.927591	8,464.3	27,770
	112 30 01.055	324 32 11.0	144 36 07.4	Maricopa 2	4.291636	19,572.0	64,212
		297 56 53		Azimuth mark.			
Vekol, 1936 (d. m.)	32 50 30.250	116 18 41.5	296 13 24.1	Big Horn	4.229196	16,951.0	55,613
	112 14 55.623	235 00 48.0	55 03 09.9	Ham	3.918757	8,293.9	27,211
		282 49 42		Azimuth mark.			
Mobile, 1936 (d. m.)	32 58 54.469	106 08 54.0	286 02 05.6	Estrella	4.306482	20,252.7	66,446
	112 16 03.940	209 39 04.6	29 41 16.1	Enid	4.101821	12,642.2	41,477
		109 02 05		Azimuth mark.			
Ocapos, 1936 (d. m.)	32 59 27.636	202 56 43.9	22 57 24.7	Estrella	3.697798	4,986.5	16,360
	112 29 48.501	272 40 12.1	92 47 41.0	Mobile	4.331084	21,433.0	70,318
		166 40 50		Azimuth mark.			
G. L. O. Station No. 20, 1936 (d. m.)	32 40 50.808	309 58 39.5	130 00 53.2	Bitter	3.925824	8,429.9	27,657
	112 12 10.367	56 24 06.0	236 21 36.0	Lorue	3.939395	8,697.5	28,535
		115 40 43.2	295 35 00.2	Maricopa 2	4.263187	18,331.0	60,141
T. 3 S., R. 1 W., sec. 12, southeast corner, 1936 (d. m.)[1]	33 10 27.18	204 44 53	24 44 53	Section	1.446413	27.952	91.71
	112 18 19.64						
T. 9 S., R. 1 E., secs. 17 and 20, ¼ corner, 1936 (d. m.)[1]	32 38 14.17	178 07	358 07	Lorue	0.979321	9.535	31.28
	112 16 48.29						
McEuen, 1936 (d. m.)	32 25 10.370	270 25 17.0	90 33 43.0	Silver Bell	4.391992	24,659.9	80,905
	111 46 01.438	350 06 22.4	170 07 30.0	Vaca	4.284379	19,247.7	63,148
		87 47 23		Azimuth mark.			

Volcanic, 1936 (d. m.)	32	31	53.733	307	44	43.4	127	50	18.5	Silver Bell	4.314310	20,621.0	67,654
	111	40	41.737	33	55	13.9	213	52	22.2	McEuen	4.175191	14,968.9	49,110
				153	23	42				Azimuth mark.			
Rotten, 1936 (d. m.)	32	33	30.705	4	53	46.8	184	53	19.3	Silver Bell	4.195366	15,680.7	51,446
	111	29	26.462	80	25	42.3	260	19	39.0	Volcanic	4.252144	17,870.8	58,631
				124	44	58				Azimuth mark.			
Toltec, 1936 (d. m.)	32	42	16.790	313	41	24.5	133	47	14.9	Rotten	4.369951	23,439.6	76,901
	111	40	16.135	1	59	37.4	181	59	23.6	Volcanic	4.283396	19,204.2	63,006
				154	48	00				Azimuth mark.			
Jack, 1936 (d. m.)	32	40	02.043	258	27	49.0	78	34	52.8	Toltec	4.319312	20,859.9	68,438
	111	53	20.845	307	10	25.8	127	17	14.8	Volcanic	4.395526	24,861.4	81,566
				130	14	28				Azimuth mark.			
Chui, 1936 (d. m.)	32	45	36.441	299	48	32.0	119	52	14.6	Toltec	4.092025	12,360.2	40,552
	111	47	07.899	43	20	40.7	223	17	19.1	Jack	4.150999	14,157.9	46,450
				346	51	12				Azimuth mark.			
Bur, 1936 (d. m.)	32	46	00.949	272	12	05.0	92	18	43.3	Chui	4.282686	19,172.8	62,903
	111	59	23.928	319	26	02.8	139	29	19.0	Jack	4.162798	14,547.8	47,729
				264	29	51				Azimuth mark.			
B. M. Z 82, 1936 (d. m.)	32	52	46.378	332	00	58.6	152	03	25.1	Chui	4.175943	14,994.9	49,196
	111	51	38.201	44	09	42.6	224	05	30.2	Bur	4.240531	17,399.3	57,084
				90	16	30				Azimuth mark.			
Double (U. S. G. S.), 1936 (d. m.)	32	52	18.621	98	09	25.3	278	05	58.4	Ham	4.000296	10,006.8	32,831
	112	04	13.132	267	26	54.0	87	33	43.8	B. M. Z 82	4.293227	19,643.9	64,448
				327	05	25.9	147	08	02.7	Bur	4.141592	13,854.5	45,454
				295	43	20				Azimuth mark.			
Bon, 1936 (d. m.)	32	58	05.434	336	32	39.5	156	34	08.7	B. M. Z 82	4.029910	10,713.0	35,148
	111	54	22.240	55	12	43.5	235	07	22.4	Double (U. S. G. S.)	4.271950	18,704.7	61,367
				294	26	47				Azimuth mark.			
Duty, 1936 (d. m.)	33	01	43.532	294	06	23.5	114	11	37.9	Bon	4.215423	16,421.9	53,878
	112	03	59.453	1	10	14.3	181	10	06.9	Double (U. S. G. S.)	4.240700	17,406.0	57,106
				32	42	06.7	212	38	32.0	Ham	4.278586	18,992.7	62,312
				114	46	13.8	294	41	50.1	Enid	4.140077	13,806.3	45,296
				265	48	44				Azimuth mark.			
Tooth, 1936 (d. m.)	32	34	04.955	297	06	09.4	117	08	52.1	Volcanic	3.947703	8,865.5	29,086
	111	45	44.157	1	34	14.3	181	34	05.0	McEuen	4.216777	16,473.2	54,046
				147	37	24				Azimuth mark.			
Slate, 1936 (d. m.)	32	22	06.390	33	21	02.4	213	18	03.8	Vaca	4.201707	15,911.3	52,202
	111	38	20.944	115	14	55.1	295	10	48.4	McEuen	4.123945	13,302.9	43,645
				132	34	33				Azimuth mark.			

[1] No check on this position.

PAPAGO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Heath, 1936 (d. m.)	33 30 03.147	31 29 36.4	211 26 31.5	Bradley	4.220243	16,605.2	54,479
	112 19 08.729	118 45 30.7	298 44 06.8	Litchfield	3.650275	4,469.7	14,664
		12 58 41		Azimuth mark.			
Pok, 1936 (d. m.)	33 30 00.139	259 19 49.9	79 24 05.4	Litchfield	4.084621	12,151.3	39,866
	112 29 23.288	302 42 34.7	122 43 51.7	Brown	3.631549	4,281.0	14,045
		295 00 05		Azimuth mark.			
Alhambra, 1936 (d. m.)	33 29 39.491	261 43 32.6	81 49 06.9	Camels Back	4.198540	15,795.7	51,823
	112 07 44.915	315 47 49.6	135 49 36.9	Court House	3.858083	7,212.5	23,663
		95 12 39		Azimuth mark.			
Jokake, 1936 (d. m.)	33 30 06.777	61 38 30.2	241 34 32.5	Court House	4.101903	12,644.5	41,484
	111 57 19.403	160 10 28.3	340 10 17.4	Camels Back	3.178802	1,509.4	4,952
		87 16 33		Azimuth mark.			
Falfa, 1936 (d. m.)	33 20 59.996	5 01 19.6	185 00 39.6	Gila Butte	4.335090	21,631.7	70,970
	111 50 27.562	148 37 40.8	328 33 43.0	Camels Back	4.330416	21,400.1	70,210
		177 41 14		Azimuth mark.			
Canarr, 1936 (d. m.)	33 19 36.075	29 13 30.1	209 09 45.8	Gila Butte	4.336916	21,722.8	71,269
	111 44 51.363	136 28 59.0	316 21 56.1	Camels Back	4.459099	28,780.5	94,424
		38 19 03		Azimuth mark.			
San, 1936 (d. m.)	33 14 55.192	55 09 18.6	235 04 06.0	Gila Butte	4.255887	18,025.5	59,139
	111 42 09.767	140 54 55.8	320 46 24.4	Camels Back	4.580331	38,047.9	124,829
		88 48 43		Azimuth mark.			
Governor Hunt's Tomb, center, 1936 (n. d.) [1]	33 27 06.65	87 51 55	267 47 34	Court House	4.087246	12,224.9	40,108
	111 56 37.23	167 04 02	347 03 28	Camels Back	3.854349	7,150.7	23,460
Treadway, 1936 (d. m.)	32 49 33.566	164 19 38.4	344 18 35.9	Stack	4.044578	11,081.0	36,355
	111 18 47.394	229 31 20.9	49 36 22.5	Loma	4.278183	18,975.1	62,254
		264 52 38		Azimuth mark.			
Smoke, 1936 (d. m.)	32 51 29.189	74 43 41.8	254 39 10.5	Treadway	4.130013	13,490.0	44,258
	111 10 27.073	113 59 50.7	293 54 16.5	Stack	4.243192	17,506.2	57,435
		189 19 31.9	9 20 01.9	Loma	3.947559	8,862.6	29,077
		96 36 15		Azimuth mark.			

North Hill, 1936 (d. m.)	32	44	51.099	118	58	55.1	298	53	27.6	Treadway	4.254883	17,983.9	59,002
	111	08	42.572	167	30	25.5	347	29	28.9	Smoke	4.099020	12,560.9	41,210
				211	11	03				Azimuth mark.			
Clemens, 1936 (n. d.)	32	43	41.044	174	38	34.3	354	38	13.1	Treadway	4.037706	10,907.0	35,784
	111	18	08.244	261	37	17.7	81	42	23.6	North Hill	4.172756	14,885.2	48,856
				91	55	04				Azimuth mark.			
Box "O", 1936 (d. m.)	32	54	31.824	102	45	23.7	282	40	34.5	Loma	4.151372	14,170.1	46,490
	111	00	39.796	170	39	58.7	350	39	13.4	Donelley	4.124449	13,318.3	43,695
				126	20	36				Azimuth mark.			
Picket Post, 1936 (d. m.)	33	15	23.815	310	34	23.0	130	38	41.0	Granite Mountain	4.206163	16,075.4	52,741
	111	09	25.752	46	25	11.4	226	16	57.0	Posten	4.510180	32,372.8	106,210
				221	34	02				Azimuth mark.			
B. M. 3761 (U. S. G. S.), 1936 (d. m.)	33	12	11.407	327	43	12.1	147	44	12.6	Granite Mountain	3.729534	5,364.6	17,600
	111	03	25.089	122	25	57.5	302	22	39.8	Picket Post	4.043785	11,060.8	36,289
Klein, 1936 (d. m.)	33	14	35.102	267	19	51.3	87	31	39.3	Picket Post	4.524508	33,458.6	109,772
	111	30	56.969	334	15	30.9	154	19	02.7	Posten	4.364267	23,134.9	75,902
				289	58	59				Azimuth mark.			
Magma, 1936 (d. m.)	33	08	03.038	246	58	10.3	67	09	28.6	Picket Post	4.542126	34,843.8	114,317
	111	30	04.595	315	14	25.4	135	17	28.3	Posten	4.091311	12,339.9	40,485
				322	25	20				Azimuth mark.			
Pasture, 1936 (d. m.)	33	10	00.650	22	27	56.3	202	26	08.5	Posten	4.127274	13,405.2	43,980
	111	21	12.231	75	19	33.1	255	14	42.0	Magma	4.154252	14,264.4	46,799
				241	23	37.5	61	30	04.5	Picket Post	4.318677	20,829.4	68,338
				187	08	26				Azimuth mark.			
Palo, 1936 (d. m.)	33	08	09.079	34	07	06.0	214	04	58.4	Posten	4.033867	10,811.0	35,469
	111	20	35.944	164	42	04.1	344	41	44.2	Pasture	3.551868	3,563.4	11,691
Lore, 1936 (d. m.)	33	14	56.855	267	09	55.6	87	15	57.4	Picket Post	4.232953	17,098.3	56,097
	111	20	25.508	7	33	27.0	187	33	01.4	Pasture	3.964026	9,205.0	30,200
				197	52	23				Azimuth mark.			
Tortilla, 1936 (d. m.)	33	01	23.183	95	30	28.1	275	17	18.3	Posten	4.576999	37,757.1	123,875
	111	00	21.044	172	58	01.3	352	57	21.1	Granite Mountain	4.191752	15,550.8	51,020
				73	12	48				Azimuth mark.			
Kel, 1936 (d. m.)	33	05	49.393	357	45	38.1	177	45	38.3	Kelvin	2.396723	249.3	818
	110	55	08.864	125	54	52.2	305	51	21.5	Granite Mountain	4.091281	12,339.0	40,482
Ray, 1936 (d. m.)	33	11	06.588	319	24	58.1	139	27	54.5	Kel	4.109310	12,862.0	42,198
	111	00	31.544	32	43	55.9	212	43	21.5	Granite Mountain	3.479740	3,018.1	9,902
				296	05	47				Azimuth mark.			

[1] No check on this position.

PAPAGO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Molenitus, 1936 (d. m.)	31 49 20.571	45 30 58.0	225 27 59.9	Boundary monument No. 156 (I. B. C.)	4.096054	12,475.4	40,930
	112 16 45.773	175 52 59.0	355 52 43.4	Kopeka	4.034163	10,818.4	35,493
		354 47 12		Azimuth mark.			
Boundary monument No. 155 (I. B. C.), (U. S.-Mex.), 1936 (d.m.).	31 43 37.017	109 57 32.8	289 55 51.7	Boundary monument No. 156 (I. B. C.)	3.730952	5,382.1	17,658
	112 19 11.726	188 08 31.4	8 09 32.8	Kopeka	4.334251	21,589.9	70,833
		199 56 13.9	19 57 30.8	Molenitus	4.051414	11,256.8	36,932
		114 17 14		Azimuth mark.			
Tecolate, 1936 (d. m.)	31 45 55.574	134 25 06.1	314 19 15.3	Kopeka	4.388451	24,459.7	80,248
	112 06 10.346	179 29 38.6	359 29 36.3	Plain	4.111293	12,920.9	42,391
		85 33 26		Azimuth mark.			
Stone tank, 1936 (d. m.)	31 54 21.669	186 54 14.8	6 54 40.4	Comeva	4.024145	10,571.7	34,684
	112 22 56.114	260 21 40.4	80 24 40.5	Kopeka	3.958131	9,080.9	29,793
		300 22 31		Azimuth mark.			
Boundary monument No. 158 (I. B. C.), (U. S.-Mex.), 1936 (d. m.).	31 46 11.922	224 16 23.5	44 21 48.8	Kopeka	4.365538	23,202.7	76,124
	112 27 31.871	289 53 07.8	109 55 49.8	Boundary monument No. 156 (I. B. C.)	3.935492	8,619.7	28,280
		286 01 14		Azimuth mark.			
G. L. O. Station No. 1, 1936 (d. m.)	31 45 28.733	109 55 25.4	289 54 12.0	Boundary monument No. 158 (I. B. C.)	3.591678	3,905.5	12,813
	112 25 12.336	241 46 49.1	61 51 15.9	Molenitus	4.179529	15,119.2	49,604
		289 53 28.1	109 54 56.7	Boundary monument No. 156 (I. B. C.)	3.673408	4,714.2	15,467
Windmill at stone tank, 1936 (n. d.).	31 54 20.895	110 58 38.8	290 58 37.6	Stone Tank	1.823409	66.59	218.5
	112 22 53.748	186 33 17.7	6 33 42.1	Comeva	4.024818	10,588.1	34,738
Pisinemo, stone windmill, center of top of tower, 1936 (n. d.) [1].	32 02 19.14	23 10 20	203 08 13	Stone Tank	4.203979	15,994.8	52,476
	112 18 56.58	49 59 42	229 58 00	Comeva	3.816191	6,549.2	21,487
G. L. O. Station No. 2, 1936 (d. m.)	31 53 44.299	132 26 23.6	312 25 58.3	Stone Tank	3.231926	1,705.8	5,596
	112 22 08.204	180 03 54.5	0 03 54.8	Comeva	4.066176	11,646.0	38,209
G. L. O. Station No. 3, 1936 (d. m.)	31 58 57.445	35 43 18.0	215 41 15.0	Stone Tank	4.019541	10,460.2	34,318
	112 19 03.685	112 30 48.1	292 29 10.6	Comeva	3.718384	5,228.6	17,154
G. L. O. Station No. 4, 1936 (d. m.)	32 04 11.259	236 56 43.1	56 59 21.5	Llano	3.969826	9,328.8	30,606
	112 31 20.264	297 49 24.1	117 54 17.2	Comeva	4.214842	16,399.9	53,805

G. L. O. Station No. 5, reference mark No. 1, 1936 (d. m.).	32	12	13.017	71	20	45.7	251	20	31.3	Nine Mile Peak	2.872975	746.4	2,449
	112	31	20.102										
G. L. O. Station No. 5, 1936 (d. m.)	32	12	01.623	99	01	00.3	279	00	45.9	Nine Mile Peak	2.854932	716.0	2,349
	112	31	20.102	180	00	08.0	0	00	08.0	G. L. O. Station No. 5, reference mark No. 1.	2.545255	350.958	1,151.43
G. L. O. Station No. 8, reference mark No. 1, 1936 (d. m.).	32	35	44.960	219	20	19.6	39	25	14.7	Maricopa 2	4.351120	22,445.0	73,638
	112	31	51.402	316	59	16.8	137	01	32.8	Moivavi	3.985145	9,663.7	31,705
G. L. O. Station No. 8, 1936 (d. m.) [1]	32	35	34.39	238	31		58	31		G. L. O. Station No. 8, reference mark No. 1.	2.794785	623.426	2,045.36
	112	32	11.79										
G. L. O. Station No. 9, 1936 (d. m.)	32	14	38.475	192	26	54.0	12	27	16.2	Grande	3.703589	5,053.5	16,580
	112	25	11.663	300	20	33.7	120	25	46.0	Blanco	4.250248	17,793.0	58,376
				7	22	56.1	187	22	18.7	Llano	4.156937	14,352.8	47,089
G. L. O. Station No. 10, 1936 (d. m.)	32	11	09.005	55	54	49.1	235	50	55.9	Llano	4.142193	13,873.7	45,517
	112	19	03.717	143	08	38.2	323	05	44.1	Grande	4.153366	14,235.3	46,704
				294	01	02.9	114	02	59.0	Blanco	3.796323	6,256.4	20,526
G. L. O. Station No. 11, 1936 (d. m.)	32	20	43.982	350	17	55.6	170	18	17.7	Grande	3.807234	6,415.6	21,049
	112	25	11.348	61	03	49.2	241	00	32.4	Redondo	4.041634	11,006.1	36,109
G. L. O. Station No. 14, 1936 (d. m.)	32	47	31.224	17	24	37.2	197	24	14.2	Chui	3.568855	3,705.6	12,157
	111	46	25.304	82	14	38.7	262	07	37.2	Bur	4.310757	20,453.0	67,103
G. L. O. Station No. 17, 1936 (d. m.)	32	30	23.676	202	14	32.5	22	15	30.0	Tooth	3.867146	7,364.5	24,162
	111	47	31.024	255	24	42.9	75	28	22.9	Volcanic	4.042835	11,036.6	36,209
G. L. O. Station No. 18, 1936 (d. m.)	32	25	20.435	273	42	48.4	93	45	32.3	Silver Bell	3.903378	8,005.3	26,264
	111	35	23.417	34	48	46.6	214	44	12.9	Vaca	4.370374	23,462.5	76,977
G. L. O. Station No. 23, 1936 (d. m.)	32	31	16.137	232	38	21.1	52	43	53.8	Bitter	4.306724	20,263.9	66,482
	112	18	20.435	306	11	12.7	126	17	27.2	Sheridan	4.353979	22,593.3	74,125
G. L. O. Station No. 13, 1936, r. 1938 (d. m.) [1]	32	35	37.18	334	14	45	154	16	31	Komelik	4.072501	11,816.8	38,769
	111	59	50.76	108	20	42	288	16	17	Bitter	4.130527	13,506.0	44,311

[1] No check on this position.

SOUTHERN ARIZONA AREA

[Not separated into principal and supplementary points]

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Big Mountain, 1920 (n. d.)	32 43 07.098	12 40 06.1	192 33 43.4	Kitts	4.932757	85,655.8	281,022
	111 23 59.623	16 29 17.8	196 25 54.3	Silver Bell	4.541644	34,805.2	114,190
		67 26 48.6	247 10 59.8	Sierra Prieta	4.696488	49,715.1	163,107
Sawtooth, 1920 (n. d.)	32 29 53.747	299 16 21.7	119 21 48.8	Silver Bell	4.261470	18,258.7	59,904
	111 40 27.241	353 06 29.0	173 08 54.2	Kitts	4.775084	59,577.7	195,465
		104 42 03.9	284 35 08.8	Sierra Prieta	4.318606	20,826.0	68,327
Casa Grande Mountain, 1920 (d.) [1]	32 48 49.61	336 23 16	156 29 52	Silver Bell	4.680551	47,923.8	157,230
	111 42 32.33	29 36 15	209 30 25	Sierra Prieta	4.533656	34,170.9	112,109
Picacho Peak, 1919 (d.)	32 38 06.264	248 37 41.7	68 51 52.1	Black Mountain	4.643273	43,981.8	144,297
	111 23 59.548	329 13 51.0	149 22 00.6	Wasson	4.669065	46,672.9	153,126
		22 17 11.2	202 13 47.9	Silver Bell	4.415861	26,053.2	85,476
Picacho Mountain, 1919 (d.) [1]	32 43 07.16	260 37 44	80 51 55	Black Mountain	4.618147	41,509.5	136,186
	111 23 59.48	334 11 34	154 19 44	Wasson	4.739110	54,841.6	179,926
Helmet Peak (Mineral Hill) 1920 (n. d.)	31 58 00.347	323 37 48.3	143 45 10.7	Baldy	4.571133	37,250.6	122,213
	111 04 49.511	89 53 16.0	269 36 48.4	Kitts	4.690061	48,984.8	160,711
		141 25 51.2	321 12 17.1	Silver Bell	4.806491	64,045.9	210,124
Tortilla, 1919 (d. m.)	32 34 59.766	67 07 36.0	246 52 45.2	Silver Bell	4.672211	47,012.2	154,239
	111 02 39.927	199 26 27.9	19 29 06.7	Black Mountain	4.361778	23,002.7	75,468
		302 50 09.5	122 58 25.6	Catalina	4.457791	28,694.0	94,140
Black Hills, 1920 (n. d.)	32 05 11.531	34 31 32.0	214 27 02.7	Samaniego	4.372178	23,560.1	77,297
	111 03 30.513	107 13 01.4	287 02 45.6	Roskruge	4.501866	31,758.9	104,196
		158 10 45.7	338 07 57.0	Wasson	4.348239	22,296.6	73,151
Coyote Mountain, 1920 (n. d.) [1]	32 00 13.37	217 43 15	37 48 06	Roskruge	4.370142	23,450.0	76,936
	111 31 55.98	287 56 42	108 07 16	Samaniego	4.519360	33,064.4	108,479
Lone Cone, 1920 (n. d.)	32 03 32.977	219 19 33.3	39 22 59.4	Roskruge	4.204783	16,024.4	52,573
	111 29 15.983	233 30 56.1	53 41 50.2	Wasson	4.602025	39,996.8	131,223
		300 57 28.0	121 06 37.4	Samaniego	4.502144	31,779.3	104,263

Rillito, 1920 (n. d.)[1]	32	23	58.64	0	12	27	180	12	26	Wasson	4.146802	14,021.7	46,003
	111	08	45.25	41	04	55	220	57	25	Roskruge	4.526536	33,615.1	110,286
Granite Peak, 1920 (n. d.)	32	26	58.613	233	24	00.3	53	41	02.9	Black Mountain	4.788445	61,439.1	201,571
	111	29	21.064	301	08	40.8	121	19	41.2	Wasson	4.576678	37,729.2	123,783
				341	35	05.4	161	38	35.3	Roskruge	4.512796	32,568.4	106,851
Twin Buttes, 1920 (n. d.)[1]	31	54	41.92	321	58	07	142	04	21	Baldy	4.481858	30,329.0	99,504
	111	02	40.26	89	56	12	269	51	17	Samaniego	4.166539	14,673.7	48,142
South Comobabi, 1919, l. 1934 (d. m.)	32	02	13.822	249	38	37.3	69	52	12.4	Roskruge	4.632022	42,857.0	140,607
	111	48	21.994	292	11	30.4	112	18	06.3	Kitts	4.326023	21,184.7	69,503
				82	42	12.3	262	31	23.0	South Mountain	4.510621	32,405.7	106,318
Waterman Peak, 1920 (n. d.)[1]	32	20	57.53	285	16	37	105	27	05	Wasson	4.503330	31,866.2	104,548
	111	28	21.80	336	10	18	156	13	16	Roskruge	4.334916	21,623.0	70,941
Santa Rosa, 1919 (d.)	32	20	51.165	176	49	18.4	356	48	53.4	Sierra Prieta	4.342658	22,011.9	72,217
	111	52	32.517	257	20	32.0	77	32	26.9	Silver Bell	4.553234	35,746.5	117,278
				328	17	40.8	148	26	31.8	Kitts	4.697587	49,841.0	163,520
Highest peak south of Wasson 1920 (n. d.).[1]	32	12	32.38	80	48	42	260	39	56	Roskruge	4.419018	26,243.3	86,100
	111	06	19.57	151	30	29	331	29	10	Wasson	3.908411	8,098.6	26,570
Mount Devine (North Comobabi) 1919, p. r. 1937 (d. m.).	32	07	54.038	170	09	35.9	350	06	52.6	Sierra Prieta	4.668422	46,603.9	152,900
	111	48	14.043	221	32	08.2	41	41	43.0	Silver Bell	4.627511	42,414.2	139,154
				313	36	01.9	133	42	34.1	Kitts	4.428114	26,798.7	87,922
Childs, 1920 (d. m.)	32	18	44.653	95	57	22.7	275	53	18.9	Ajo	4.079078	11,997.1	39,360
	112	42	55.486	215	34	37.8	35	38	40.2	Sauceda	4.307767	20,312.7	66,643
Dome, 1920 (d. m.)	32	38	07.402	323	29	50.8	143	34	44.9	Sauceda	4.380217	24,000.3	78,741
	112	44	29.636	356	03	58.2	176	04	48.7	Childs	4.555103	35,900.7	117,784
				15	19	03.3	195	15	48.9	Ajo	4.554459	35,847.5	117,610
Bates, 1920 (d. m.)	32	11	30.631	42	11	39.4	222	06	01.3	Quitovaquita	4.395587	24,864.9	81,578
	112	58	04.696	219	02	08.6	39	06	10.5	Ajo	4.274475	18,813.7	61,725
				240	36	32.8	60	44	38.0	Childs	4.436126	27,297.7	89,559
Window, 1920, r. 1934 (d. m.)[1]	32	20	40.16	59	20	14	239	11	10	Nine Mile Peak	4.491780	31,029.9	101,804
	112	14	48.00	78	42	37	258	33	47	Redondo	4.422473	26,452.9	86,788
Boundary monument No. 160 (I. B. C.) (U. S.-Mex.), 1920 (d. m.).	31	47	39.12	109	50	52	289	41	12	Boundary monument No. 168 (I. B. C.)	4.487110	30,698.0	100,715
	112	32	14.41	150	49	00	330	44	09	Sierra del Ajo	4.470405	29,539.6	96,915
				238	16	48	58	29	11	South Mountain	4.637928	43,443.8	142,532
Boundary monument No. 160, eccentric, 1920 (d. m.).	31	47	39.15	109	51	52	289	41	12	Boundary monument No. 168 (I.B.C.)	4.487065	30,694.8	100,705
	112	32	14.52	150	49	14	330	44	24	Sierra del Ajo	4.470371	29,537.3	96,907
				238	16	59	58	29	23	South Mountain	4.637947	43,445.7	142,538
				288	38	05	108	38	05	Boundary monument No. 160 (I.B.C.)	0.48827	3.078	10.10

[1] No check on this position.

SOUTHERN ARIZONA AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
	° ′ ″	° ′ ″	° ′ ″				
Mesquite, 1920 (d. m.)	31 53 34.59	38 41 21	218 38 25	Boundary monument No. 160 (I. B. C.)	4.146802	14,021.7	46,003
	112 26 41.24	122 41 46	302 33 59	Sierra del Ajo	4.439409	27,504.8	90,239
		247 11 14	67 20 42	South Mountain	4.485761	30,602.8	100,403
Boundary monument No. 162 (I. B. C.) (U. S.-Mex.), 1920 (d. m.).	31 48 59.44	162 01 02	341 58 30	Sierra del Ajo	4.389270	24,505.9	80,400
	112 36 35.00	241 27 34	61 32 47	Mesquite	4.249492	17,762.0	58,274
		289 49 36	109 51 53	Boundary monument No. 160 (I. B. C.)	3.862561	7,287.2	23,908
Boundary monument No. 162 eccentric, 1920 (d. m.).	31 48 59.57	162 01 56	341 59 24	Sierra del Ajo	4.389160	24,499.7	80,379
	112 36 35.30	241 28 58	61 34 12	Mesquite	4.249620	17,767.2	58,291
		289 50 02	109 52 20	Boundary monument No. 160 (I. B. C.)	3.863091	7,296.1	23,937
		295 57 28	115 57 28	Boundary monument No. 162 (I. B. C.)	0.95231	8.96	29.4
Montezuma Head, 1920 (n. d.)	32 06 11.304	130 40 03.9	310 26 32.3	Growler	4.719210	52,385.4	171,868
	112 40 42.084	191 50 57.2	11 53 47.6	Sauceda	4.608386	40,586.9	133,159
		282 43 41.3	103 00 37.8	South Mountain	4.712201	51,546.7	169,116
Cimarron Mountains, south peak, 1920 (n. d.) [1]	32 26 16.47	255 43 09	75 59 25	Sierra Prieta	4.689570	48,929.4	160,529
	112 23 36.61	334 18 52	154 26 47	South Mountain	4.731607	53,902.3	176,844
Cimarron Mountains, north peak, 1920 (n. d.)	32 26 36.85	96 07 12	276 00 52	Sauceda	4.270212	18,630.0	61,122
	112 23 33.70	256 24 47	76 41 01	Sierra Prieta	4.687569	48,704.5	159,791
		334 40 24	154 48 17	South Mountain	4.735886	54,436.0	178,595
Sawtooth, Maricopa Range, 1920 (n. d.) [1]	32 40 37.15	287 28 32	107 44 20	Sierra Prieta	4.682286	48,115.6	157,859
	112 22 38.26	343 47 21	163 54 46	South Mountain	4.893210	78,200.6	256,563
Dome, south of Sierra del Ajo, 1920 (n. d.)	31 58 04.419	139 53 26.8	319 39 22.9	Growler	4.807886	64,251.9	210,800
	112 39 38.576	157 08 44.3	337 07 48.8	Sierra del Ajo	3.849809	7,076.3	23,216
		228 25 16.7	48 50 00.1	Sierra Prieta	4.986517	96,943.1	318,054
Spire, north of Sierra del Ajo, 1920 (n. d.)	32 06 52.715	237 54 39.2	58 20 51.4	Sierra Prieta	4.956818	90,535.3	297,031
	112 42 19.023	351 28 25.9	171 28 55.5	Sierra del Ajo	3.993899	9,860.5	32,351
		131 26 53.2	311 14 13.3	Growler	4.695754	49,631.1	162,831
Dome, north of Mesquite, 1920 (n. d.) [1]	31 57 49.58	42 12 36	222 07 39	Boundary monument No. 162 (I. B. C.)	4.343023	22,030.4	72,278
	112 27 12.23	107 24 27	287 16 56	Sierra del Ajo	4.369311	23,405.1	76,788
Menager's store, north gable, 1920 (n. d.) [1]	31 49 03.27	334 25 45	154 26 10	Boundary monument No. 160 (I. B. C.)	3.458370	2,873.2	9,426
	112 33 01.55	88 48 43	268 46 50	Boundary monument No. 162 (I. B. C.)	3.749345	5,614.9	18,422

Wasson (U. S. G. S.), 1920 (d. m.)[1]	32	16	23.465	356	44		176	44		Wasson	0.017868	1.042	3.42
	111	08	47.195										
Black Mountain (U. S. G. S.), 1920 (d. m.)[1]	32	46	44.006	349	20		169	20		Black Mountain	0.740363	5.5	18
	110	57	45.775										

QUEEN CREEK AREA

Principal points	°	′	″	°	′	″	°	′	″				
Roadside, 1938 (d. m.)	33	22	50.502	18	09	02.14	198	05	40.63	Mineral Butte	4.4855109	30,585.17	100,344.8
	111	28	58.208	42	31	56.20	222	24	30.36	Santan	4.4933450	31,141.89	102,171.4
				132	17	54.73	312	12	43.05	Usery (U. S. G. S.)	4.2953009	19,737.90	64,756.8
				246	25	01.06	66	27	45.04	Superstition (U. S. G. S.)	3.9242521	8,399.47	27,557.3
				153	07	51				B. M. A 107.			
Queen, 1938 (d. m.)	33	21	53.163	151	41	40.68	331	37	12.39	Verde	4.4225834	26,459.61	86,809.6
	111	38	38.207	181	25	01.10	1	25	09.04	Usery (U. S. G. S.)	4.1773505	15,043.56	49,355.4
				263	14	09.70	83	19	28.75	Roadside	4.1788831	15,096.74	49,529.9
				325	53	25				Azimuth mark.			
Tower, 1938 (d. m.)	33	14	54.122	175	55	23.17	355	54	28.08	Verde	4.5597805	36,289.46	119,059.7
	111	45	04.647	200	18	41.69	20	22	22.20	Usery (U. S. G. S.)	4.4743251	29,807.47	97,793.3
				239	30	38.93	59	39	29.73	Roadside	4.4622282	28,988.66	95,107.0
				334	19	31.23	154	20	55.52	Santan	3.9639250	9,202.91	30,193.2
				163	40	32				Azimuth mark.			
Weeks, 1938 (d. m.)	33	29	44.491	349	14	43.55	169	15	35.19	Roadside	4.1133389	12,981.92	42,591.5
	111	30	31.928	9	37	59.07	189	35	28.71	Mineral Butte	4.6275467	42,417.66	139,165.3
				27	32	42.78	207	26	07.76	Santan	4.6050088	40,272.52	132,127.4
				284	17	52				Azimuth mark.			
Dromedary, 1938 (d. m.)	33	15	11.642	64	19	42.38	244	08	48.64	Mineral Butte	4.5359773	34,354.00	112,709.7
	111	15	11.389	123	31	36.48	303	24	02.33	Roadside	4.4088609	25,636.63	84,109.5
				142	01	06.05	321	56	15.42	Superstition (U. S. G. S.)	4.3464790	22,206.44	72,855.6
				133	01	41				B. M. N 107.			
Fraser, 1938 (d. m.)	33	22	44.658	5	00	21.13	184	59	55.19	Dromedary	4.1464264	14,009.62	45,963.2
	111	14	24.164	48	08	41.10	227	57	20.37	Mineral Butte	4.6356269	43,214.24	141,778.7
				90	31	24.01	270	23	23.12	Roadside	4.3539738	22,592.99	74,123.8
				103	24	31.95	283	19	14.84	Superstition (U. S. G. S.)	4.1847893	15,303.45	50,208.1
				55	40	30				Azimuth mark.			
Supplementary points													
Phoenix-Tucson airway beacon O, 1938 (n. d.)	33	22	01.401	218	49	20.4	38	55	57.0	Verde	4.471115	29,588.0	97,073
	111	58	43.906	264	40	23.8	84	59	30.5	Superstition (U. S. G. S.)	4.732966	54,071.2	177,399
				267	59	11.8	88	15	34.2	Roadside	4.664494	46,184.3	151,523
				268	41	10.9	89	05	34.1	Fraser	4.837379	68,766.8	225,612
				270	22	27.9	90	33	31.0	Queen	4.493749	31,170.9	102,267

[1] No check on this position.

QUEEN CREEK AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Phoenix-Tucson airway beacon 2, 1938 (n. d.)	33 11 18.808	183 20 55.4	3 21 48.8	Verde	4.632498	42,904.0	140,761
	111 48 21.858	217 39 18.0	37 44 38.2	Queen	4.392682	24,699.1	81,034
		219 00 11.4	39 09 59.4	Weeks	4.642306	43,884.0	143,976
		234 37 28.7	54 48 07.2	Roadside	4.566887	36,888.2	121,024
		236 46 16.7	56 59 39.0	Superstition (U. S. G. S.)	4.654632	45,147.3	148,121
		248 00 28.7	68 19 06.9	Fraser	4.754378	56,803.9	186,364
Phoenix-Tucson airway beacon 3A, 1938 (n. d.)	33 02 40.212	175 48 20.6	355 46 48.8	Verde	4.770597	58,965.4	193,456
	111 43 57.466	217 14 31.5	37 25 27.5	Superstition (U. S. G. S.)	4.708547	51,114.8	167,699
		230 55 41.8	51 11 53.1	Fraser	4.771153	59,040.9	193,703
		239 10 18.5	59 15 08.8	Mineral Butte	4.205579	16,053.8	52,670
Phoenix-Tucson airway beacon 3B, 1938 (n. d.)	33 00 11.458	195 41 52.2	15 47 18.4	Weeks	4.753972	56,750.8	186,190
	111 40 26.750	203 01 17.9	23 07 34.8	Roadside	4.658092	45,508.4	149,305
		209 23 16.4	29 32 16.6	Superstition (U. S. G. S.)	4.715524	51,942.6	170,415
		213 01 32.1	33 04 27.2	Mineral Butte	4.183860	15,270.7	50,101
		224 02 13.0	44 16 28.5	Fraser	4.764216	58,105.3	190,634
Phoenix-Tucson airway beacon 5, 1938 (n. d.)	32 49 15.141	184 09 03.2	4 10 58.2	Weeks	4.875282	75,038.1	246,187
	111 34 02.337	187 12 57.2	7 15 43.3	Roadside	4.796468	62,584.7	205,330
		193 22 09.1	13 27 38.0	Superstition (U. S. G. S.)	4.827879	67,278.9	220,731
B. M. 1407 PHNX (U. S. G. S.), 1938 (d. m.) [1]	33 21 53.913	324 33 52	144 33 52	Queen	1.452859	28.370	93.08
	111 38 38.843						

[1] No check on this position.

EXPLANATION OF DESCRIPTIONS, ELEVATIONS, AND PLANE COORDINATES

Until recently, the plane coordinates of the triangulation stations have been listed in separate tables apart from the descriptions in publications of this Bureau. In this publication, for the convenience of the engineer and others who use the information, the plane coordinates of a station are given with its description, where the data are readily available. The elevation of the station is also given at the end of the description in the few cases where this information is 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.

EXPLANATION OF 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. 67.) Where magnetic azimuths are given they are indicated as such. Wherever the name of a point is printed in *italic* 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 dates when the station was visited.

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, 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. 1) 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

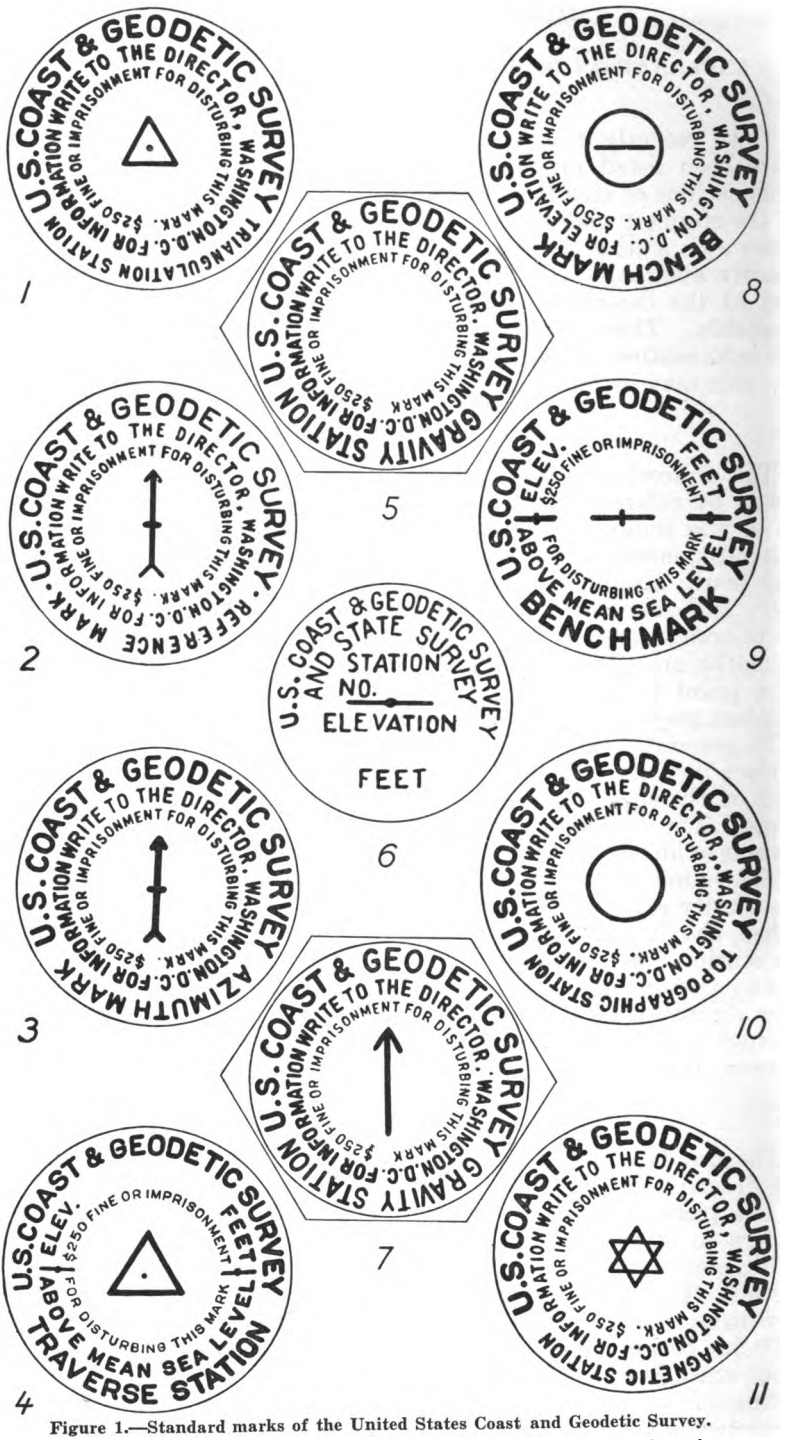

Figure 1.—Standard marks of the United States Coast and Geodetic Survey.

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

place. In recent years the slits in the stems of both station and 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 about 1915 and 1920 have grooves cut around the shank instead of the slit.

The old type of station mark used in marking stations 30 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 1 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, referred to on page 64, is also shown in figure 1. It 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.

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, azimuth, 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 MARKING OF STATIONS

Surface marks

Note 1.—A standard disk triangulation station mark set in the top of (*a*) a a square block or post of concrete, (*b*) a concrete cylinder, (*c*) an irregular mass of concrete, (*d*) a pipe which is set in a circular 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, (*e*) an earthenware jug with the mouth projecting a little above the concrete.

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

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

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

Reference 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, (*d*) a mass of concrete fastened to the top of a long pile driven into the marsh, (*e*) a pipe which is set in a circular 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*) embedded in the ground, (*b*) surrounded by a mass of concrete, (*c*) fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (*d*) set in a block of concrete and projecting from 12 to 20 inches above the block.

Witness marks

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

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

ELEVATIONS

The elevations of some of the triangulation stations and bench marks included in this publication have been determined by means of spirit levels. Where the elevation of a station has been determined (only a few are included in this publication) it is given in the description of the station. The elevations are based on mean sea-level datum.

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.

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, 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 Arizona (see fig. 2). 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 usually given on both zones. (Since the area covered by this publication is all in the central zone, except for the usual overlap into adjacent zones, the plane coordinates are given for the central zone only.) 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 ends of the descriptions of the stations (these coordinates are on the central zone). In publications of Arizona the zone upon which a station has been computed is denoted in the description by either the initial "E" (east), "C" (central), or "W" (west) directly preceding the plane coordinates in the second paragraph of each description. Coordinate tables for the State have been prepared by this Bureau as a basis for computing the coordinates (see p. 70). 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.

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

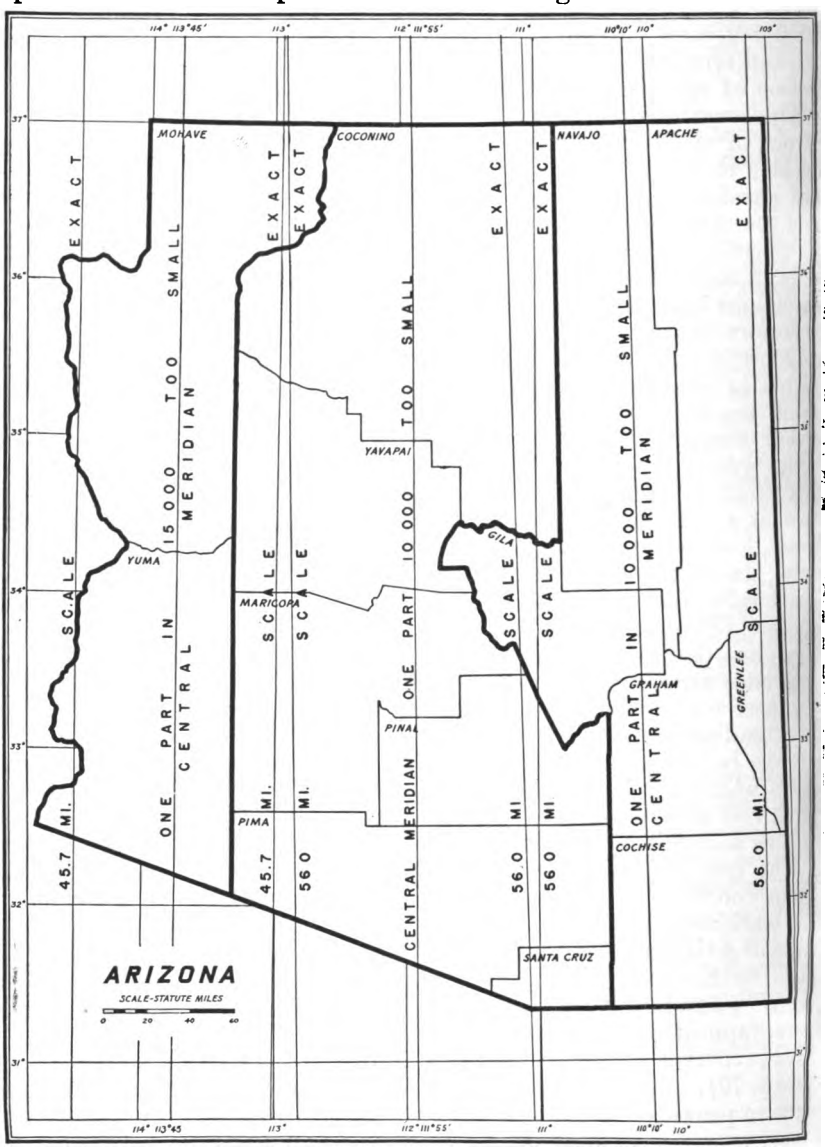

Figure 2.—Map of Arizona with grid system outline.

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, 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.

A few stations, for which geodetic positions are given in this publication, lie so far outside the central zone that plane coordinates were not computed for them on the grid of this zone. 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 zone 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 6 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:[1]

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

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

[1] See Special Publication No. 193, Manual of plane-coordinate computation, p. 13.

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.[2]

The value of $\log \frac{1}{(6\rho_0^2 \sin 1'')_g}$ is given among the constants of the projection, page 70, 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. 5) 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 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.

[2] Idem, p. 28.

EXPLANATION OF PLANE-COORDINATE PROJECTION TABLES

The State tables of plane coordinates (see p. 70) 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 mean 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 76. 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. 6) 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 ARIZONA

Table of constants

Constant	Central zone
Central meridian	111°55′00″.0000
log R	−0. 00004343
$\log\left(\frac{1}{6\rho_0^2}\right)_\sigma$	4. 5816636−20
$\log\frac{1}{(6\rho_0^2 \sin 1'')}$	9. 8960887−20

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

Table I, central zone

Latitude	y	Tabular difference for 1 second of latitude	Latitude	y	Tabular difference for 1 second of latitude
° ′	*Feet*		° ′	*Feet*	
31 00	0	101. 02667	31 31	187, 916. 92	101. 03483
01	6, 061. 60	683	32	193, 979. 01	517
02	12, 123. 21	717	33	200, 041. 12	533
03	18, 184. 84	733	34	206, 103. 24	567
04	24, 246. 48	783	35	212, 165. 38	583
05	30, 308. 15	783	31 36	218, 227. 53	101. 03617
31 06	36, 369. 82	101. 02833	37	224, 289. 70	650
07	42, 431. 52	850	38	230, 351. 89	667
08	48, 493. 23	867	39	236, 414. 09	700
09	54, 554. 95	900	40	242, 476. 31	733
10	60, 616. 69	933	31 41	248, 538. 55	101. 03750
31 11	66, 678. 45	101. 02950	42	254, 600. 80	783
12	72, 740. 22	101. 02983	43	260, 663. 07	800
13	78, 802. 01	101. 03000	44	266, 725. 35	833
14	84, 863. 81	033	45	272, 787. 65	850
15	90, 925. 63	067	31 46	278, 849. 96	101. 03900
31 16	96, 987. 47	101. 03083	47	284, 912. 30	900
17	103, 049. 32	117	48	290, 974. 64	950
18	109, 111. 19	133	49	297, 037. 01	967
19	115, 173. 07	167	50	303, 099. 39	101. 03983
20	121, 234. 97	200	31 51	309, 161. 78	101. 04017
31 21	127, 296. 89	101. 03217	52	315, 224. 19	050
22	133, 358. 82	233	53	321, 286. 62	067
23	139, 420. 76	283	54	327, 349. 06	100
24	145, 482. 73	300	55	333, 411. 52	133
25	151, 544. 71	317	31 56	339, 474. 00	101. 04150
31 26	157, 606. 70	101. 03350	57	345, 536. 49	183
27	163, 668. 71	383	58	351, 599. 00	217
28	169, 730. 74	400	59	357, 661. 53	233
29	175, 792. 78	433	32 00	363, 724. 07	250
30	181, 854. 84	467			

PLANE-COORDINATE PROJECTION TABLES FOR ARIZONA—Continued

Table I, central zone—Continued

Latitude		y	Tabular difference for 1 second of latitude	Latitude		y	Tabular difference for 1 second of latitude
°	′	*Feet*		°	′	*Feet*	
32	01	369,786.62	101.04300	33	06	763,887.61	101.06050
	02	375,849.20	300		07	769,951.24	083
	03	381,911.78	350		08	776,014.89	117
	04	387,974.39	367		09	782,078.56	133
	05	394,037.01	400		10	788,142.24	150
32	06	400,099.65	101.04417	33	11	794,205.93	101.06200
	07	406,162.30	450		12	800,269.65	217
	08	412,224.97	483		13	806,333.38	233
	09	418,287.66	500		14	812,397.12	267
	10	424,350.36	533		15	818,460.88	300
32	11	430,413.08	101.04550	33	16	824,524.66	101.06333
	12	436,475.81	583		17	830,588.46	350
	13	442,538.56	617		18	836,652.27	383
	14	448,601.33	633		19	842,716.10	400
	15	454,664.11	667		20	848,779.94	433
32	16	460,726.91	101.04700	33	21	854,843.80	101.06467
	17	466,789.73	717		22	860,907.68	500
	18	472,852.56	750		23	866,971.58	517
	19	478,915.41	767		24	873,035.49	533
	20	484,978.27	800		25	879,099.41	583
32	21	491,041.15	101.04833	33	26	885,163.36	101.06600
	22	497,104.05	850		27	891,227.32	617
	23	503,166.96	883		28	897,291.29	667
	24	509,229.89	900		29	903,355.29	683
	25	515,292.83	950		30	909,419.30	700
32	26	521,355.80	101.04950	33	31	915,483.32	101.06733
	27	527,418.77	101.05000		32	921,547.36	767
	28	533,481.77	017		33	927,611.42	800
	29	539,544.78	033		34	933,675.50	817
	30	545,607.80	067		35	939,739.59	850
32	31	551,670.84	101.05100	33	36	945,803.70	101.06883
	32	557,733.90	133		37	951,867.83	900
	33	563,796.98	150		38	957,931.97	933
	34	569,860.07	183		39	963,996.13	950
	35	575,923.18	200		40	970,060.30	101.06983
32	36	581,986.30	101.05233	33	41	976,124.49	101.07017
	37	588,049.44	267		42	982,188.70	050
	38	594,112.60	283		43	988,252.93	067
	39	600,175.77	317		44	994,317.17	083
	40	606,238.96	350		45	1,000,381.42	133
32	41	612,302.17	101.05367	33	46	1,006,445.70	101.07150
	42	618,365.39	400		47	1,012,509.99	183
	43	624,428.63	417		48	1,018,574.30	200
	44	630,491.88	450		49	1,024,638.62	233
	45	636,555.15	483		50	1,030,702.96	267
32	46	642,618.44	101.05500	33	51	1,036,767.32	101.07300
	47	648,681.74	533		52	1,042,831.70	317
	48	654,745.06	567		53	1,048,896.09	333
	49	660,808.40	583		54	1,054,960.49	383
	50	666,871.75	617		55	1,061,024.92	400
32	51	672,935.12	101.05633	33	56	1,067,089.36	101.07433
	52	678,998.50	667		57	1,073,153.82	450
	53	685,061.90	700		58	1,079,218.29	483
	54	691,125.32	733		59	1,085,282.78	517
	55	697,188.76	750	34	00	1,091,347.29	533
32	56	703,252.21	101.05767	34	01	1,097,411.81	101.07567
	57	709,315.67	817		02	1,103,476.35	600
	58	715,379.16	833		03	1,109,540.91	617
	59	721,442.66	850		04	1,115,605.48	650
33	00	727,506.17	883		05	1,121,670.07	683
33	01	733,569.70	101.05933	34	06	1,127,734.68	101.07700
	02	739,633.26	933		07	1,133,799.30	733
	03	745,696.82	101.05967		08	1,139,863.94	767
	04	751,760.40	101.06000		09	1,145,928.60	783
	05	757,824.00	017		10	1,151,993.27	817

PLANE-COORDINATE PROJECTION TABLES FOR ARIZONA—Continued

Table I, central zone—Continued

Latitude		y	Tabular difference for 1 second of latitude	Latitude		y	Tabular difference for 1 second of latitude
°	′	Feet		°	′	Feet	
34	11	1,158,057.96	101.07850	35	16	1,552,298.80	101.09667
	12	1,164,122.67	883		17	1,558,364.60	683
	13	1,170,187.40	900		18	1,564,430.41	733
	14	1,176,252.14	917		19	1,570,496.25	750
	15	1,182,316.89	967		20	1,576,562.10	783
34	16	1,188,381.67	101.07983	35	21	1,582,627.97	101.09800
	17	1,194,446.46	101.08000		22	1,588,693.85	833
	18	1,200,511.26	050		23	1,594,759.75	867
	19	1,206,576.09	067		24	1,600,825.67	900
	20	1,212,640.93	083		25	1,606,891.61	917
34	21	1,218,705.78	101.08133	35	26	1,612,957.56	950
	22	1,224,770.66	150		27	1,619,023.53	101.09983
	23	1,230,835.55	183		28	1,625,089.52	101.10000
	24	1,236,900.46	200		29	1,631,155.52	033
	25	1,242,965.38	233		30	1,637,221.54	067
34	26	1,249,030.32	101.08267	35	31	1,643,287.58	101.10083
	27	1,255,095.28	300		32	1,649,353.63	117
	28	1,261,160.26	317		33	1,655,419.70	150
	29	1,267,225.25	333		34	1,661,485.79	167
	30	1,273,290.25	383		35	1,667,551.89	217
34	31	1,279,355.28	101.08400	35	36	1,673,618.02	101.10233
	32	1,285,420.32	433		37	1,679,684.16	250
	33	1,291,485.38	450		38	1,685,750.31	283
	34	1,297,550.45	483		39	1,691,816.48	317
	35	1,303,615.54	517		40	1,697,882.67	350
34	36	1,309,680.65	101.08550	35	41	1,703,948.88	101.10367
	37	1,315,745.78	567		42	1,710,015.10	417
	38	1,321,810.92	600		43	1,716,081.35	433
	39	1,327,876.08	633		44	1,722,147.61	450
	40	1,333,941.26	650		45	1,728,213.88	483
34	41	1,340,006.45	101.08683	35	46	1,734,280.17	101.10517
	42	1,346,071.66	700		47	1,740,346.48	550
	43	1,352,136.88	750		48	1,746,412.81	567
	44	1,358,202.13	767		49	1,752,479.15	600
	45	1,364,267.39	783		50	1,758,545.51	633
34	46	1,370,332.66	101.08833	35	51	1,764,611.89	101.10650
	47	1,376,397.96	850		52	1,770,678.28	683
	48	1,382,463.27	883		53	1,776,744.69	717
	49	1,388,528.60	900		54	1,782,811.12	750
	50	1,394,593.94	933		55	1,788,877.57	767
34	51	1,400,659.30	101.08967	35	56	1,794,944.03	101.10800
	52	1,406,724.68	101.08983		57	1,801,010.51	833
	53	1,412,790.07	101.09017		58	1,807,077.01	850
	54	1,418,855.48	050		59	1,813,143.52	883
	55	1,424,920.91	083	36	00	1,819,210.05	917
34	56	1,430,986.36	101.09100	36	01	1,825,276.60	101.10933
	57	1,437,051.82	133		02	1,831,343.16	101.10983
	58	1,443,117.30	150		03	1,837,409.75	101.11000
	59	1,449,182.79	183		04	1,843,476.35	017
35	00	1,455,248.30	233		05	1,849,542.96	067
35	01	1,461,313.84	101.09233	36	06	1,855,609.60	101.11083
	02	1,467,379.38	267		07	1,861,676.25	100
	03	1,473,444.94	300		08	1,867,742.91	150
	04	1,479,510.52	333		09	1,873,809.60	167
	05	1,485,576.12	350		10	1,879,876.30	200
35	06	1,491,641.73	101.09383	36	11	1,885,943.02	101.11233
	07	1,497,707.36	417		12	1,892,009.76	250
	08	1,503,773.01	450		13	1,898,076.51	283
	09	1,509,838.68	467		14	1,904,143.28	317
	10	1,515,904.36	500		15	1,910,210.07	333
35	11	1,521,970.06	101.09517	36	16	1,916,276.87	101.11367
	12	1,528,035.77	550		17	1,922,343.69	400
	13	1,534,101.50	583		18	1,928,410.53	433
	14	1,540,167.25	617		19	1,934,477.39	450
	15	1,546,233.02	633		20	1,940,544.26	483

PLANE-COORDINATB PROJECTION TABLES FOR ARIZONA—Continued

Table I, central zone—Continued

Latitude	y	Tabular difference for 1 second of latitude	Latitude	y	Tabular difference for 1 second of latitude
° ′	*Feet*		° ′	*Feet*	
36 21	1,946,611.15	101.11517	36 51	2,128,625.85	101.12367
22	1,952,678.06	533	52	2,134,693.27	400
23	1,958,744.98	583	53	2,140,760.71	433
24	1,964,811.93	583	54	2,146,828.17	450
25	1,970,878.88	633	55	2,152,895.64	500
36 26	1,976,945.86	101.11650	36 56	2,158,963.14	101.12517
27	1,983,012.85	683	57	2,165,030.65	533
28	1,989,079.86	717	58	2,171,098.17	583
29	1,995,146.89	750	59	2,177,165.72	600
30	2,001,213.94	767	37 00	2,183,233.28	633
36 31	2,007,281.00	101.11800	37 01	2,189,300.86	101.12667
32	2,013,348.08	817	02	2,195,368.46	683
33	2,019,415.17	867	03	2,201,436.07	717
34	2,025,482.29	883	04	2,207,503.70	750
35	2,031,549.42	917	05	2,213,571.35	767
36 36	2,037,616.57	101.11933	37 06	2,219,639.01	101.12800
37	2,043,683.73	101.11967	07	2,225,706.69	833
38	2,049,750.91	101.12000	08	2,231,774.39	867
39	2,055,818.11	033	09	2,237,842.11	900
40	2,061,885.33	050	10	2,243,909.85	917
36 41	2,067,952.56	101.12083	37 11	2,249,977.60	101.12933
42	2,074,019.81	117	12	2,256,045.36	101.12983
43	2,080,087.08	150	13	2,262,113.15	101.13017
44	2,086,154.37	167	14	2,268,180.96	033
45	2,092,221.67	200	15	2,274,248.78	067
36 46	2,098,288.99	101.12233	37 16	2,280,316.62	101.13083
47	2,104,356.33	250	17	2,286,384.47	117
48	2,110,423.68	283	18	2,292,452.34	150
49	2,116,491.05	317	19	2,298,520.23	183
50	2,122,558.44	350	20	2,304,588.14	

Table II, central zone

[Common to all three zones]

Latitude	Colog A	Log C	Latitude	Colog A	Log C
° ′			° ′		
31 00	1.49066367	1.184158	31 21	1.49067164	1.190116
01	6405	4443	22	7202	0399
02	6443	4727	23	7240	0681
03	6481	5012	24	7278	0964
04	6519	5296	25	7317	1247
05	6556	5580			
31 06	1.49066594	1.185864	31 26	1.49067355	1.191529
07	6632	6148	27	7393	1811
08	6670	6432	28	7431	2094
09	6708	6716	29	7469	2376
10	6746	7000	30	7507	2658
31 11	1.49066784	1.187284	31 31	1,49067545	1.192940
12	6822	7567	32	7583	3222
13	6860	7851	33	7622	3504
14	6898	8134	34	7660	3786
15	6936	8418	35	7698	4068
31 16	1.49066974	1.188701	31 36	1.49067736	1.194349
17	7012	8984	37	7775	4631
18	7050	9267	38	7813	4912
19	7088	9550	39	7851	5194
20	7126	1.189833	40	7889	5475

PLANE-COORDINATE PROJECTION TABLES FOR ARIZONA—Continued

Table II, central zone—Continued

[Common to all three zones]

Latitude		Colog A	Log C	Latitude		Colog A	Log C
°	′			°	′		
31	41	1.49067927	1.195756	32	46	1.49070439	1.213860
	42	7966	6037		47	0478	4136
	43	8004	6318		48	0517	4411
	44	8042	6599		49	0556	4687
	45	8081	6880		50	0595	1.214963
31	46	1.49068119	1.197161	32	51	1.49070634	1.215239
	47	8157	7442		52	0673	5514
	48	8196	7722		53	0713	5790
	49	8234	8003		54	0752	6065
	50	8272	8283		55	0791	6341
31	51	1.49068311	1.198563	32	56	1.49070830	1.216616
	52	8349	8844		57	0869	6892
	53	8388	9124		58	0908	7167
	54	8426	9404		59	0947	7442
	55	8465	9684	33	00	0986	7717
31	56	1.49068503	1.199964	33	01	1.49071025	1.217992
	57	8541	1.200244		02	1065	8267
	58	8580	0524		03	1104	8542
	59	8618	0803		04	1143	8817
32	00	8657	1083		05	1182	9091
32	01	1.49068695	1.201362	33	06	1.49071221	1.219366
	02	8734	1642		07	1261	9641
	03	8772	1920		08	1300	1.219915
	04	8811	2200		09	1339	1.220190
	05	8850	2479		10	1378	0464
32	06	1.49068888	1.202758	33	11	1.49071417	1.220738
	07	8927	3037		12	1457	1013
	08	8965	3316		13	1496	1287
	09	9004	3594		14	1535	1561
	10	9042	3873		15	1575	1835
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	1.209987		37	2441	7843
	33	9933	1.210264		38	2481	8116
	34	1.49069972	0541		39	2520	8388
	35	1.49070011	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	1.229749
	40	0206	2202		45	2758	1.230021
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

PLANE-COORDINATE PROJECTION TABLES FOR ARIZONA—Continued

Table II, central zone—Continued

[Common to all three zones]

Latitude		Colog A	Log C	Latitude		Colog A	Log C
°	′			°	′		
33	51	1.49072995	1.231651	34	56	1.49075591	1.249167
	52	3035	1923		57	5632	9435
	53	3075	2194		58	5672	9702
	54	3114	2466		59	5712	1.249970
	55	3154	2737	35	00	5752	1.250237
33	56	1.49073194	1.233008	35	01	1.49075793	1.250504
	57	3233	3279		02	5833	0771
	58	3273	3550		03	5873	1038
	59	3313	3821		04	5914	1305
34	00	3352	4092		05	5954	1572
34	01	1.49073392	1.234363	35	06	1.49075994	1.251839
	02	3432	4634		07	6034	2106
	03	3472	4904		08	6075	2373
	04	3511	5175		09	6115	2639
	05	3551	5446		10	6155	2906
34	06	1.49073591	1.235716	35	11	1.49076196	1.253173
	07	3631	5987		12	6236	3439
	08	3670	6257		13	6277	3706
	09	3710	6528		14	6317	3972
	10	3750	6798		15	6357	4238
34	11	1.49073790	1.237068	35	16	1.49076398	1.254505
	12	3830	7339		17	6438	4771
	13	3870	7609		18	6479	5037
	14	3909	7879		19	6519	5304
	15	3949	8149		20	6559	5570
34	16	1.49073989	1.238419	35	21	1.49076600	1.255836
	17	4029	8689		22	6640	6102
	18	4069	8959		23	6681	6368
	19	4109	9228		24	6721	6634
	20	4149	9498		25	6762	6900
34	21	1.49074189	1.239767	35	26	1.49076802	1.257165
	22	4229	1.240037		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	1.260086
	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		59	8142	5909
	55	5551	8900	36	00	8183	6173

PLANE-COORDINATE PROJECTION TABLES FOR ARIZONA—Continued

Table II, central zone—Continued

[Common to all three zones]

Latitude	Colog A	Log C	Latitude	Colog A	Log C
° ′			° ′		
36 01	1.49078224	1.266437	36 41	1.49079861	1.276957
02	8265	6701	42	9902	7219
03	8306	6965	43	9943	7481
04	8346	7229	44	1.49079984	7743
05	8387	7493	45	1.49080025	8005
36 06	1.49078428	1.267756	36 46	1.49080066	1.278267
07	8469	8020	47	0107	8529
08	8510	8284	48	0148	8791
09	8550	8547	49	0189	9052
10	8591	8811	50	0231	9314
36 11	1.49078632	1.269074	36 51	1.49080272	1.279575
12	8673	9338	52	0313	1.279837
13	8714	9601	53	0354	1.280098
14	8755	1.269865	54	0395	0359
15	8796	1.270128	55	0436	0621
36 16	1.49078836	1.270391	36 56	1.49080478	1.280882
17	8877	0655	57	0519	1143
18	8918	0918	58	0560	1405
19	8959	1181	59	0601	1666
20	9000	1444	37 00	0642	1927
36 21	1.49079041	1.271707	37 01	1.49080683	1.282188
22	9082	1970	02	0725	2450
23	9123	2233	03	0766	2711
24	9164	2496	04	0807	2972
25	9205	2759	05	0848	3233
36 26	1.49079246	1.273021	37 06	1.49080890	1.283494
27	9287	3284	07	0931	3755
28	9327	3547	08	0972	4016
29	9368	3809	09	1013	4277
30	9409	4072	10	1054	4538
36 31	1.49079450	1.274334	37 11	1.49081096	1.284798
32	9491	4597	12	1137	5059
33	9532	4859	13	1178	5320
34	9573	5122	14	1220	5580
35	9614	5384	15	1261	5841
36 36	1.49079656	1.275646	37 16	1.49081302	1.286101
37	9697	5909	17	1344	6361
38	9738	6171	18	1385	6623
39	9779	6433	19	1426	6883
40	9820	6695	20	1467	7144

Table III, 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	50,000	−421.9	0.9999029
5,000	−434.2	000	55,000	−419.3	035
10,000	−433.8	001	60,000	−416.4	041
15,000	−433.2	003	65,000	−413.3	048
20,000	−432.3	005	70,000	−410.0	056
25,000	−431.2	0.9999007	75,000	−406.4	0.9999064
30,000	−429.8	010	80,000	−402.5	073
35,000	−428.2	014	85,000	−398.4	083
40,000	−426.4	018	90,000	−394.0	093
45,000	−424.3	023	95,000	−389.4	103

PLANE-COORDINATE PROJECTION TABLES FOR ARIZONA—Continued

Table III, central 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*		
100,000	−384.6	0.9999114	315,000	+59.0	136
105,000	−379.5	126	320,000	+74.8	172
110,000	−374.1	139			
115,000	−368.5	151	325,000	+90.8	1.0000209
120,000	−362.7	165	330,000	+107.1	247
			335,000	+123.6	285
125,000	−356.6	0.9999179	340,000	+140.4	323
130,000	−350.3	193	345,000	+157.4	362
135,000	−343.7	209			
140,000	−336.8	224	350,000	+174.7	1.0000402
145,000	−329.7	241	355,000	+192.2	443
			360,000	+210.0	484
150,000	−322.4	0.9999258	365,000	+228.0	525
155,000	−314.8	275	370,000	+246.3	567
160,000	−307.0	293			
165,000	−298.9	312	375,000	+264.8	1.0000610
170,000	−290.6	331	380,000	+283.6	653
			385,000	+302.6	697
175,000	−282.0	0.9999351	390,000	+321.8	741
180,000	−273.2	371	395,000	+341.3	786
185,000	−264.1	392			
190,000	−254.8	413	400,000	+361.1	1.0000831
195,000	−245.2	435	405,000	+381.1	878
			410,000	+401.4	924
200,000	−235.4	0.9999458	415,000	+421.9	1.0000971
205,000	−225.3	481	420,000	+442.6	1.0001019
210,000	−215.0	505			
215,000	−204.5	529	425,000	+463.6	1.0001067
220,000	−193.7	554	430,000	+484.9	117
			435,000	+506.4	166
225,000	−182.6	0.9999580	440,000	+528.2	216
230,000	−171.3	606	445,000	+550.2	267
235,000	−159.7	632			
240,000	−147.9	659	450,000	+572.4	1.0001318
245,000	−135.9	687	455,000	+594.9	370
			460,000	+617.6	422
250,000	−123.6	0.9999715	465,000	+640.6	475
255,000	−111.0	744	470,000	+663.9	529
260,000	−98.2	774			
265,000	−85.2	804	475,000	+687.4	1.0001583
270,000	−71.9	834	480,000	+711.1	637
			485,000	+735.1	693
275,000	−58.4	0.9999866	490,000	+759.4	749
280,000	−44.6	897	495,000	+783.9	805
285,000	−30.5	930			
290,000	−16.2	963	500,000	+808.6	1.0001862
295,000	−01.7	0.9999996	505,000	+833.6	919
			510,000	+858.8	1.0001977
300,000	+13.1	1.0000030	515,000	+884.3	1.0002036
305,000	+28.1	065	520,000	+910.0	095
310,000	+43.4	100	525,000	+936.0	155

TABLE FOR MACHINE COMPUTATIONS OF PLANE COORDINATES ON THE TRANSVERSE MERCATOR PROJECTION

The form for computing transverse Mercator coordinates by means of a calculating machine is almost self-explanatory. The basic equations appear at the bottom of the form which is nothing but a tabular layout for solving these equations. The central meridian (λ) is a constant (111°55′00″.0000 for the Arizona central zone). The values of H, V, and a are taken from table 1 on page 78 with the latitude (ϕ) as the argument. The values of b and c are taken from table 2 on page 79 with $\Delta\lambda$ (in seconds) as the argument. H ($\Delta\lambda$) is considered positive until ab has been added or subtracted depending on whether it (ab) is positive or negative. x' is then given the sign of $\Delta\lambda$. The tabular y is interpolated from the tables on pages 70 to 73 with the latitude as the argument.

The lower section of the form is used for computing $\Delta\alpha$ for reducing geodetic to grid azimuths or vice versa. The value of $\frac{\phi+\phi'}{2}$ is the mean latitude corresponding to the mean y value, $\frac{(\text{tabular } y)+y}{2}$. This is interpolated from the tables on pages 70 to 73. F is a constant (7.47×10^{-13} for the Arizona central zone). $\Delta\alpha$ has the same sign as $\Delta\lambda$.

Table 1, factors, central zone

[For machine computation]

Central meridian = 111°55′00″.0000

$\frac{1}{(6\rho\sigma^2 \sin 1'')_\phi} = 0.787207 \times 10^{-10}$

Latitude	H	ΔH	Minutes	Correction for second difference	V	ΔV	ϵ
°							
31 00	87.033908	0.151772	1 and 9	33	1.086800	3352	−1.000
10	86.882136	.152507	2 and 8	59	1.090152	3315	−.987
20	86.729629	.153241	3 and 7	77	1.093467	3279	−.975
30	86.576388	.153974	4 and 6	88	1.096746	3241	−.962
40	86.422414	.154705	5 and 5	92	1.099987	3205	−.949
50	86.267709	.155436			1.103192	3167	−.937
32 00	86.112273	.156166			1.106359	3129	−.924
32 10	85.956107	0.156893	1 and 9	33	1.109488	3092	−.911
20	85.799214	.157620	2 and 8	58	1.112580	3055	−.899
30	85.641594	.158345	3 and 7	76	1.115635	3017	−.886
40	85.483249	.159068	4 and 6	87	1.118652	2979	−.874
50	85.324181	.159792	5 and 5	91	1.121631	2941	−.861
33 00	85.164389	.160513			1.124572	2904	−.848
33 10	85.003876	0.161234	1 and 9	32	1.127476	2865	−.836
20	84.842642	.161953	2 and 8	57	1.130341	2827	−.823
30	84.680689	.162670	3 and 7	75	1.133168	2789	−.810
40	84.518019	.163387	4 and 6	86	1.135957	2751	−.798
50	84.354632	.164101	5 and 5	90	1.138708	2712	−.785
34 00	84.190531	.164815			1.141420	2673	−.772
34 10	84.025716	0.165527	1 and 9	32	1.144093	2635	−.760
20	83.860189	.166238	2 and 8	57	1.146728	2596	−.747
30	83.693951	.166947	3 and 7	74	1.149324	2557	−.735
40	83.527004	.167655	4 and 6	85	1.151881	2519	−.722
50	83.359349	.168362	5 and 5	89	1.154400	2479	−.710
35 00	83.190987	.169068			1.156879	2441	−.697
35 10	83.021919	0.169772	1 and 9	32	1.159320	2401	−.685
20	82.852147	.170474	2 and 8	56	1.161721	2362	−.672
30	82.681673	.171176	3 and 7	74	1.164083	2323	−.660
40	82.510497	.171876	4 and 6	84	1.166406	2283	−.647
50	82.338621	.172574	5 and 5	88	1.168689	2244	−.635
36 00	82.166047	.173271			1.170933	2204	−.622
36 10	81.992776	0.173966	1 and 9	31	1.173137	2164	−.610
20	81.818810	.174660	2 and 8	55	1.175301	2125	−.598
30	81.644150	.175353	3 and 7	73	1.177426	2085	−.585
40	81.468797	.176043	4 and 6	83	1.179511	2046	−.573
50	81.292754	.176733	5 and 5	86	1.181557	2005	−.561
37 00	81.116021	.177421			1.183562	1965	−.549
37 10	80.938600	0.178108			1.185527	1925	−.537
20	80.760492				1.187452		−.524

For interpolation of V

Minutes	Correction for second difference
1 and 9	2
2 and 8	3
3 and 7	4
4 and 6	5
5 and 5	5

Table 2, factors, central zone

[For machine computation]

$F = 7.47 \times 10^{-13}$

$\Delta\lambda$	b	Δb	c	$\Delta\lambda$	b	Δb	c
Seconds				*Seconds*			
0	0.000	+0.370	0.000				
100	+.370	+.370	.000	3,100	+6.697	−0.110	−0.133
200	+.740	+.367	−.001	3,200	+6.587	−.141	−.135
300	+1.107	+.364	−.002	3,300	+6.446	−.173	−.136
400	+1.471	+.360	−.003	3,400	+6.273	−.205	−.135
500	+1.831	+.355	−.005	3,500	+6.068	−.239	−.133
600	+2.186	+.350	−.007	3,600	+5.829	−.273	−.131
700	+2.536	+.343	−.010	3,700	+5.556	−.309	−.128
800	+2.879	+.335	−.014	3,800	+5.247	−.346	−.124
900	+3.214	+.326	−.018	3,900	+4.901	−.382	−.120
1,000	+3.540	+.315	−.022	4,000	+4.519	−.422	−.115
1,100	+3.855	+.305	−.027	4,100	+4.097	−.462	−.109
1,200	+4.160	+.294	−.032	4,200	+3.635	−.503	−.101
1,300	+4.454	+.282	−.038	4,300	+3.132	−.544	−.091
1,400	+4.736	+.268	−.043	4,400	+2.588	−.585	−.078
1,500	+5.004	+.255	−.049	4,500	+2.003	−.626	−.063
1,600	+5.259	+.239	−.055	4,600	+1.377	−.667	−.045
1,700	+5.498	+.223	−.061	4,700	+.710	−.710	−.025
1,800	+5.721	+.206	−.067	4,800	.000	−.755	.000
1,900	+5.927	+.188	−.073	4,900	−.755	−.807	+.026
2,000	+6.115	+.169	−.079	5,000	−1.562	−.860	+.053
2,100	+6.284	+.149	−.085	5,100	−2.422	−.911	+.084
2,200	+6.433	+.128	−.091	5,200	−3.333	−.960	+.117
2,300	+6.561	+.105	−.096	5,300	−4.293	−1.014	+.153
2,400	+6.666	+.082	−.101	5,400	−5.307	−1.067	+.191
2,500	+6.748	+.058	−.106	5,500	−6.374	−1.120	+.232
2,600	+6.806	+.033	−.111	5,600	−7.494	−1.172	+.275
2,700	+6.839	+.007	−.116	5,700	−8.666	−1.225	+.321
2,800	+6.846	−.021	−.121	5,800	−9.891	−1.277	+.371
2,900	+6.825	−.049	−.125	5,900	−11.168	−1.331	+.426
3,000	+6.776	−.079	−.130	6,000	−12.499		+.487

INTERPOLATION TABLE FOR $\Delta\alpha$

The table of $\Delta\alpha$ was computed by the formula:

$$\Delta\alpha = \Delta\lambda \sin \frac{\phi + \phi'}{2} + F(\Delta\lambda)^3$$

The $\Delta\alpha$ for any station can be obtained from this table by double interpolation with the latitude of the station and its difference in longitude from the central meridian as the arguments. An average tabular difference of $\Delta\lambda$ for any particular latitude is given at the right of the table. This may be used in the interpolation in the direction of $\Delta\lambda$. Interpolation in the other direction can be done readily without the use of a tabular difference table. The sign of the $\Delta\alpha$ is the same as the sign of $\Delta\lambda$ which is derived from the expression: $\Delta\lambda = (\text{central meridian} - \lambda)$ where the value of the central meridian is a constant for any particular plane coordinate projection zone ($111°55'00''.0000$ for the Arizona central zone) and λ is the longitude of the station.

Table for computing $\Delta\alpha$

Latitude	$\Delta\lambda$ = (central meridian − λ)						Tabular differences	
	0°05′	0°10′	0°15′	0°20′	0°25′	0°30′	$\Delta\lambda=1'$	$\Delta\lambda=1''$
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″		
31 00	2 34.5	5 09.0	7 43.5	10 18.0	12 52.6	15 27.1	+30.91	+0.515
10	35.3	10.5	45.8	21.0	12 56.3	31.6	+31.06	+.518
20	36.0	12.0	48.0	24.0	13 00.0	36.0	+31.21	+.520
30	36.8	13.5	50.2	27.0	03.8	40.5	+31.35	+.523
40	37.5	15.0	52.5	30.0	07.5	45.0	+31.50	+.525
50	38.2	16.5	54.7	32.9	11.2	49.4	+31.65	+.528
32 00	2 39.0	5 18.0	7 56.9	10 35.9	13 14.9	15 53.9	+31.80	+.530
10	39.7	19.4	7 59.2	38.9	18.6	15 58.3	+31.95	+.532
20	40.4	20.9	8 01.4	41.8	22.3	16 02.7	+32.09	+.535
30	41.2	22.4	03.6	44.8	26.0	07.2	+32.24	+.537
40	41.9	23.8	05.8	47.7	29.6	11.6	+32.39	+.540
50	42.7	25.3	08.0	50.6	33.3	16.0	+32.54	+.542
33 00	2 43.4	5 26.8	8 10.2	10 53.6	13 37.0	16 20.4	+32.68	+.545
10	44.1	28.2	12.4	56.5	40.6	24.8	+32.83	+.547
20	44.8	29.7	14.6	10 59.4	44.3	29.1	+32.98	+.550
30	45.6	31.2	16.8	11 02.3	47.9	33.5	+33.12	+.552
40	46.3	32.6	18.9	05.2	51.6	37.9	+33.27	+.554
50	47.0	34.1	21.1	08.1	55.2	42.2	+33.41	+.557
34 00	2 47.8	5 35.5	8 23.3	11 11.0	13 58.8	16 46.6	+33.56	+.559
10	48.5	37.0	25.4	13.9	14 02.4	50.9	+33.70	+.562
20	49.2	38.4	27.6	16.8	06.0	55.2	+33.85	+.564
30	49.9	39.8	29.8	19.7	09.6	16 59.5	+33.99	+.567
40	50.6	41.3	31.9	22.6	13.2	17 03.9	+34.13	+.569
50	51.4	42.7	34.1	25.4	16.8	08.2	+34.28	+.571
35 00	2 52.1	5 44.2	8 36.2	11 28.3	14 20.4	17 12.5	+34.42	+.574
10	52.8	45.6	38.4	31.2	23.9	16.7	+34.56	+.576
20	53.5	47.0	40.5	34.0	27.5	21.0	+34.71	+.578
30	54.2	48.4	42.6	36.8	31.1	25.3	+34.85	+.581
40	54.9	49.8	44.8	39.7	34.6	29.5	+34.99	+.583
50	55.6	51.3	46.9	42.5	38.2	33.8	+35.13	+.586
36 00	2 56.3	5 52.7	8 49.0	11 45.4	14 41.7	17 38.0	+35.27	+.588
10	57.0	54.1	51.1	48.2	45.2	42.3	+35.42	+.590
20	57.7	55.5	53.2	51.0	48.7	46.5	+35.56	+.593
30	58.4	56.9	55.3	53.8	52.2	50.7	+35.70	+.595
40	59.1	58.3	57.4	56.6	55.7	54.9	+35.84	+.597
50	2 59.8	5 59.7	8 59.5	11 59.4	14 59.2	17 59.1	+35.98	+.600
37 00	3 00.5	6 01.1	9 01.6	12 02.2	15 02.7	18 03.3	+36.12	+.602

Table for computing $\Delta\alpha$

Latitude	$\Delta\lambda$ = (central meridian − λ)						Tabular difference	
	0°35′	0°40′	0°45′	0°50′	0°55′	1°00′	$\Delta\lambda=1'$	$\Delta\lambda=1''$
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″		
31 00	18 01.6	20 36.1	23 10.7	25 45.2	28 19.7	30 54.3	+30.91	+0.515
10	06.8	42.1	17.4	25 52.7	28.0	31 03.2	+31.06	+.518
20	12.1	48.1	24.1	26 00.1	36.2	12.2	+31.21	+.520
30	17.3	20 54.0	30.8	07.6	44.4	21.1	+31.35	+.523
40	22.5	21 00.0	37.5	15.0	28 52.5	30.0	+31.50	+.525
50	27.7	05.9	44.2	22.4	29 00.7	38.9	+31.65	+.528
32 00	18 32.9	21 11.9	23 50.8	26 29.8	29 08.8	31 47.8	+31.80	+.530
10	38.0	17.8	23 57.5	37.2	17.0	31 56.7	+31.95	+.532
20	43.2	23.7	24 04.1	44.6	25.1	32 05.6	+32.09	+.535
30	48.4	29.6	10.8	52.0	33.2	14.4	+32.24	+.537
40	53.5	35.4	17.4	26 59.3	41.3	23.2	+32.39	+.540
50	18 58.6	41.3	24.0	27 06.7	49.4	32.0	+32.54	+.542
33 00	19 03.8	21 47.2	24 30.6	27 14.0	29 57.4	32 40.8	+32.68	+.545
10	08.9	53.0	37.2	21.3	30 05.5	49.6	+32.83	+.547
20	14.0	21 58.9	43.7	28.6	13.5	32 58.4	+32.98	+.550
30	19.1	22 04.7	50.3	35.9	21.5	33 07.1	+33.12	+.552
40	24.2	10.5	24 56.8	43.2	29.5	15.8	+33.27	+.554
50	29.3	16.3	25 03.4	50.4	37.5	24.5	+33.41	+.557
34 00	19 34.3	22 22.1	25 09.9	27 57.7	30 45.5	33 33.2	+33.56	+.559
10	39.4	27.9	16.4	28 04.9	30 53.4	41.9	+33.70	+.562
20	44.4	33.7	22.9	12.1	31 01.3	50.6	+33.85	+.564
30	49.5	39.4	29.4	19.3	09.2	33 59.2	+33.99	+.567
40	54.5	45.2	35.8	26.5	17.1	34 07.8	+34.13	+.569
50	19 59.5	50.9	42.3	33.6	25.0	16.4	+34.28	+.571
35 00	20 04.5	22 56.6	25 48.7	28 40.8	31 32.9	34 25.0	+34.42	+.574
10	09.5	23 02.3	25 55.1	48.0	40.8	33.6	+34.56	+.576
20	14.5	08.0	26 01.5	28 55.1	48.6	42.1	+34.71	+.578
30	19.5	13.7	07.9	29 02.2	31 56.4	50.7	+34.85	+.581
40	24.5	19.4	14.3	09.3	32 04.2	34 59.2	+34.99	+.583
50	29.4	25.1	20.7	16.4	12.0	35 07.7	+35.13	+.586
36 00	20 34.4	23 30.7	26 27.1	29 23.4	32 19.8	35 16.2	+35.27	+.588
10	39.3	36.4	33.4	30.5	27.6	24.6	+35.42	+.590
20	44.2	42.0	39.8	37.5	35.3	33.1	+35.56	+.593
30	49.2	47.6	46.1	44.6	43.0	41.5	+35.70	+.595
40	54.1	53.2	52.4	51.6	50.7	49.9	+35.84	+.597
50	20 59.0	23 58.8	26 58.7	29 58.6	32 58.4	35 58.3	+35.98	+.600
37 00	21 03.8	24 04.4	27 05.0	30 05.5	33 06.1	36 06.7	+36.12	+.602

Table for computing $\Delta\alpha$—Continued

Latitude		$\Delta\lambda$ = (central meridian − λ)										Tabular difference	
		1°00′		1°05′		1°10′		1°15′		1°20′		1°25′		$\Delta\lambda$=1′	$\Delta\lambda$=1″
°	′	′	″	′	″	′	″	′	″	′	″	′	″		
31	00	30	54.3	33	28.8	36	03.4	38	38.0	41	12.5	43	47.1	+30.91	+0.515
	10	31	03.2		38.5		13.8	38	49.2		24.5	43	59.8	+31.06	+.518
	20		12.2		48.2		24.3	39	00.4		36.4	44	12.5	+31.21	+.520
	30		21.1	33	57.9		34.7		11.5	41	48.3		25.1	+31.35	+.523
	40		30.0	34	07.6		45.1		22.7	42	00.2		37.8	+31.50	+.525
	50		38.9		17.2	36	55.5		33.8		12.1	44	50.4	+31.65	+.528
32	00	31	47.8	34	26.9	37	05.9	39	44.9	42	23.9	45	03.0	+31.80	+.530
	10	31	56.7		36.5		16.2	39	56.0		35.8		15.6	+31.95	+.532
	20	32	05.6		46.1		26.6	40	07.1		47.6		28.1	+32.09	+.535
	30		14.4	34	55.6		36.9		18.1	42	59.4		40.6	+32.24	+.537
	40		23.2	35	05.2		47.2		29.2	43	11.1	45	53.1	+32.39	+.540
	50		32.0		14.7	37	57.5		40.2		22.9	46	05.6	+32.54	+.542
33	00	32	40.8	35	24.3	38	07.7	40	51.2	43	34.6	46	18.1	+32.68	+.545
	10		49.6		33.8		18.0	41	02.1		46.3		30.5	+32.83	+.547
	20	32	58.4		43.3		28.2		13.1	43	58.0		42.9	+32.98	+.550
	30	33	07.1	35	52.7		38.4		24.0	44	09.6	46	55.3	+33.12	+.552
	40		15.8	36	02.2		48.5		34.9		21.3	47	07.6	+33.27	+.554
	50		24.5		11.6	38	58.7		45.8		32.9		20.0	+33.41	+.557
34	00	33	33.2	36	21.0	39	08.8	41	56.6	44	44.5	47	32.3	+33.56	+.559
	10		41.9		30.4		19.0	42	07.5	44	56.0		44.6	+33.70	+.562
	20		50.6		39.8		29.1		18.3	45	07.6	47	56.8	+33.85	+.564
	30	33	59.2		49.2		39.1		29.1		19.1	48	09.1	+33.99	+.567
	40	34	07.8	36	58.5		49.2		39.9		30.6		21.3	+34.13	+.569
	50		16.4	37	07.8	39	59.2	42	50.6		42.1		33.5	+34.28	+.571
35	00	34	25.0	37	17.1	40	09.2	43	01.4	45	53.5	48	45.6	+34.42	+.574
	10		33.6		26.4		19.2		12.1	46	04.9	48	57.8	+34.56	+.576
	20		42.1		35.7		29.2		22.8		16.3	49	09.9	+34.71	+.578
	30		50.7		44.9		39.2		33.4		27.7		22.0	+34.85	+.581
	40	34	59.2	37	54.1		49.1		44.1		39.1		34.1	+34.99	+.583
	50	35	07.7	38	03.3	40	59.0	43	54.7	46	50.4		46.1	+35.13	+.586
36	00	35	16.2	38	12.5	41	08.9	44	05.3	47	01.7	49	58.1	+35.27	+.588
	10		24.6		21.7		18.8		15.9		13.0	50	10.1	+35.42	+.590
	20		33.1		30.9		28.7		26.5		24.2		22.1	+35.56	+.593
	30		41.5		40.0		38.5		37.0		35.5		34.0	+35.70	+.595
	40		49.9		49.1		48.3		47.5		46.7		45.9	+35.84	+.597
	50	35	58.3	38	58.2	41	58.1	44	58.0	47	57.9	50	57.8	+35.98	+.600
37	00	36	06.7	39	07.3	42	07.9	45	08.4	48	09.0	51	09.7	+36.12	+.602

Table for computing $\Delta\alpha$— Continued

Latitude	$\Delta\lambda$ = (central meridian − λ)										Tabular difference	
	1°30′		1°35′		1°40′		1°45′		1°50′		$\Delta\lambda = 1'$	$\Delta\lambda = 1''$
° ′	′	″	′	″	° ′	″	° ′	″	° ′	″		
31 00	46	21.7	48	56.3	0 51	30.9	0 54	05.5	0 56	40.1	+30.91	+0.515
10		35.1	49	10.5	51	45.8		21.2	56	56.6	+31.06	+.518
20	46	48.6		24.7	52	00.7		36.9	57	13.0	+31.21	+.520
30	47	02.0		38.8		15.6	54	52.5		29.3	+31.35	+.523
40		15.4	49	52.9		30.5	55	08.1	57	45.7	+31.50	+.525
50		28.7	50	07.0	52	45.4		23.7	58	02.0	+31.65	+.528
32 00	47	42.0	50	21.1	0 53	00.2	0 55	39.2	0 58	18.3	+31.80	+.530
10	47	55.3		35.1		15.0	55	54.8		34.6	+31.95	+.532
20	48	08.6	50	49.2		29.7	56	10.3	58	50.8	+32.09	+.535
30		21.9	51	03.2		44.4		25.7	59	07.0	+32.24	+.537
40		35.1		17.1	53	59.1		41.2		23.2	+32.39	+.540
50	48	48.3		31.1	54	13.8	56	56.6		39.4	+32.54	+.542
33 00	49	01.5	51	45.0	0 54	28.5	0 57	12.0	0 59	55.5	+32.68	+.545
10		14.7	51	58.9		43.1		27.3	1 00	11.6	+32.83	+.547
20		27.8	52	12.8	54	57.7		42.7		27.6	+32.98	+.550
30		40.9		26.6	55	12.3	57	58.0		43.6	+33.12	+.552
40	49	54.0		40.4		26.8	58	13.2	00	59.6	+33.27	+.554
50	50	07.1	52	54.2		41.3		28.5	01	15.6	+33.41	+.557
34 00	50	20.1	53	08.0	0 55	55.8	0 58	43.7	1 01	31.5	+33.56	+.559
10		33.1		21.7	56	10.3	58	58.9	01	47.4	+33.70	+.562
20		46.1		35.4		24.7	59	14.0	02	03.3	+33.85	+.564
30	50	59.1	53	49.1		39.1		29.1		19.2	+33.99	+.567
40	51	12.0	54	02.7	56	53.5		44.2		35.0	+34.13	+.569
50		24.9		16.3	57	07.8	0 59	59.3	02	50.7	+34.28	+.571
35 00	51	37.8	54	29.9	0 57	22.1	1 00	14.3	1 03	06.5	+34.42	+.574
10	51	50.6		43.5		36.4		29.3		22.2	+34.56	+.576
20	52	03.5	54	57.1	57	50.7		44.3		37.9	+34.71	+.578
30		16.3	55	10.6	58	04.9	00	59.2	03	53.5	+34.85	+.581
40		29.1		24.1		19.1	01	14.1	04	09.1	+34.99	+.583
50		41.8		37.5		33.2		29.0		24.7	+35.13	+.586
36 00	52	54.5	55	50.9	0 58	47.4	1 01	43.8	1 04	40.3	+35.27	+.588
10	53	07.2	56	04.3	59	01.5	01	58.6	04	55.8	+35.42	+.590
20		19.9		17.7		15.5	02	13.4	05	11.3	+35.56	+.593
30		32.5		31.1		29.6		28.1		26.7	+35.70	+.595
40		45.1		44.4		43.6		42.8		42.1	+35.84	+.597
50	53	57.7	56	57.7	0 59	57.6	02	57.5	05	57.5	+35.98	+.600
37 00	54	10.3	57	10.9	1 00	11.5	1 03	12.2	1 06	12.9	+36.12	+.602

DESCRIPTIONS, ELEVATIONS, AND PLANE COORDINATES

TEXAS-CALIFORNIA ARC

Principal points

Baldy (U. S. G. S.) (Santa Cruz County, J. S. Hill, 1910; 1919; 1935).—On Old Baldy or Santa Rita Peak, a high prominent peak near the south end of the Santa Rita Range, 11 miles northwest of Crittenden and 12 miles northwest of Patagonia, towns on the Southern Pacific Railroad. Station is marked by a U.S. Geological Survey triangulation station mark cemented into the solid rock. The reference mark, which is identical with the U.S. Geological Survey reference mark, is a cross cut in the top of a rock and 18.22 meters (59.8 feet) from the station in azimuth 220°53′. This station was reported lost in 1935, a lookout house having been built over the mark.

Plane coordinates: (C), x=832,554.26 feet; y=254,790.26 feet.

Catalina (Pima County, J. S. Hill, 1910; 1919; 1936).—On the north spur of what is known locally as Lemon Mountain, the highest peak of the Catalina Mountains, about 22 miles in a direct line northeast of Tucson. The best approach is from the north from the town of Oracle, via the "3C" Ranch and Camp Apache Mine, but the station may also be reached from the south or Tucson side by a trail leading up the Salino Canyon. Timber on the peak obstructs the view except where it has been cleared. The station is marked by a standard triangulation disk cemented into a drill hole in solid outcropping rock. The reference mark, a U.S. Geological Survey bench mark disk cemented into the rock, is 3.225 meters (10.58 feet) from station in azimuth 205°26′. Reference mark No. 2, a standard bronze reference disk driven into a 3½-foot pine tree, is 15.105 meters (49.56 feet) from station in azimuth 28°07′.

Plane coordinates: (C), x=848,181.75 feet; y=526,603.27 feet.

Table (Pinal County, J. S. Hill, 1910; 1936).—On the highest point, which is the northwest end, of the northeast knob of Table Top Mountain, about 24½ miles west-southwest of Casa Grande and about 8 miles south of State Highway No. 84. Marked by a standard bronze disk as described in note 2. The reference mark, a standard bronze reference disk, note 12a, is 7.897 meters (25.91 feet) from station in azimuth 171°13′. A cross cut in the top of a large flat rock is 3.80 meters (12.5 feet) from station in azimuth 265°46′.

Plane coordinates: (C), x=436,065.42 feet; y=637,808.55 feet.

Superstition (U. S. G. S.) (Pinal County, J. S. Hill, 1910; 1936; 1938).—About 25 miles east of Mesa, about 6 miles north-northeast of the Sand Tanks service station on the U. S. Highway No. 60, and on the more southeastern one of the two highest peaks of the Superstition Mountains. Station is on the highest point of the peak, which is narrow and has nearly vertical sides near the top. Marked by a standard U. S. Geological Survey disk cemented into the bedrock. The reference mark, a standard bronze reference disk, note 12a, is 1.757 meters (5.76 feet) from station in azimuth 223°08′. A cross chiseled in rock is 2.267 meters (7.44 feet) from station in azimuth 110°26′.

Plane coordinates: (C), x=657,638.22 feet; y=877,416.86 feet.

Whitetank (Maricopa County, J. S. Hill, 1910; 1919; 1924; 1935; 1936).—About 22 miles almost due west of Peoria, 13 miles northwest of Litchfield, on a high peak near the middle of the Whitetank Range, and about 1½ miles southeast of the highest peak. Marked by a standard bronze disk as described in note 2. Reference mark (1910), a cross cut on rock, is 5.417 meters (17.77 feet) from station in azimuth 203°21′. Reference mark No. 1 (1935), a standard bronze reference disk, note 12a, is 8.073 meters (26.49 feet) from station in azimuth 19°22′. Reference mark No. 2 (1935), a standard bronze reference disk, note 12a, is 11.496 meters (37.72 feet) from station in azimuth 112°33′. The azimuth mark, a standard bronze disk, note 12a, is about 8 feet east of and 2 feet lower than a rock cairn which stands on the highest point of the peak, and is about 0.2 mile from station in azimuth 350°34′07″.

For notes in regard to marking of stations, see page 63.

Plane coordinates: (C), x=304,755.50 feet; y=934,446.33 feet; the grid azimuth to the azimuth mark=350°55′22″.9.*

Maricopa (Maricopa County, J. S. Hill, 1910; 1919; 1936).—On the highest and most western peak of the short spur of mountains extending to the eastward from the Maricopa Divide, 23 miles direct or 28 miles by road southeast of Gila Bend, a town on the Southern Pacific, and about 24 miles direct or 28 miles by road northwest of the Vekol mining camp. The peak is one-half mile north of the Vekol-Gila Bend Road and is the most prominent one to be seen in approaching the mountains from the eastward. Marked by a standard bronze disk as described in note 7. Station reported destroyed in 1936.

Plane coordinates: (C), x=357,822.06 feet; y=637,687.16 feet.

Harquahalla (Yuma County, J. S. Hill, 1910; 1919; 1924).—On the highest peak of the Harquahala Mountains, about 11 miles direct or 16 miles by road and trail east of Wenden, a town on a branch of the Santa Fe Railroad, and about 7 miles south of the nearest point of the railroad. Marked by a standard bronze disk as described in note 2. The reference mark, a cross cut in the top and near the north edge of a large boulder, is 8.21 meters (26.9 feet) from station in azimuth 88°32′. A building of the Smithsonian Institution is about 100 yards south of the station.

Plane coordinates: (C), x=65,788.67 feet; y=1,025,856.93 feet.

Mohawk (Yuma County, J. S. Hill, 1910; 1920; 1934).—On the highest and most southern peak of the Mohawk Mountains, 11 miles south of Stovall, from which place the peak may be seen, and 16 miles by road from Mohawk. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 17.577 meters (57.67 feet) from station in azimuth 50°34′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 26.077 meters (85.55 feet) from station in azimuth 145°32′. A cross cut in the top of a boulder near the edge of a bluff is 13.31 meters (43.7 feet) from station in azimuth 186°28′.

Plane coordinates not given, as station is west of central zone limits.

Mazatzal (Gila and Yavapai Counties, C. V. Hodgson, 1919; 1924).—On the boundary line between Gila and Yavapai Counties, on the highest point of the Mazatzal Mountains, about 11 miles direct and 18 miles by road and trail southwest of Payson and 9 miles by trail from the H-Bar ranch (deserted), which is on the Roosevelt-Payson wagon road. Station is best reached from H-Bar ranch by way of Barnhardts Canyon. Marked by a standard bronze disk as described in note 5. The reference mark, a standard bronze reference disk, note 12c, is 6.28 meters (20.6 feet) from station in azimuth 248°16′.

Plane coordinates: (C), x=638,050.44 feet; y=1,114,426.23 feet.

Supplementary points

Maricopa astronomical station eccentric (Maricopa County, J. S. Hill, 1910).—See description of *Maricopa east pier.*

Plane coordinates: (C), x=459,130.53 feet; y=749,157.49 feet.

Maricopa east pier (Maricopa County, J. S. Hill, 1910; 1923).—This is an old longitude pier (Maricopa longitude, 1899) west by north from the Maricopa Hotel in Maricopa and on the same side of the railroad track to Phoenix as the Southern Pacific Railroad station, 20.64 meters west of the center of the railroad track to Phoenix, 175.61 meters north of the center of the railroad track to Gila Bend and 10.64 meters from the tenth telegraph pole from the Southern Pacific Railroad station. Marked by a standard bronze disk in the top of a brick pier about 2 inches above the ground. *Maricopa astronomical station eccentric*, a nail in the top of a stake, is 21.673 meters (71.11 feet) from station in azimuth 138°07′18″.

Plane coordinates:[1] (C), x=459,177.95 feet; y=749,104.47 feet.

Maricopa west pier (Maricopa County, J. S. Hill, 1910).—This is an old latitude pier (Maricopa latitude, 1899), 1.85 meters (6.1 feet) directly west of *Maricopa east pier.* Marked by a standard bronze disk in the top of a brick pier, about 36 inches above the ground.

Plane coordinates:[1] (C), x=459,171.99 feet; y=749,104.38 feet.

Maricopa northwest base (U. S. G. S.) (Pinal County, J. S. Hill, 1910).—About one-half mile southeast of Maricopa, 26 feet north of the center of the

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

railroad track, opposite milepost 897. Marked by an iron bench mark post set flush with the ground and surrounded with a collar of concrete. Bottom of the post rests on a rock.

Plane coordinates: (C), x=463,051.01 feet; y=745,731.16 feet.

Comobabi Peak (Pima County, J. S. Hill, 1910).—Plane coordinates: (C), x=599,913.34 feet; y=280,564.07 feet.

Desert Peak (Pinal County, J. S. Hill, 1910).—Plane coordinates: (C), x=659,007.17 feet; y=625,563.20 feet.

Gila Peak (Maricopa County, J. S. Hill, 1910).—Plane coordinates: (C), x=203,831.38 feet; y=789,787.09 feet.

Mare (Maricopa County, J. S. Hill, 1910).—Plane coordinates: (C), x=388,948.37 feet; y=827,155.50 feet.

Four Peaks (Gila County, J. S. Hill, 1910).—Plane coordinates: (C), x=679,413.21 feet; y=975,719.48 feet.

Flat Top (center) (Maricopa County, J. S. Hill, 1910).—Plane coordinates: (C), x=246,099.73 feet; y=595,832.95 feet.

Needles (Maricopa County, J. S. Hill, 1910).—Plane coordinates: (C), x=76,664.08 feet; y=877,078.57 feet.

UNITED STATES-MEXICO BOUNDARY ARC

Principal points

Kitts (Pima County, G. D. Cowie, 1920; 1935; 1936; 1938).—About 40 miles, air line, southwest of Tucson, 2½ miles south-southwest of Coyote Village, on the Papago Indian Reservation, on the highest part of the rocky ridge at the north end of the Baboquivari Mountain Range (locally known as Black Mountain) that has a noticeable growth of timber on top and the eastern slope and lies about 5 miles, air line, southwest of a jagged rocky range known as the Coyote Mountain Range, among the large clump of white granite boulders that form the highest part. Marked by a standard bronze disk as described in note 2, set in bedrock. Reference mark No. 1, a standard bronze reference disk, note 12c, is set in top of large detached rock fragment and is 4.130 meters (13.55 feet) from station in azimuth 306°06′. Reference mark No. 2, a standard bronze reference disk, note 12a, is at north edge of the summit and set in bedrock and is 1.669 meters (5.48 feet) from station in azimuth 142°33′. The azimuth mark, a standard bronze disk, note 11a, is at Coyote Indian Village on the northwest side of the track road leading through the village, at the village church, 21 yards south of the south corner of the church, and 2½ miles from station in azimuth 211°24′15″.

Plane coordinates: (C), x=598,633.75 feet; y=351,079.58 feet; the grid azimuth to the azimuth mark=211°14′09″.*

Silver Bell (Pima County, G. D. Cowie, 1919; 1935; 1936).—Near the town of Silverbell, on the highest part of the rocky peak just east of the terminal of the American Smelting & Refining Co. Railroad, which peak is slightly lower than a similar peak about 1 mile south. To reach, follow up the wash east of the roundhouse to the foot of the peak, then climb over the ledges to the top. Marked by a standard bronze disk as described in note 1. Reference mark No. 1 is 7.825 meters (25.67 feet) from station in azimuth 35°05′. Reference mark No. 2 is 8.413 meters (27.60 feet) from station in azimuth 135°10′. The azimuth mark, a standard bronze disk, note 12a, is in bedrock near the east end of the old ore loading chute, near the old railroad dump, about 0.7 mile east of the center of Silverbell and about 2 miles from station in azimuth 96°40′41″.

Plane coordinates: (C) x=627,059.07 feet; y=515,891.26 feet; the grid azimuth to the azimuth mark=96°27′27″.*

Sierra Prieta (Pima County, G. D. Cowie, 1920).—On the Sierra Prieta Mountains, about 30 miles south of Casa Grande and 2 miles west of the Lake Shore mine. To reach from the mine, go northeast toward saddle south of highest point, follow up slide rock and follow up ridge to northward to highest point. Marked by a standard bronze disk as described in note 2a. The reference mark, a standard bronze reference disk, note 12c, is 17.81 meters (58.4 feet) from station in azimuth 10°14′.

Plane coordinates: (C), x=508,620.44 feet; y=562,248.49 feet.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

South Mountain (Pima County, G. D. Cowie, 1920; 1934; 1935; 1936).—On the south end of South or Quijotoa Mountain, about 15 miles, air line, west of Sells, on the western one of the two ridges that form the top of the mountain. Marked by a standard bronze disk as described in note 2a. Station plate has been so badly battered in apparent effort to remove it that stamping is almost illegible. Reference mark No. 1, a standard bronze reference disk, note 12c, is 14.531 meters (47.67 feet) from station in azimuth 113°16′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 16.419 meters (53.87 feet) from station in azimuth 164°55′. The azimuth mark (1936), note 12a, is on the first prominent peak north of the south and highest end of the east ridge on the mountain, one-half mile from station in azimuth 278°22′03″.

Plane coordinates: (C), x=428,825.65 feet; y=363,653.84 feet; the grid azimuth to the azimuth mark=278°29′21″.*

Sauceda (Sauceedo or Saucedo) (Pima County, G. D. Cowie, 1920; 1935; 1936).—On the highest summit of the Sauceda Mountains, 18 miles, air line, northeast of Ajo, on hill west of the Indian village of Road Runner, about 3 miles, 242° (magnetic), from two charcos. Marked by a standard bronze disk, note 2a, stamped "Sauceda 1920, 1935." Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.460 meters (17.91 feet) from station in azimuth 149°51′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.064 meters (19.89 feet) from station in azimuth 53°18′. The azimuth mark, a standard bronze disk, note 12a, is one-half mile from station in azimuth 307°12′06″.

Plane coordinates: (C), x=292,409.56 feet; y=532,193.53 feet; the grid azimuth to the azimuth mark=307°33′46″.*

Sierra del Ajo (Pima County, G. D. Cowie, 1920; 1935; 1936).—On the highest part of the Sierra del Ajos. To reach from Ajo, follow the Ajo-Sells Road east for 15.5 miles to a cross road with a sign reading "Poso Redondo"; turn right here and follow this road south to the town of Kerwo; from there go southwest to a corral on a small hill approximately 0.3 mile from a church. At the corral take the road on the south and follow for 1.7 miles; turn left on the old dim road and follow it to the foot of the hill heading directly for the wide-mouthed canyon near the south end of the mountain. This road is rough and winding. About the center of the wide mouth and near the long sloping ridge on the left (south) leave truck and follow this ridge up to a high rock ledge on the top of the ridge. Turn right and follow the foot of cliff, then climb higher to the summit of ridge, follow the ridge around southwest to the highest point where the station will be found on the top of a huge rock just south and about 50 yards from a point which is about 20 feet higher than the station. Marked by a standard bronze disk as described in note 2a. Disk is erroneously stamped "Sierra de Ajo." Reference mark No. 1, a standard bronze reference disk, note 12c, is 34.924 meters (114.58 feet) from station in azimuth 191°32′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 6.492 meters (21.30 feet) from station in azimuth 304°35′. The azimuth mark is on the ridge that extends southeast and south from the crest on which the station is located and is 15 feet northwest of a General Land Office pipe stamped "P. I. R. 10M. 1929." The azimuth mark was stamped "Sierra del Ajo 1920–1936." It is one fourth mile from station in azimuth 314°27′18″.

Plane coordinates: (C), x=260,398.48 feet; y=374,293.23 feet; the grid azimuth to the azimuth mark=314°51′54″.*

Growler (Yuma County, G. D. Cowie, 1920).—About 25 miles west of Ajo and on the highest point of the mountain in that vicinity. To reach, follow road toward pass south of the mountain leading to Toney's ranch. Just before dropping down steep slope to windmill follow up highest part of pass to mountain; from here it is a 2-mile pack over rough, loose, steep rock to highest point. Marked by a standard bronze disk as described in note 2a.

Plane coordinates: (C), x=134,580.07 feet; y=514,999.75 feet.

Quitovaguita (Pima County, G. D. Cowie, 1920).—To reach, take road from Ajo to Bates Well, go west and south about 5 miles to point west of high mountain, turn northwest and follow desert to point about northeast of highest part and turn in to mountain, going in as far as open slope will permit. From here pack up canyon on north side to ridge and work along north side of

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

mountain to westward to highest point. Marked by a standard bronze disk as described in note 2a. The reference mark, a standard bronze reference disk, note 12c, is 12.98 meters (42.6 feet) from station in azimuth 118°05′.

Plane coordinates: (C), x=119,396.06 feet; y=375,194.30 feet.

MARICOPA-YAVAPAI COUNTY-LINE ARC

Principal points

Forepaugh (Maricopa County, W. Mussetter, 1924).—About 7 miles northeast of Aguila, 20 miles west and 3 miles north of Wickenburg, and about 2 miles northwest of Forepaugh, a station on the Santa Fe Railroad. It is on a prominent detached hill visible for miles along the Wickenburg-Aguila Road, on the end of the ridge extending north from the highest peak, about 300 yards north of and 50 yards lower than the peak, and one-fourth mile south of the Maricopa-Yavapai county line. Marked by a standard bronze disk as described in note 2. The reference mark, a standard bronze reference disk, note 12c, is 4.92 meters (16.1 feet) from station in azimuth 280°57′.

Plane coordinates: (C), x=151,420.24 feet; y=1,091,811.34 feet.

Initial Monument (Yavapai County, W. Mussetter, 1924; 1936).—About 11 miles west and 4 miles north of Aguila, 2 miles north of the Long ranch house and 148 feet north of the northwest corner of Maricopa County. Marked by standard bronze disks as described in notes 1a and 7a. An eccentric point used for magnetic observations, marked by a nail in mesquite stake, 2½ inches in diameter and 2 feet long projecting about 4 inches and surrounded by a pile of small rocks, is 73.365 meters (240.70 feet) northwest of the station. *Barlow boundary monument No. 1* is 2.30 meters (7.5 feet) from station in azimuth 92°56′.

Plane coordinates: (C), x=70,736.97 feet; y=1,094,417.70 feet.

Pioneer (Maricopa County, W. Mussetter, 1924).—About 5 miles west and 3 miles south of Aguila, 2 miles southwest of the Uster or Pioneer ranch, and on the highest point of a prominent foothill known about Aguila as Little Harquahala. This peak is steep and about 1,000 feet high and almost on line from Aguila to Mount Harquahala. Reached from Aguila by way of the Uster ranch and thence following road leading southwest to Golden about 2 miles, to foot of peak. Marked by a standard bronze disk as described in note 2. The reference mark, a standard bronze reference disk, note 12a, is 4.01 meters (13.2 feet) from station in azimuth 268°18′.

Plane coordinates: (C), x=91,905.30 feet; y=1,054,679.24 feet.

Castle (Yavapai County, W. Mussetter, 1924; 1935).—On the southern and highest end of a low ridge just east of a north and south wash which crosses the Castle-Hot Springs Road at the Tipton cow ranch, about 8.5 miles east of Morristown. Station is about three-fourths mile north of the Castle-Hot Springs Road and about 1 mile north of the Maricopa-Yavapai county boundary monument No. 16. Marks are standard bronze disks set in native rock.

Plane coordinates: (C), x=316,977.48 feet; y=1,073,273.80 feet.

McDowell (Maricopa County, W. Mussetter, 1924; 1935).—About 25 miles, air line, northeast of Phoenix, on the westerly and lower summit of McDowell Peak, the highest point in the McDowell Mountains lying east of Paradise Valley, and west of Fort McDowell. The highest point of McDowell Peak is on the same ridge as the station, and about one-half mile east by south. In 1935 the station disk had been pried loose from the shank, but was still in the drill hole. Reference mark No. 1 (1935), a standard bronze reference disk, note 12a, is 17.620 meters (57.81 feet) from station in azimuth 214°25′. Reference mark No. 2 (1935), a standard bronze reference disk note 12a, is 6.850 meters (22.47 feet) from station in azimuth 332°50′. The azimuth mark, rock cairn on highest point about one-half mile south-southeast of station, is in azimuth 327°41′58″.

Plane coordinates: (C), x=528,408.50 feet; y=967,701.63 feet; the grid azimuth to the azimuth mark=327°38′52″.*

Bilby (Maricopa County, W. Mussetter, 1924).—About 40 miles north of Phoenix, 10 miles southeast of Canyon, 7 miles northeast of Sheep Ranger Station on New River and 9 miles by trail northeast of the TT ranch. Station

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

is on a sharp peak between New River and the Agua Fria, and lies about 1½ miles south of the U. S. Geological Survey station New River, which is on the highest summit of the New River Mountains. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=470,078.99 feet; y=1,099,273.19 feet.

Buford (Maricopa County, W. Mussetter, 1924).—About 35 miles north-northeast of Phoenix, 3 miles northeast of the Sears ranch on Camp Creek, 1½ miles northwest of a branding corral on the Camp Creek-Verde River wagon road, and on the highest point of a prominent mountain known on General Land Office maps as Mount Buford, to the Forest Service as Kentuck Mountain, and at the Sears ranch as Buck Basin Mountain. This peak is the highest in the vicinity and can be recognized from the south as the pointed peak with the long slope to the west and steep slope to the east. Marked by a standard bronze disk as described in note 2. The reference mark, a standard bronze reference disk, note 12a, is 5.778 meters (18.96 feet) from station in azimuth 139°03′.

Plane coordinates: (C), x=540,462.37 feet; y=1,059,909.57 feet.

Verde (Maricopa County, W. Mussetter, 1924).—About 37 miles north and 24 miles east of Phoenix, 2 miles north of the Sears K ranch on the Verde River, three-fourths mile northeast of the OK ranch buildings and 30 feet back from the bluff on the south side of Deadman wash about one-half mile east of the Verde River. Marked by a standard bronze disk set in a buried boulder.

Plane coordinates: (C), x=561,303.49 feet; y=1,090,725.54 feet.

Table (Maricopa County, W. Mussetter, 1924).—About 34 miles due north of Phoenix, 3 miles northeast of New River Station store on the Black Canyon Road, one-half mile east of the Black Canyon Road where it crosses New River and on the summit of a prominent flat-topped lava hill lying just south of New River. Station is near the bluffs on the south side of the mesa, and a short distance from the southwest point of the summit. Marked by a standard bronze disk as described in note 2. The reference mark, a standard bronze reference disk, note 12a, is 10.16 meters (33.3 feet) from station in azimuth 262°10′.

Plane coordinates: (C), x=439,602.85 feet; y=1,078,263.18 feet.

Agua Fria (Maricopa-Yavapai Counties, W. Mussetter, 1924).—About 40 miles north of Phoenix, 2 miles southwest of Canyon, 1 mile southwest of Rock Springs store on the Black Canyon road, 200 yards south of a mine trail and on the first hill east of and overlooking the Agua Fria River. Station is about 10 yards north of the highest point of the hill and on the Maricopa-Yavapai county line. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=426,127.42 feet; y=1,108,828.21 feet.

Malpai (Maricopa County, W. Mussetter, 1924).—About 33 miles north and 6 miles west of Phoenix, 3 miles west of the New River Station store on the Black Canyon Road and on the high prominent black malpais mesa rising just east of the Agua Fria River. This mesa has steep slopes and bluffs on nearly all sides and a flat, slightly tipped top. Station is in about the middle of the west side, on the highest point near the bluff and overlooks the Agua Fria River. Marked by a standard bronze disk as described in note 4. The reference mark, a standard bronze reference disk, note 12c, is 7.89 meters (25.9 feet) from station in azimuth 165°13′.

Plane coordinates: (C), x=409,182.67 feet; y=1,070,558.33 feet.

Cactus (Yavapai County, W. Mussetter, 1924).—About 7 miles west and 4 miles north of Aguila in the open greasewood and mesquite flats; about 3 miles west of *Fence*, 2 miles east of *Initial Monument* and 90 yards north of the Maricopa-Yavapai county line. Marked by standard bronze disks as described in notes 1a and 7a.

Plane coordinates: (C), x=82,669.69 feet; y=1,094,382.69 feet.

Rabbit (Yavapai County, W. Mussetter, 1924).—About 4 miles north and 2 miles east of Aguila, in level greasewood and mesquite plain, and about one-half mile west of the Aguila-Congress Junction wagon road. Marked by standard bronze disks as described in notes 1a and 7a. *Thompson boundary monument No. 3* is 5.45 meters (17.9 feet) from station in azimuth 348°36′. *T. 8 N., R. 9 W., sec. 25, southwest corner* is 90.175 meters (295.85 feet) from station in azimuth 194°00′46″.

Plane coordinates: (C), x=129,030.28 feet; y=1,093,624.44 feet.

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Fence (Yavapai County, W. Mussetter, 1924).—About 4 miles west and 4 miles north of Aguila, about 30 yards north of Maricopa-Yavapai county line, 20 feet west of a fence line and about 80 paces south of the corner of secs. 25, 36, 30 and 31, T. 8 N., Rs. 9 and 10 W. Marked by standard bronze disks as described in notes 1a and 7a. *Thompson boundary monument No. 2* is 14.72 meters (48.3 feet) from station in azimuth 269°20′.

Plane coordinates: (C), x=97,320.16 feet; y=1,094,088.49 feet.

Aguila (Maricopa County, W. Mussetter, 1924).—About 2 miles south and 2 miles east of Aguila, in open galletta flats and 6 feet north of a fence line. Marked by standard bronze disks as described in notes 1a and 7a. *T. 7 N., R. 9 W., sec. 25, southwest corner* is 2.00 meters (6.6 feet) from station in azimuth 2°25′.

Plane coordinates: (C), x=128,579.53 feet; y=1,062,212.20 feet.

Palo (Maricopa County, W. Mussetter, 1924).—About 10 miles east and 2 miles south of Aguila on a low mound in sec. 29, T. 7 N., R. 7 W. Marked by a standard bronze disk set in a buried boulder. To reach from Aguila or Wickenburg follow main road between these towns to crossroads at the quarter corner of secs. 18 and 19, T. 7 N., R. 7 W. This point is 8½ miles east of Aguila, and about 19 miles west of Wickenburg. Take road leading south about 1¼ miles to a tank, pass to the east of the tank, and continue southeasterly by first right-hand road, passing to the east of a low rounded hill to the base of the second low hill, on top of which the station is located.

Plane coordinates: (C), x=169,877.37 feet; y=1,062,701.63 feet.

Corral (Maricopa County, W. Mussetter, 1924).—About 12 miles west and 2 miles north of Wickenburg, 2 miles west of Divide, one-fourth mile north of the track at a point one-half mile west of mileboard 8 and in Thompson's brushed line. Station is on a greasewood and galletta flat, about 200 paces southeast of an old corral made of railroad ties. Marked by standard bronze disks as described in notes 1a and 7a.

Plane coordinates: (C), x=188,951.57 feet; y=1,092,664.93 feet.

Quartz (Maricopa County, W. Mussetter, 1924).—About 12 miles west and 3 miles south of Wickenburg, on a low rounded hill in sec. 30, T. 7 N., R. 6 W. To reach from Wickenburg-Aguila Road, take fork leading southwest at a point about 8 miles west of Wickenburg. Follow main road in a southwesterly direction to a point about 300 yards north of the station. An old road crosses the main road and passes just west of the hill; the north branch cuts through to the Wickenburg-Aguila Road. There is some outcropping white quartz on the summit of the hill, which is about 75 feet high. Marked by a standard bronze disk as described in note 2. The reference mark, a cross cut in rock, is 9.705 meters (31.84 feet) from station in azimuth 174°08′.

Plane coordinates: (C), x=190,969.19 feet; y=1,065,359.60 feet.

Pack (Yavapai County, W. Mussetter, 1924).—About 7 miles west and 4 miles north of Wickenburg, on a long black malpais ridge about one-half mile north of the Santa Fe Railroad and 3½ miles west of A. & C. Junction. Station is on a bench about 50 feet below the main summit, and near the south end of the main ridge. Marked by a standard bronze disk set in malpais boulder. The reference mark, a cross cut in rock, is 3.99 meters (13.1 feet) from station in azimuth 330°27′.

Plane coordinates: (C). x=221,601.11 feet: y=1,094,697.95 feet.

Spur (Maricopa County, W. Mussetter, 1924).—About 6 miles west and 3 miles south of Wickenburg, on a spur or long sloping ridge extending northward from a high dark-colored pointed hill. Station is in northeast quarter of sec. 25, T. 7 N., R. 6 W. To reach from the Wickenburg-Aguila Road, take old dim road leading south, about 7 miles west of Wickenburg. Follow old road about 1 mile, head up draw to south three-fourths mile and climb ridge to east. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a cross cut in rock, is 5.325 meters (17.47 feet) from station in azimuth 170°12′. Reference mark No. 2, a cross cut in rock, is 2.485 meters (8.15 feet) from station in azimuth 268°40′.

Plane coordinates: (C), x=222,718.61 feet; y=1,064,112.99 feet.

Road (Maricopa County, W. Mussetter, 1924).—About 3 miles northwest of Wickenburg, and 10 feet northeast of the Wickenburg-Prescott Highway. Station is about one-half mile northwest of top of first long hill north of Wickenburg where the road leaves the bottoms and climbs to the plateau.

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Marked by a standard bronze disk set in a buried boulder. *Thompson boundary monument No. 10* is 1.595 meters (5.23 feet) from station in azimuth 278°45′.

Plane coordinates: (C), x=243,999.13 feet; y=1,092,215.66 feet.

Burg (Maricopa County, W. Mussetter, 1924).—About 3 miles south and 1 mile east of Wickenburg and 2 miles west of Allah siding on the Santa Fe Railroad, on the highest point of a three-lobed ridge. This ridge is one among many and not prominent. It is visible from the Phoenix-Wickenburg Highway and the summit has somewhat the appearance of a bracket. Marked by a standard bronze disk as described in note 2. The reference mark, a cross cut in rock, is 12.82 meters (42.1 feet) from station in azimuth 205°38′.

Plane coordinates: (C), x=254,900.19 feet; y=1,067,278.63 feet.

Dusty (Yavapai County, W. Mussetter, 1924).—About 2 miles east of Wickenburg, on the north side of the old Wickenburg-Hot Springs Junction Road near the summit of the divide between the Hassayampa River and Calamity Gulch. Station is about 30 yards north of the Maricopa-Yavapai county line. Marked by a standard bronze disk as described in note 4.

Plane coordinates: (C), x=264,821.13 feet; y=1,087,764.88 feet.

Googie (Yavapai County, W. Mussetter, 1924).—About 6 miles east of Wickenburg, and 1 mile southwest of the old Wickenburg-Hot Springs Junction Road at a point about 8 miles from Wickenburg. Station is on a low ridge, the highest between the Hassayampa River and the wash running south from Tub Springs crossed by the boundary. This ridge is one of many similar ridges in the vicinity. Marked by a standard bronze disk as described in note 4.

Plane coordinates: (C), x=278,350.80 feet; y=1,083,511.09 feet.

Quince (Maricopa County, W. Mussetter, 1924).—About 7 miles north and 4 miles east of Hot Springs Junction or Morristown, 2½ miles northwest of the Tipton ranch, and 2 miles northeast of the Vermont and Arizona mine, on a ridge forming the divide between Santo Domingo wash and the wash on which the Tipton ranch is located. Station is about one-fourth mile northwest of and 100 feet lower than the highest point of the main ridge. Fragments of an old road are visible, running around the northwest side of the hill. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=308,033.52 feet; y=1,074,290.39 feet.

Selin (Yavapai County, W. Mussetter, 1924).—About 6 miles north and 7 miles east of Hot Springs Junction or Morristown, three-eighths mile northwest of the Hot Springs Junction-Castle-Hot Springs Road, and three-fourths mile east of Andrew Selin's house. Station is on the northerly of two peaks of about the same elevation, the northerly peak having a white quartz outcrop on top and the southerly peak being red and rocky on the summit. Station is about 500 feet in elevation above the road and visible from road and from Selin's house. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=320,838.83 feet; y=1,070,348.61 feet.

Citrus (Maricopa County, W. Mussetter, 1924).—About 6 miles west and 3 miles north of Wickenburg, and 1½ miles west of A. and C. Junction or Matthie, on the southerly end of a lower branch of the malpais ridge on which station *Pack* is located, and a few feet lower than the summit of the ridge. Marked by a standard bronze disk set in malpais rock.

Plane coordinates: (C), x=224,014.76 feet; y=1,092,482.48 feet.

Rail (Maricopa County, W. Mussetter, 1924).—About 3 miles northwest of Wickenburg, one-half mile north of A. and C. Junction, and near the north end of the junction siding on a low hill just east of the track leading to Prescott. Marked by a standard bronze disk as described in note 4.

Plane coordinates: (C), x=229,390.06 feet; y=1,092,482.88 feet.

Hass (Yavapai County, W. Mussetter, 1924).—About 3 miles north of Wickenburg, 200 yards east of the east bank of the Hassayampa River, on the first low bench above the mesquite thickets of the river bottom and between the river and the first hill rising to the east. Marked by a standard bronze disk as described in note 4. *Thompson boundary monument No. 11* is 53.855 meters (176.69 feet) from station in azimuth 95°43′46″.

Plane coordinates: (C), x=250,180.99 feet: y=1,092,146.81 feet.

Divide (Maricopa County, W. Mussetter, 1924).—In an open plain, about 10 miles west and 3 miles north of Wickenburg, and 1 mile south of west of station Divide on the Santa Fe Railroad. Station lies in edge of right-of-way north of track near mileboard 7, and between track and wagon trail north of railroad. Marked by a standard bronze disk set in a buried boulder.

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Plane coordinates: (C), x=196,131.98 feet; y=1,092,608.89 feet.

Prince (Maricopa County, W. Mussetter, 1924).—About 16 miles west and 22 miles north of Phoenix, on the summit of a prominent conical peak just south of the Prince of Arizona mine. A good road leads from the south around the west side of the peak to the mine, which is about half way up the mountain on the north side. The road is a gradual grade from the base of the peak, and can be seen from the south and west. This is the only peak in the vicinity that has a road of any kind on it. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=363,559.75 feet; y=1,009,824.59 feet.

Mill (Maricopa County, W. Mussetter, 1924).—About 33 miles north and 17 miles west of Phoenix, 1 mile northeast of the old abandoned Morgan City mill, on a ridge which is a continuation of Pike's Peak, and about one-half mile north of Pike's Peak. Station is about one-half mile southwest of a large and very prominent malpais rock dome with perpendicular bluffs on all sides, and about 30 yards north of the highest point of the ridge. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=354,833.42 feet; y=1,059,802.84 feet.

Nada (Maricopa County, W. Mussetter, 1924).—About 3 miles east and 2 miles north of Nada, a station on the Santa Fe Railroad between Phoenix and Hot Springs Junction, in greasewood desert and 10 yards southeast of a dim wagon trail. Marked by a standard bronze disk set in a buried boulder. General Land Office ¼ sec. corner, secs. 4 and 5, T. 5 N., R. 2 W., is in azimuth 197°16′.

Plane coordinates: (C), x=328,472.36 feet; y=1,020,260.33 feet.

Morgan (Yavapai County, W. Mussetter, 1924).—About 33 miles north and 20 miles west of Phoenix, 3 miles east of Hot Springs Junction-Castle-Hot Springs Road, and 2 miles northwest of the old Morgan City mine and mill, on the highest point of the long ridge extending north and south across the county boundary west of Morgan City wash. Station is on high point on extreme north end of ridge, and about 30 yards north of the Maricopa-Yavapai county line. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=339,810.95 feet; y=1,064,762.68 feet.

Orion (Maricopa County, W. Mussetter, 1924).—About 2 miles northeast of Hot Springs Junction or Morristown, and three-fourths mile southeast of the Orion mine, on a high, prominent and very sharp topped black peak, the highest in the vicinity, and easily visible and identified from Hot Springs Junction. Marked by a standard bronze disk set in malpais rock.

Plane coordinates: (C), x=298,753.66 feet; y=1,047,919.68 feet.

Black (Maricopa County, W. Mussetter, 1924).—About 30 miles north and 9 miles west of Phoenix, 2 miles northeast of Frog Tanks, and 2 miles southeast of the Sullivan ranch, on the first range of high black malpais hills east of the Agua Fria. The hill or ridge on which the station is located is visible from the Frog Tanks Road and has a white scar near the south end. A higher ridge lies 1 mile northeast. Marked by a standard bronze disk set in malpais boulder.

Plane coordinates: (C), x=399,468.25 feet; y=1,044,468.40 feet.

New (Maricopa County, W. Mussetter, 1924).—About 31 miles due north of Phoenix and one-half mile south of New River Station store on the Black Canyon Road. Station is about one-quarter mile east of road, on a slight ridge or swell sloping gently to the west, and between the road and power transmission line. Some paloverde trees were cut at the station and some chollas burned. Station is about three-quarters of a mile southwest of Sentinel Peak and 300 yards west of the transmission line. Marked by a standard bronze disk as described in note 4. Reference mark, a standard bronze reference disk, note 12c, is 8.610 meters (28.25 feet) from station in azimuth 20°37′.

Plane coordinates: (C), x=389,398.38 feet; y=1,049,330.78 feet.

Barry (Yavapai County, W. Mussetter, 1924).—About 30 miles north and 11 miles west of Phoenix, 2 miles north of Frog Tanks, 1 mile south of the Sullivan ranch, and one-half mile west of the Agua Fria River, on a low mound in the greasewood and cactus desert. Station is a few yards north of the Yavapai-Maricopa county line. Marked by a standard bronze disk set in a buried boulder.

Plane coordinates: (C), x=389,328.38 feet; y=1,049,330.78 feet.

Cholla (Yavapai County, W. Mussetter, 1924).—About 30 miles north and 12 miles west of Phoenix, 2½ miles northwest of Frog Tanks dam site, 1½ miles west of the Sullivan ranch on the Agua Fria River, and on the summit of the

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first conical hill west of the Agua Fria and south of Castle Creek. Hill is of malpais formation and covered with a dense growth of chollas. Marked by a standard bronze disk set in malpais rock.

Plane coordinates: (C), x=382,150 feet; y=1,051,830 feet.

Traverse point A (Yavapai County, W. Mussetter, 1924).—Plane coordinates:[1] (C), x=390,152 feet; y=1,049,003 feet.

Barry Monument (Yavapai County, W. Mussetter, 1924).—Plane coordinates:[1] (C), x=390,360 feet; y=1,048,957 feet.

Mesa (Maricopa County, W. Mussetter, 1924).—About 32 miles north and 5 miles east of Phoenix, 7 miles north of Cave Creek Post Office, and 2½ miles northwest of the old Phoenix mine and mill, on the extreme southeasterly and highest point of New River Mesa lying between New River and Cave Creek. This mesa covers several square miles, and is very flat on top with steep malpais slopes on all sides. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=481,299.46 feet; y=1,063,594.07 feet.

Cook (Maricopa County, W. Mussetter, 1924).—About 38 miles north and 10 miles east of Phoenix, 3½ miles north of Ashdale Ranger Station on Cave Creek, and 1 mile northwest of Magazine Spring, on the southernmost extension of Cook Mesa. The trail from Ashdale Ranger Station to Sheep Ranger Station on New River passes around the south base of the hill about ½ mile south of the station. Station is on the north end of the hill and overlooks the saddle to the north between this hill and the main Cook Mesa. The Forest Service Sheep Trail passes through this saddle and the Maricopa-Yavapai county line is about ¼ mile north of the station. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=506,564.99 feet; y=1,096,760.67 feet.

Rover (Yavapai County, W. Mussetter, 1924).—About 38 miles north and 15 miles east of Phoenix, 1 mile east of the Red Rover mine, on the southerly end of Rover Mountain. To reach from Phoenix, go by way of Sears ranch on Camp Creek, thence 7½ miles up Camp Creek Road to road leading north 4 miles to the Red Rover mine. About three-quarters mile before reaching the mine buildings, a road branches off to right, and leads to a mine shaft and hoist visible one-half mile distant on the slope of the mountain. From shaft pack up ridge to northeast and summit and thence along summit to station. Station is about one-half mile north of east from the shaft and visible from it. Marked by a standard bronze disk as described in note 3.

Plane coordinates: (C), x=527,845.63 feet; y=1,095,346.19 feet.

Burro (Yavapai County, W. Mussetter, 1924).—About 40 miles north and 26 miles east of Phoenix, 7 miles northeast of the Sears K ranch on the Verde River, and one-half mile southwest of the J. S. ranch belonging to the Coburn Bros., on a small but prominent peak shown on Forest Service maps as Black Mountain. Station is on southeasterly and highest point of peak, about 3½ miles east of the Verde, and 1 mile north of Deadman wash. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=578,552.59 feet; y=1,106,938.05 feet.

Sears (Maricopa County, W. Mussetter, 1924).—About 4 miles east of the Sears K ranch on the Verde River, 1 mile south of Davenport wash, and 1½ miles southwest of Davenport Peak, a high conical rocky peak lying just south of Davenport wash about 8 miles by trail from the Verde River. Station is on a long ridge forming the divide between Davenport wash and Sheep Creek. This ridge continues to rise in elevation as it extends eastward, and the station is on a low knoll with a higher swell one-quarter mile to the eastward. Marked by a standard bronze disk as described in note 4.

Plane coordinates: (C), x=588,290.85 feet; y=1,082,204.20 feet.

Club (Yavapai County, W. Mussetter, 1924).—About 7 miles east and 6 miles north of the Sears K ranch on the Verde River, 2 miles northwest of the Club ranch, and 1 mile west of the Club ranch-J. S. Ranch trail where it crosses the high divide between Davenport and Deadman washes. Station is on the very high peak with almost vertical slopes at the east end of Table Mountain. To the west of the station is a sloping grassy mesa with steep sides. Station is visible from the Club ranch, and easily identified as the highest point in the vicinity. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=603,353.84 feet; y=1,110,228.82 feet.

[1] No check on this position.

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Ridge (Yavapai County, W. Mussetter, 1924).—About 8 miles east and 2½ miles north of the Sears K ranch on the Verde River, 4 miles southwest of the Club ranch, 1½ miles south of Davenport wash where it is crossed by the drift fence between the Sears and Club ranch pastures, and 1½ miles south of east from Davenport Peak, on a high ridge that makes up from Davenport Peak in a southeasterly direction to the foothills of the Mazatzal Mountains. From the west, the ridge has the appearance of having a small sharp peak on the south end, and a level ridge extending north about one-fourth mile. Station is near north end of ridge, about 50 yards from where it declines steeply to the north. Marked by a standard bronze disk countersunk in soft rock outcrop.

Plane coordinates: (C), x=599,191.31 feet; y=1,091,579.79 feet.

Tonto (Gila County, W. Mussetter, 1924).—About 6 miles southeast of the Club ranch, 12 miles by trail west of the Bar-T-Bar ranch in Tonto Basin, on a high round-topped peak of the Mazatzal Mountains known to ranchers in the Tonto Basin as Mount Pelee. This peak lies between the headwaters of Sheep and Deer Creeks. Station is near south end of westerly and lower of two large solid rock outcrops. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=630,399.22 feet; y=1,092,287.28 feet.

Deadman (Yavapai County, W. Mussetter, 1924).—About 38 miles north and 25 miles east of Phoenix, 3 miles north of east of the Sears K ranch on the Verde River, and 2 miles east of the OK ranch, on the northwesterly edge of a low bench, the second above the Verde River and the first south of Deadman wash. Station is about 2 miles east of the Verde River and one-half mile south of Deadman. Some paloverde trees were cut just north of the station. Marked by a standard bronze disk as described in note 4.

Plane coordinates: (C), x=568,903.43 feet; y=1,091,438.69 feet.

Lime (Maricopa County, W. Mussetter, 1924).—About 38 miles north and 19 miles east of Phoenix, 2 miles north of the Sears K ranch on the Verde River, and 1 mile west of the OK ranch buildings, which are on the west bank of the Verde, one-half mile north of Lime Creek. Station is on the jagged, light brown ridge forming the divide between the Verde and Lime Creek. This divide is very steep and rises from the south to a high serrated ridge, then declines into a saddle and again ascends, getting higher as it goes north. Station is on north end of first hump overlooking the saddle, through which the Maricopa-Yavapai county line passes. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=547,641.54 feet; y=1,092,447.86 feet.

Rock (Maricopa County, W. Mussetter, 1924).—About 40 miles due north of Phoenix, 2 miles southeast of Canyon, and one-fourth mile south of the Rock Springs store on the Black Canyon Road, on a low tufa hill about 100 yards east of the road where the Maricopa-Yavapai county line crosses it. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=430,359.60 feet; y=1,108,208.31 feet.

Moore (Yavapai County, W. Mussetter, 1924).—About 40 miles north of Phoenix, 4 miles east of the Black Canyon road, one-half mile west of Moores Gulch, on the divide between Moores Gulch and Little Squaw Creek, and about 120 yards north of the Maricopa-Yavapai county line. Station is on a rounded spur, there being two higher-rounded hills one-half mile northeast. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=454,260.68 feet; y=1,105,386.66 feet.

Summit (Yavapai County, W. Mussetter, 1924).—On the New River Mountains forming the divide between New River and the Agua Fria, about three-fourths mile southwest of the highest summit of the New River Mountains, on a rounded hump about 500 feet below the summit and about 15 yards west of a large juniper tree. Marked by a standard bronze disk as described in note 2.

Plane coordinates: (C), x=470,898.85 feet; y=1,102,946.32 feet.

Supplementary points

Barlow boundary monument No. 1 (Yavapai and Yuma Counties, W. Mussetter, 1924).—See description of *Initial Monument*.

Plane coordinates:[1] (C), x=70,730 feet; y=1,094,418 feet.

Thompson boundary monument No. 2 (Maricopa and Yavapai Counties, W. Mussetter, 1924).—See description of *Fence*.

Plane coordinates:[1] (C), x=97,368 feet; y=1,094,088 feet.

Thompson boundary monument No. 3 (Maricopa and Yavapai Counties, W. Mussetter, 1924).—See description of *Rabbit*.

[1] No check on this position.

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Plane coordinates: [1] (C), x=129,034 feet; y=1,093,607 feet.

T. 8 N., R. 9 W., sec. 25, southwest corner (Yavapai County, W. Mussetter, 1924).—See description of *Rabbit*.

Plane coordinates: [1] (C), x=129,106 feet; y=1,093,910 feet.

T. 7 N., R. 9 W., sec 25, southwest corner (Maricopa County, W. Mussetter, 1924).—See description of *Aguila*.

Plane coordinates: [1] (C), x=128,290 feet; y=1,037,946 feet.

Thompson boundary monument No. 4 (Maricopa and Yavapai Counties, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=150,950 feet; y=1,093,281 feet.

Thompson boundary monument No. 10 (Maricopa and Yavapai Counties, W. Mussetter, 1924).—See description of *Road*.

Plane coordinates: [1] (C), x=244,004 feet; y=1,092,214 feet.

Thompson boundary monument No. 11 (Maricopa and Yavapai Counties, W. Mussetter, 1924).—See description of *Hass*.

Plane coordinates: [1] (C), x=250,005 feet; y=1,092,166 feet.

Bullard Peak (Yuma County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=64,340 feet; y=1,118,190 feet.

Aguila, water tank (Maricopa County, W. Mussetter, 1924).—Plane coordinates: (C), x=118,829.82 feet; y=1,073,120.93 feet.

Eagle Eye Peak, summit (Maricopa County, W. Mussetter, 1924).—Plane coordinates: (C), x=120,293.40 feet; y=1,053,894.30 feet.

Seven Mile Peak (Maricopa County, W. Mussetter, 1924).—Plane coordinates: (C), x=156,321.22 feet; y=1,067,465.09 feet.

Vulture Picacho (Maricopa County, W. Mussetter, 1924).—Plane coordinates: (C), x=233,602.36 feet; y=1,048,647.13 feet.

Wickenburg, church belfry (Maricopa County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=253,924 feet; y=1,081,190 feet.

Faith (U. S. G. S.) (Yavapai County, W. Mussetter, 1924).—Plane coordinates: (C), x=261,769.98 feet; y=1,102,293.51 feet.

Square Rock (U. S. G. S.) (Yavapai County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=318,833 feet; y=1,078,244 feet.

Morristown magnetic station (Maricopa County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=285,747 feet; y=1,038,810 feet.

Morristown, railroad station, southeast corner (Maricopa County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=285,881 feet; y=1,038,194 feet.

Nada, schoolhouse (Maricopa County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=315,246 feet; y=1,012,348 feet.

Syenite (U. S. G. S.) (Maricopa County, W. Mussetter, 1924).—Plane coordinates: (C), x=356,795.54 feet; y=1,036,845.10 feet.

Estrella Mountains, highest summit (Maricopa County, W. Mussetter, 1924).—Plane coordinates: (C), x=388,941.95 feet; y=827,163.61 feet.

Pyramid Peak (U. S. G. S.) (Maricopa County, W. Mussetter, 1924).— Plane coordinates: [1] (C), x=419,859 feet; y=999,398 feet.

Rock Pinnacle (U. S. G. S.) Maricopa County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=516,047 feet; y=992,203 feet.

Weaver's Needle (Maricopa County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=666,792 feet; y=885,442 feet.

Davenport Peak (Yavapai County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=593,270 feet; y=1,093,141 feet.

Saddle Mountain (Maricopa County, W. Mussetter, 1924).—Plane coordinates: [1] (C), x=619,855 feet; y=1,075,956 feet.

YUMA TO STEWART DAM ARC

Principal points

Tartron (Maricopa County, E. B. Latham, 1934).—About 4 miles, air line, east by north of Sentinel; about 1 mile north of U. S. Highway No. 80; on a prominent black malpais butte. Turn left off of highway at telephone pole No. 17320 and follow an old road north for 0.6 mile, turn left off of road and drive toward base of butte for about 0.3 mile. About a 10-minute pack. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.24 meters (17.2 feet) from station in azimuth 260°57′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 5.97 meters

[1] No check on this position.

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(19.6 feet) from station in azimuth 30°30′. The azimuth mark, a standard bronze disk, note 12a, is set in drill hole in concrete culvert on the north side of highway about 500 feet west of the Tartron Service station and 1 mile from station in azimuth 347°17′27″.

Plane coordinates: (C), x=124,060.68 feet; y=687,602.17 feet; the grid azimuth to the azimuth mark=347°57′21″.*

Painted (Maricopa County, E. B. Latham, 1934).—About 4 miles south of the Rowley mine in the Painted Rock Mountains. To reach from Gila Bend, take U. S. Highway No. 80 west for 23 miles, turn north and go one-half mile, then go north-northeast on main traveled road 10.9 miles, turn right onto a dim road, go 0.6 mile and bear right onto a well traveled road, go 0.2 mile to end of truck travel, just after crossing a wash, and climb south to the top of the ridge and follow it south to the station. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 4.602 meters (15.10 feet) from station in azimuth 193°38′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.570 meters (21.56 feet) from station in azimuth 142°57′. The azimuth mark, a standard bronze disk, note 12a, is about 200 yards to the left of the main traveled road on a small ridge and in azimuth 111°14′59″.

Plane coordinates: (C), x=160,524.09 feet; y=734,873.46 feet; the grid azimuth to the azimuth mark=111°51′11″.*

Monte (Maricopa County, E. B. Latham, 1934).—On what is known as the Montezuma Mountains, about 1¼ miles east of the highest and westernmost point which has a large rock cairn thereon, about 250 yards southeast of a small bump or rise (which is about 75 feet higher than the hill on which the station is located) and on the north rim of the ridge. A deep canyon runs to the north, while the south slopes off gradually. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 10.323 meters (33.87 feet) from station in azimuth 287°27′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 14.781 meters (48.49 feet) from station in azimuth 42°39′. *Saddle, water tank* may be used as an azimuth mark.

Plane coordinates: (C), x=111,888.87 feet; y=779,751.71 feet; the grid azimuth to *Saddle, water tank*=257°25′28″.7.

Rock (Maricopa County, E. B. Latham, 1934).—About 18 miles, air line, northwest of Gila Bend; about 5 miles, air line, northeast of the Gila River; on the highest and most eastern of two ridges of about the same elevation which form the most western high ridge of the Gila Bend Mountains, near the Gila River. There is a table-shaped ridge with a sharp point on it, higher than the station, and about 2 miles east by south from the station. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 14.62 meters (48.0 feet) from station in azimuth 136°26′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 23.84 meters (78.2 feet) from station in azimuth 26°10′. Airway beacon (near station *Rose*) is in azimuth 165°47′19″.

Plane coordinates: (C), x=173,549.39 feet; y=771,592.70 feet; the grid azimuth to airway beacon (near station *Rose*)=166°22′16″.*

Saddle (Maricopa County, E. B. Latham, 1934).—About 35 miles, air line, northwest of Gila Bend, on a large flat-topped hill. The hill slopes gradually to the south, the north side is a steep ridge or rim and the hill runs east and west. Station is on the north edge of the highest point on the rim. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 8.484 meters (27.83 feet) from station in azimuth 107°14′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 12.420 meters (40.75 feet) from station in azimuth 22°16′. *Saddle, water tank* may be used as an azimuth mark.

Plane coordinates: (C), x=132,047.74 feet; y=819,102.96 feet; the grid azimuth to *Saddle, water tank*=339°19′57″.6

Webb (Maricopa County, E. B. Latham, 1934).—To reach from Gila Bend, follow U. S. Highway No. 80 east and north for about 30 miles to a point about 5 miles north of Gillespie Dam, and about 1 mile south of the Desert Rose service station. (There is a large sign west of the highway reading "Agua Caliente Hot Springs 50 miles.") Turn left, west, off the highway at the sign

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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and take the left one of two roads, go 3.4 miles, turn left at a sign reading "Harcan Mine and U. S. I. H. Dept. of Commerce", go 2.2 miles and continue straight ahead on main traveled road. Turn left and go south and southeast for 1.1 miles to end of truck travel and climb south to the station. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 13.305 meters (43.65 feet) from station in azimuth 187°58′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.400 meters (21.00 feet) from station in azimuth 316°14′. The azimuth mark, a standard bronze disk, note 11c, is in old concrete block at end of truck travel and in azimuth 156°01′39″ from the station.

Plane coordinates: (C), x=204,197.03; y=810,222.87 feet; the grid azimuth to the azimuth mark=156°33′27″.*

Rose (Maricopa County, E. B. Latham, 1934).—About 15 miles, air line, west of Hassayampa, on a prominent black ridgelike hill. This hill is the first one immediately south of the road leading west from the Hassayampa Airport. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 16.56 meters (54.3 feet) from station in azimuth 162°19′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 16.28 meters (53.4 feet) from station in azimuth 88°34′. *"B" (G. L. O.)* may be used as an azimuth mark.

Plane coordinates: (C), x=172,361.21 feet; y=851,717.44 feet. Grid azimuth to *"B" (G. L. O.)*=265°32′06″.7.

Powers Butte (Maricopa County, E. B. Latham, 1934).—About 24 miles northeast, air line, from Gila Bend, on a malpais butte, about 0.3 mile south of the Gila River, and about 0.5 mile north of the road. The butte stands out by itself, and has a low ridge running west from it. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 6.915 meters (22.69 feet) from station in azimuth 270°30′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 7.255 meters (23.80 feet) from station in azimuth 14°14′. The azimuth mark (reference mark No. 3), a standard bronze disk, note 12a, is on the road about 2¼ miles south from end of truck travel and in azimuth 21°59′06″.

Plane coordinates: (C), x=250,227.44 feet; y=840,095.09 feet; the grid azimuth to the azimuth mark=22°26′02″.*

Wintersburg (Maricopa County, E. B. Latham, 1934).—About 1 mile south-southwest of Wintersburg, on the highest of several low black malpais buttes. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 17,188 meters (56.39 feet) from station in azimuth 17°31′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 13.790 meters (45.24 feet) from station in azimuth 286°54′. The azimuth mark is a standard Coast and Geodetic Survey bench mark disk set in concrete post, stamped "H 13, 1927." Mark is located about 2.0 miles south of Wintersburg on the Hassayampa Road, about 100 feet west of road and about 1½ miles, air line, from station in azimuth 282°03′11″.

Plane coordinates: (C), x=207,662.01 feet; y=880,334.46 feet; the grid azimuth to bench mark H 13, 1927=282°34′50″.*

"C" (G. L. O.) (Maricopa County, E. B. Latham, 1934).—About 8 miles, air line, north of Hassayampa, on the corner of secs. 4, 5, 8, and 9, in T. 1 N., R. 5 W. Marked by a General Land Office section corner marker. Reference mark No. 1, a standard bronze reference disk, note 12c, is 27.848 meters (91.36 feet) from station in azimuth 74°07′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 15.280 meters (50.13 feet) from station in azimuth 342°36′. The azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is 0.8 mile from station in azimuth 359°23′55″.

Plane coordinates: (C), x=236,428.14 feet; y=892,355.40 feet; the grid azimuth to the azimuth mark=359°52′30″.*

Buckeye (Maricopa County, E. B. Latham, 1934; 1936).—About 3 miles, air line, south-southeast of Buckeye, on the south side of the Gila River, on the first and highest point south of the river. There are two points, the eastern one, on which the station is located, being the higher and about 300 yards east of the lower point. There are higher points to the southward. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 12.708 meters (41.69 feet) from station in

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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azimuth 177°01′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 13.731 meters (45.05 feet) from station in azimuth 303°22′. The azimuth mark, a standard bronze disk, note 12a, is in a rock outcrop on northeast side of a small knoll and about one-half mile from station in azimuth 64°37′38″.

Plane coordinates: (C), x=301,912.24 feet; y=847,286.40 feet; the grid azimuth to the azimuth mark=64°59′01″.*

White (Maricopa County, E. B. Latham, 1934).—About 6½ miles, air line, from the town of Buckeye, on the southern and slightly lower of the two high points (about 150 yards apart) of the most southwestern ridge of the White Tank Mountains. There are several hills southwest of the station that are lower. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.130 meters (20.11 feet) from station in azimuth 129°19′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 5.000 meters (16.40 feet) from station in azimuth 344°25′. No azimuth mark established. Other stations visible from ground.

Plane coordinates: (C), x=297,065.52 feet; y=900,173.09 feet.

Brown (Maricopa County, E. B. Latham, 1934; 1936).—About 5½ miles west-southwest of the village of Litchfield, 7¼ miles north-northeast of Liberty, 1.1 miles east of the main canal of the Maricopa County Municipal Water Conservation District No. 1, 1 mile south of the county road west from Litchfield, 0.4 mile west of T-road intersection at section corner, 50 feet north of lateral No. 15 of district No. 1 and 14.5 feet south of the center of the section line road. Marked by a standard bronze disk set in top of a concrete post, as described in note 1a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 13.672 meters (44.86 feet) from station in azimuth 230°51′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 11.122 meters (36.49 feet) from station in azimuth 138°36′. The original azimuth mark set in 1934 having been destroyed, a new one was set in 1936. It is a standard bronze disk, note 11a, in the southwest angle of the intersection of the county road west from Litchfield and a section line road 100 feet south of the county road, 90 feet west of the section road, and about 1 mile from station in azimuth 203°18′17″.

Plane coordinates: (C), x=337,059.69 feet; y=902,261.18 feet; the grid azimuth to the azimuth mark=203°35′58″.*

Bradley (Maricopa County, E. B. Latham, 1934; 1936).—About 10½ miles east of the village of Buckeye, in sec. 1, T. 1 S., R. 2 W., on the highest and most northerly one of a group of low hills lying just south of the Gila River and about 1 mile southeast of the J. L. Bradley ranch, near the south end of the summit, on ridge line, about 50 feet south-southeast of the high point. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is on high point of summit, in sharp rock outcrop, 12.262 meters (40.23 feet) from station in azimuth 171°19′. Reference mark No. 2, a standard bronze reference disk, note 12a, is down the west slope of the summit, in ledge, 9.758 meters (32.01 feet) from station in azimuth 60°36′. Station *Cotton* may be used as the azimuth mark.

Plane coordinates: (C), x=348,688.74 feet; y=863,635.25 feet; the grid azimuth to station *Cotton*=181°59′09″.8.

Litchfield (Maricopa County, E. B. Latham, 1935; 1936).—About 0.1 mile southeast of the highest point of a low ridge just north of the Litchfield residence, near the north line of sec. 16, T. 2 N., R. 1 W. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 14.157 meters (46.45 feet) from station in azimuth 34°19′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 18.207 meters (59.73 feet) from station in azimuth 126°23′. The azimuth mark, a standard bronze disk, note 11a, is reference mark No. 3, and is 0.3 mile from station in azimuth 329°51′02″.

Plane coordinates: (C), x=364,498.81 feet; y=917,079.64 feet; the grid azimuth to the azimuth mark=330°05′46″.*

Initial Monument (Maricopa County, E. B. Latham, 1935).—On a low butte, near the General Land Office corner marking the corner of T. 1 N., and T. 1 S., R. 1 E., and R. 1 W., just south of the confluence of the Gila and Salt Rivers and about one-half mile west and 4 miles south of Cashion. (This butte is known locally as Monument Hill.) Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note

*This azimuth has been computed by the first formula (p. 67), neglecting the *second* term.

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12a, is 5.673 meters (18.61 feet) from station in azimuth 334°56′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 10.980 meters (36.02 feet) from station in azimuth 119°39′. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=381,316.94 feet; y=864,940.97 feet.

Glendale (Maricopa County, E. B. Latham, 1935).—On the top of the water tank of the city of Glendale. There is a standard disk set in the concrete around the feed pipe of the tank, but this is not the true station. The true station is the deeper of two punch holes in the ball on top of the water tank which is 125 feet above the ground. (Punch holes are not in center of ball.) Permission to ascend the tank must be received from the city of Glendale. Reference mark No. 1, a standard bronze reference disk, note 11c, is 139.84 meters (458.8 feet) from station in azimuth 247°48′53″. The azimuth mark is Coast and Geodetic Survey bench mark Q 23, set in the sidewalk above the underground comfort station in the southwest corner of the city park and in azimuth 196°20′45″.

Plane coordinates: (C), x=418,224.41 feet; y=922,641.21 feet; the grid azimuth to bench mark Q 23=196°29′38″.*

Salt (Maricopa County, E. B. Latham, 1935).—On the north range of hills south of Phoenix known locally as Salt Mountains. About 5 miles, air line, south of Phoenix on the highest point of the range which can be seen from the city as a sharp point. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.762 meters (18.90 feet) from station in azimuth 217°13′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 5.908 meters (19.38 feet) from station in azimuth 307°04′. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=436,648.27 feet; y=848,331.67 feet.

River (Maricopa County, E. B. Latham, 1935).—About 6 miles, air line, south of Phoenix in the Phoenix Mountains, on the higher and more northeastern of two hills from the road, the other hill being about 300 yards to the south and west. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 4.784 meters (15.70 feet) from station in azimuth 251°40′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 13.585 meters (44.57 feet) from station in azimuth 312°40′. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=467,362.77 feet; y=857,124.49 feet.

Court House (Maricopa County, E. B. Latham, 1935; 1936).—In Phoenix, on the roof of the Maricopa County Courthouse, at South First Avenue and West Washington Street. Permission to visit the station must be obtained from the sheriff's office where the key to the penthouse may be secured. The county jail is on the top floor. Station mark and reference marks No. 1 and No. 2 are standard bronze disks set in the cement roof of the building. Reference mark No. 1 is 10.490 meters (34.42 feet) from station in azimuth 272°01′. Reference mark No. 2 is 9.370 meters (30.74 feet) from station in azimuth 132°45′. The azimuth mark (reference mark No. 3) is a standard bronze disk set in the southwest curb at West Jefferson and South Eighth Streets and is in azimuth 83°58′43″ from station.

Plane coordinates: (C), x=451,685.95 feet; y=890,417.40 feet, the grid azimuth to the azimuth mark=84°03′58″.*

Camels Back (Maricopa County, E. B. Latham, 1935; 1936).—About 10 miles northeast of Phoenix, on the west end and highest point of a prominent mountain known locally as Camels Back. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 14.462 meters (47.45 feet) from station in azimuth 32°44′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 6.011 meters (19.72 feet) from station in azimuth 160°12′. Reference mark No. 3, a standard bronze reference disk, note 12c, is 10.118 meters (33.20 feet) from station in azimuth 337°54′. The azimuth mark, a standard bronze disk, is at the entrance to Dr. Holmes' property, on the top of a 4-foot stone post, on the south side of the entrance. It is about 1 mile from station in azimuth 270°04′36″.

Plane coordinates: (C), x=486,518.29 feet; y=914,765.08 feet; the grid azimuth to the azimuth mark=270°06′03″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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Mesa (Maricopa County, E. B. Latham, 1935).—In the yard of the largest of the two water tanks in the city of Mesa, and 95 feet east of the west leg of the tank. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 21.907 meters (71.87 feet) from station in azimuth 350°07′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 28.698 meters (94.15 feet) from station in azimuth 102°20′. The azimuth mark (reference mark No. 3), a standard bronze disk, is 1 block east from station in azimuth 263°57′58″.

Plane coordinates: (C), x=481,299.46 feet; y=1,063,594.47 feet; the grid azimuth to the azimuth mark=263°55′06″.*

"D" (G. L. O.) (Maricopa County, E. B. Latham, 1935).—In the south one-sixteenth of sec. 6, T. 2 N., R. 5 E., east of a lone windmill. Marked by a General Land Office pipe. Reference mark No. 1, a standard bronze reference disk, note 11a, is 21.080 meters (69.16 feet) from station in azimuth 203°43′. Reference mark No. 2, a standard bronze reference disk, set in the concrete around the well pipe at the windmill, is 23.287 meters (76.40 feet) from station in azimuth 81°16′. The azimuth mark is a General Land Office pipe marking the corners of secs. 6 and 7, T. 2 N., R. 5 E., and one-quarter mile from station in azimuth 0°12′25″.

Plane coordinates: (C), x=507,896.87 feet; y=924,686.70 feet; the grid azimuth to the azimuth mark=0°11′33″.*

Val Vista (Maricopa County, E. B. Latham, 1935).—About 6 miles, air line, northeast of Mesa, about 1 mile, air line, south of the Salt River, on the mesa south of the Salt River, about 200 feet south of the mesa rim, and about 200 yards west of the Roosevelt Conservation Canal, about 200 yards north of the house on the Munger property. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.932 meters (62.11 feet) from station in azimuth 3°23′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 27.004 meters (88.60 feet) from station in azimuth 80°04′. The azimuth mark is a 3-inch bronze disk with a cross marked in its center, set in the concrete headgate of an irrigation ditch that runs north and south, about 200 yards from station, and in azimuth 225°02′49″.

Plane coordinates: (C), x=550,472.62 feet; y=900,245.66 feet; the grid azimuth to the azimuth mark=224°57′20″.*

Verde (Maricopa County, E. B. Latham, 1935; 1938).—On the highest and southeast end of a prominent black butte in the southern part of the McDowell Mountains, about 6 miles, air line, north of the Salt River and about 6.5 miles, air line, west of the Verde River. The butte is easily identified by the prominent bump on the southeast end. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 2.939 meters (9.64 feet) from station in azimuth 4°53′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 10.679 meters (35.04 feet) from station in azimuth 311°47′. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=541,906.15 feet; y=936,640.06 feet.

Usery (U. S. G. S.) (Maricopa County, E. B. Latham, 1935; 1938).—On the highest point of the Usery Mountains, which are about 2 miles south of the junction of the Salt and Verde Rivers, about 16 miles northeast of Mesa, and 3 miles southeast of the Granite Reef Dam in the Salt River. The Usery Mountains run in a north-south direction and the station is on the second prominent point from the north; a large rock is about 10 feet east by south of the station. Marked by a standard U. S. Geological Survey bench mark set in a loose rock about 1 foot square. Reference mark No. 1, a standard bronze reference disk, note 12c, is 6.904 meters (22.65 feet) from station in azimuth 98°24′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 12.656 meters (41.52 feet) from station in azimuth 177°06′. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=584,356.11 feet; y=909,664.44 feet.

Sawik (Maricopa County, E. B. Latham, 1935).—On the highest point of Sawik Mountain, a lone butte which lies about 3 miles north of the Salt River, and about 6 miles west of the confluence of the Salt and Verde Rivers. Station is about 15 feet south of a rock cairn. Marked by a standard bronze disk

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 21.778 meters (71.45 feet) from station in azimuth 54°43′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 14.735 meters (48.34 feet) from station in azimuth 142°13′. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=547,392.60 feet; y=922,787.02 feet.

Fort (B. M. 1812 U. S. G. S.) (Maricopa County, E. B. Latham, 1935).—About 3 miles, air line, northwest of Fort McDowell, about 3 miles west of the Verde River on the south end of the most southern ridge of the Lousely Mountains. Marked by a standard U. S. Geological Survey bench mark disk set in bedrock. Reference mark No. 1, a standard bronze reference disk, note 12a, is 12.615 meters (41.39 feet) from station in azimuth 250°20′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 12.86 meters (42.2 feet) from station in azimuth 167°03′. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=564,277.38 feet; y=969,635.29 feet.

Stewart Mountain (Maricopa County, E. B. Latham, 1935).—About 20 miles, air line, northeast of Mesa, about 6 miles, air line, east of the Verde River, about 1½ miles, air line, northwest of the Stewart Dam, on the Salt River, on the most western and highest of the three peaks which form the summit of Stewart Mountain. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 10.472 meters (34.36 feet) from station in azimuth 291°14′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 8.835 meters (28.99 feet) from station in azimuth 138°02′. A rock cairn (U. S. G. S.) is 9.3 meters (31 feet) from station in azimuth 186°. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=609,411.84 feet; y=939,492.51 feet.

Adams (Maricopa County, E. B. Latham, 1935).—On the highest point of Adams Mesa, about 4 miles, air line, east of Verde River and about 6 miles, air line, north of the Salt River. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.643 meters (21.79 feet) from station in azimuth 296°37′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 8.500 meters (27.89 feet) from station in azimuth 33°26′. The azimuth mark, a standard bronze disk, note 12a, is one-fourth mile from station in azimuth 322°19′32″.

Plane coordinates: (C), x=599,245.53 feet; y=962,056.43 feet; the grid azimuth to the azimuth mark=322°08′41″.*

Supplementary points

Saddle, water tank (Maricopa County, E. B. Latham, 1934).—Plane coordinates:[1] (C), x=144,175 feet; y=786,954 feet.

Mid (Maricopa County, E. B. Latham, 1934).—To reach from Gila Bend, go west on U. S. Highway No. 80 for 15.2 miles to a sign on right side of highway (north side) reading "Midway Garage Repairing 7 miles." Station is about 75 feet from this sign on left side of road. Marked by a standard bronze disk as described in note 1b. Reference mark No. 1, a standard bronze reference disk, note 11a, is 25.023 meters (82.10 feet) from station in azimuth 339°35′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 23.497 meters (77.09 feet) from station in azimuth 245°41′. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=176,289.62 feet; y=696,025.77 feet.

Crossing (Maricopa County, E. B. Latham, 1934).—About 10 miles west of Gila Bend, on railroad property south of highway between railroad and fence, and 250 feet west of railroad crossing. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 19.162 meters (62.87 feet) from station in azimuth 119°18′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 19.234 meters (63.10 feet) from station in azimuth 223°28′. Azimuth mark (reference mark No. 3), a standard bronze disk set in concrete culvert on north side of road, is one-half mile from station in azimuth 83°00′56″.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

Plane coordinates: (C), x=196,752.05 feet; y=699,055.29 feet; the grid azimuth to the azimuth mark=83°33'10".*

"B" (G. L. O.) (Maricopa County, E. B. Latham, 1934).—On the corner of secs. 11, 12, 13, and 14, in T. 1 S., R. 6 W., about 2½ miles, air line, north of Arlington Post Office. Station mark is a standard General Land Office section corner marker, set 8 inches below the surface of the ground. Reference mark No. 1, a standard bronze reference disk, note 11a, is 23.671 meters (77.66 feet) from station in azimuth 134°11'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 21.631 meters (70.97 feet) from station in azimuth 39°53'. Azimuth mark (reference mark No. 3), a standard bronze disk is on a malpais bump west of the road 0.3 mile from station in azimuth 90°53'10".

Plane coordinates: (C), x=220,373.91 feet; y=855,466.46 feet; the grid azimuth to the azimuth mark=91°23'22".*

Gillespie (Maricopa County, E. B. Latham, 1934).—On a small rock knoll on the north side of the Gillespie Dam. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 17.562 meters (57.62 feet) from station in azimuth 40°07'. Reference mark No. 2, a standard bronze reference disk, note 12a, is 20.265 meters (66.49 feet) from station in azimuth 173°13'. The azimuth mark (reference mark No. 3) is a brass disk marking a bench mark across the river east of the gatehouse on the south edge of the dam close to the railing. Mark is stamped "Elev. 763.84 1921," and is in azimuth 260°15'49".

Plane coordinates: (C), x=238,442.39 feet; y=811,724.62 feet; the grid azimuth to the azimuth mark=260°43'56".*

Hassayampa Airport, air beacon (Maricopa County, E. B. Latham, 1934).—Plane coordinates:[1] (C), x=245,104 feet; y=860,310 feet.

Arches (Maricopa County, E. B. Latham, 1934).—Two miles west of Buckeye on U. S. Highway No. 80 and 0.1 mile west of Arches service station, at the east end of a curve in the highway. (Where highway turns south there is another paved road making a junction that is 0.1 mile west of the service station.) On the south side of the road, and on the south side of a fence, between the fence and an irrigation ditch and opposite a sign that reads "White House Cabins, 50 cents and up." Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 14.516 meters (47.62 feet) from station in azimuth 253°01'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 14.793 meters (48.53 feet) from station in azimuth 82°38'. The azimuth mark, a standard bronze disk, note 11c, is 0.3 mile from station, on left side of road in culvert, and in azimuth 267°46'45".

Plane coordinates: (C), x=284,169.60 feet; y=862,864.31 feet; the grid azimuth to the azimuth mark=268°10'05".*

Lane (Maricopa County, E. B. Latham, 1934).—On the west side of a lane 0.1 mile south of U. S. Highway No. 80 and 4 feet east of the fence line running north and south. To reach from Buckeye: Follow the highway east for about 6.5 miles to the Blue Bonnet sign and turn right, going 0.1 mile to the station. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 15.730 meters (51.61 feet) from station in azimuth 94°59'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 18.796 meters (61.67 feet) from station in azimuth 262°27'. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is on the north side of Highway No. 80 just at the head of the lane and about 0.15 mile from station in azimuth 100°37'32".

Plane coordinates: (C), x=330,160.13 feet; y=864,686.97 feet; the grid azimuth to the azimuth mark=100°55'53".*

Cotton (Maricopa County, E. B. Latham, 1935).—About 3.6 miles west of the town of Cold Water, on the south side of the road and 0.1 mile west of a cross road. The surface mark is stamped 1934 but was not occupied until 1935. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.044 meters (59.20 feet) from station in azimuth 182°07'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 11.353 meters (37.25 feet) from station in azimuth 272°06'. Azimuth mark (reference mark No. 3) is set

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

in a cement culvert of an irrigation ditch, 0.4 mile east of the station and on the south side of the highway in azimuth 270°04′03″.

Plane coordinates: (C), x=349,474.62 feet; y=886,298.20 feet; the grid azimuth to the azimuth mark=270°20′21″.*

Cashion (Maricopa County, E. B. Latham, 1935).—About 13.0 miles west of Phoenix and 0.3 mile east of Cashion; about 30 feet north of U. S. Highway No. 80, midway between it and tracks of the Southern Pacific Railroad and about 150 paces west of railroad signals 8933 and 8934. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.780 meters (61.61 feet) from station in azimuth 90°44′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 17.078 meters (56.03 feet) from station in azimuth 6°48′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is located at Cashion, about 0.28 mile west from the station, on the south side of U. S. Highway No. 80 and in the fence line about 10 feet from the edge of the pavement in azimuth 88°13′22″.

Plane coordinates: (C), x=385,906.63 feet; y=886,162.71 feet; the grid azimuth to the azimuth mark=88°25′44″.*

Power plant west of Phoenix, chimney (Maricopa County, E. B. Latham, 1934).—Plane coordinates:[1] (C), x=427,509 feet; y=888,840 feet.

Phoenix, Westward Ho Hotel, flagpole (Maricopa County, E. B. Latham, 1934).—Plane coordinates:[1](C), x=452,159 feet; y=893,096 feet.

Phoenix, east radio tower (Maricopa County, E. B. Latham, 1934).—Plane coordinates:[1] (C), x=452,325 feet; y=890,925 feet.

Phoenix, west radio tower (Maricopa County, E. B. Latham, 1934).—Plane coordinates:[1] (C), x=452,003 feet; y=891,358 feet.

Phoenix (Maricopa County, E. B. Latham, 1935).—About 0.2 mile east of the south end of Seventh Avenue in the northeast corner of the city of Phoenix dumping grounds, on the north bank of the Salt River. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 29.568 meters (97.01 feet) from station in azimuth 209°32′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 31.518 meters (103.41 feet) from station in azimuth 133°06′. No azimuth mark established. Other stations visible from the ground.

Plane coordinates: (C), x=450,273.32 feet; y=881,099.95 feet.

Whitem (Maricopa County, E. B. Latham, 1935).—About 3 miles west of Mesa, on the north side of U. S. Highway No. 80 and in the yard of Mr. E. M. White. Station mark is about 15 feet east of the fence at the west edge of the yard, and about 50 feet north of the ditch. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 22.70 meters (74.5 feet) from station in azimuth 209°07′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 40.64 meters (133.3 feet) from station in azimuth 282°47′. Azimuth mark is Coast and Geodetic Survey bench mark M 22, 1933, set in a concrete headgate of the ditch on the north side of U. S. Highway No. 80 and in azimuth 86°49′31″.

Plane coordinates: (C), x=508,764.90 feet; y=878,485.94 feet; the grid azimuth to bench mark M 22=86°48′34″.*

Tempe Butte, airway beacon (Maricopa County, E. B. Latham, 1935).—Plane coordinates: (C), x=494,375.82 feet; y=883,297.37 feet.

Landing (Maricopa County, E. B. Latham, 1935).—On the top of a gatehouse on the south side of the Arizona Canal, about 6½ miles east of Scottsdale (air line). There is a landing field southwest of station. Marked by a standard bronze disk, set in the top of the house, 1.250 meters (4.10 feet) from the south side and equidistant from the east and west sides. Reference mark No. 1, a standard bronze reference disk, in top of floodgate, is 13.045 meters (42.80 feet) from station in azimuth 199°36′. Reference mark No. 2, a standard bronze reference disk, in top of main gate, is 15.590 meters (51.15 feet) from station in azimuth 286°09′. The azimuth mark, a standard bronze disk, is on the north side of the road about one-fourth mile from the station in azimuth 84°50′12″.

Plane coordinates: (C), x=532,084.79 feet; y=910,536.60 feet; the grid azimuth to the azimuth mark=84°46′43″.*

Granite Reef (Maricopa County, E. B. Latham, 1935).—On the south end of the Granite Reef Dam, which is about 10 miles up the Salt River from the city

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

of Mesa. Station mark is a standard disk set in the concrete of the dam just north of the south gatehouse. Reference Mark No. 1, a standard disk set in the concrete of the dam just east of the south gatehouse, is 16.342 meters (53.62 feet) from station in azimuth 316°09′. Reference mark No. 2, a U. S. Bureau of Reclamation bench mark (elevation 1,325.6), set in the concrete of the dam just west of the gatehouse, is 14.390 meters (47.21 feet) from station in azimuth 19°53′. The azimuth mark is U. S. Bureau of Reclamation bench mark No. 9, set in the concrete siding of the spillway on the north side of the dam, and in azimuth 165°44′03″.

Plane coordinates: (C), x=568,907.20 feet; y=914,671.62 feet; the grid azimuth to the azimuth mark=165°36′34″.*

Stewart Dam (Maricopa County, E. B. Latham, 1935).—On a small hill about one-half mile southeast of the east end of the Stewart Dam which is located about 24 miles east of Mesa. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 12.800 meters (41.99 feet) from station in azimuth 293°59′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 20,230 meters (66.37 feet) from station in azimuth 138°07′. The azimuth mark, a small cross made in the floor of the walk on the east side of the dam, is in azimuth 108°30′51″.

Plane coordinates: (C), x=617,696.10 feet; y=933,383.01 feet; the grid azimuth to the azimuth mark=108°18′02″.*

AJO TO TUCSON TO PHOENIX TO WINKELMAN ARC

Principal points

Ajo (Pima County, G. D. Cowie, 1920; 1935; 1936).—On the summit of a black mountain (the highest point on the highest hill within a radius of 6 miles from the town of Ajo), and 3 miles, air line, southeast of Ajo. Station is best reached by taking the Sonoyta road south from Ajo for 3 miles. The mountain is on the east side of the Sonoyta Road and about 1 mile from the road. Marked by a standard bronze disk as described in note 1a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 9.278 meters (30.44 feet) from station in azimuth 195°56′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 12.042 meters (39.51 feet) from station in azimuth 283°34′. The azimuth mark, bench mark S 36, was established in 1933 by the Coast and Geodetic Survey. It is at an intersection of the Ajo-Tucson Highway with a plain track road to the south, 1.3 miles southeast of Rowood Post Office, about 10 yards south of the main highway, and about 3 miles from station in azimuth 192°27′37″.

Plane coordinates: (C) x=214,119.11 feet; y=482,660.18 feet; the grid azimuth to bench mark S 36=192°57′19″.*

Nine Mile Peak (Pima County, G. D. Cowie, 1920; 1935; 1936).—On a very prominent reddish-colored peak about 2 miles south of the Ajo-Sells Highway at a point 25 miles east of Ajo and 9.4 miles west of Tracy's store, and 23 miles west of Covered Wells. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, is 7.614 meters (24.98 feet) from station in azimuth 247°58′. Reference mark No. 2, a standard bronze reference disk, is 9.630 meters (31.59 feet) from station in azimuth 135°19′. The azimuth mark, a standard bronze disk stamped "Nine Mile 1935–1936" is 0.45 mile from station in azimuth 257°10′45″.

Plane coordinates: (C), x=310,364.04 feet; y=437,548.50 feet; the grid azimuth to the azimuth mark=257°30′21″.*

Grande (Pima County, E. B. Latham, 1935; 1936).—On a flat-topped lava ridge 10.5 miles northeast, air line, of Nine Mile Peak and 0.5 mile east of a prominent clump of lava rocks which project farther out into the valley. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 11.002 meters (36.10 feet) from station in azimuth 164°15′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.138 meters (20.14 feet) from station in azimuth 244°19′. The azimuth mark (1936), in bedrock on the top of a clump of lava rocks, is one-half mile from station in azimuth 81°09′39″.

Plane coordinates: (C), x=348,062.96 feet; y=469,025.34 feet; the grid azimuth to the azimuth mark=81°25′25″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Redondo (Pima County, G. D. Cowie, 1920; 1935; 1936).—On rounded knob on the second mountain range east of the Indian village of Poso Redondo and 33 miles by road east of Ajo, in the center and highest portion of a long lava ridge, 9 miles, air line, north of Nine Mile Peak, on the northern one of two lighter colored rocks forming the summit. Marked by a standard bronze disk as described in note 1. Reference mark No. 1, a standard bronze reference disk, note 11a, is 9.975 meters (32.73 feet) from station in azimuth 153°10′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 11.622 meters (38.13 feet) from station in azimuth 332°46′. Azimuth mark was established in 1936. It is set in a large boulder, 2 feet by 3 feet and 3 feet above the ground, on the top of the ridge, about halfway between the station and the northwest end of the ridge, about 75 feet lower than the station and three-fourths mile from station in azimuth 138°11′05″.

Plane coordinates: (C), x=312,932.97 feet; y=472,466.38 feet; the grid azimuth to the azimuth mark=138°30′30″.*

Llano (Pima County, E. B. Latham, 1935; 1936).—On the northeast hill of five lava hills about 9 miles, air line, from Pisinemo on the Sells-Ajo Highway, one-fourth mile northwest of a charco and an old camp site and on the highest and most southerly point of the hill. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 12.613 meters (41.38 feet) from station in azimuth 190°00′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 13.039 meters (42.78 feet) from station in azimuth 284°02′. The azimuth mark, a standard bronze disk, note 12c, is on the north end of the first hill to the south and one-fourth mile from station in azimuth 341°54′38″.

Plane coordinates: (C), x=338,145.13 feet; y=406,186.96 feet; the grid azimuth to the azimuth mark=342°11′18″.*

Blanco (Pima County, E. B. Latham, 1935; 1936).—On an isolated lava butte, 9 miles, air line, north of Pisinemo and approximately three-fourths mile south from the Ajo-Sells Road at its nearest point. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.432 meters (21.10 feet) from station in azimuth 111°54′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.349 meters (14.27 feet) from station in azimuth 208°33′. An azimuth mark was set in 1936 (no marking or distance given), and is in azimuth 186°26′00″ from station.

Plane coordinates: (C), x=394,650.30 feet; y=423,130.74 feet; the grid azimuth to the azimuth mark=186°36′52″.*

Comeva (Pima County, E. B. Latham, 1935; 1936).—On the highest point of a low black lava hill about 4 miles southwest of the trading post of Pisinemo, on the Papago Indian Reservation. Reached as follows from Pisinemo: Go south from the Sutherland trading post along the Santa Cruz Road for 3.2 miles to a point where the road has three branches. Take the extreme right fork and go 0.3 mile to the Indian village of Lopez. Bear to the right between corral and houses and go 0.2 mile to a Y intersection. Keep straight ahead on the main track road and go 1.5 miles to the base of small lava hill. From the base it is a 10-minute pack to the top and station. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 9.72 meters (31.9 feet) from station in azimuth 339°21′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 10.605 meters (34.79 feet) from station in azimuth 44°43′. The azimuth mark, a standard bronze disk, note 11a, is at the Y intersection and about 1½ miles distant from the station in azimuth 298°20′07″.

Plane coordinates: (C), x=359,841.00 feet; y=364,260.34 feet; the grid azimuth to the azimuth mark=298°34′29″.*

Black Butte (Pima County, E. B. Latham, 1935).—From schoolhouse at Pisinemo, go south on the Sells Road for 2.8 miles, turn left onto track road and go 4.5 miles, take left fork, and go 1.6 miles, take left fork and go 0.5 mile, turn left off main road, and go 0.1 mile to base of a prominent, detached black lava hill. From here follow ridge southwestward to a summit of hill and station. Marked by a standard bronze disk as described in note 4a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.837 meters (22.43 feet) from station in azimuth 150°06′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.738 meters (15.54 feet) from station in azimuth 234°17′. No azimuth mark was established. Other stations are visible from the ground.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Plane coordinates: (C), x=407,185.95 feet; y=385,346.32 feet.

Kopeka (Pima County, E. B. Latham, 1935; 1936).—On the summit of a very prominent peak locally called Kopa, 9 miles, air line, south by west of Pisinemo. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 4, is 9.433 meters (30.95 feet) from station in azimuth 283°57′. Reference mark No. 2, a standard bronze disk, note 4, is 3.689 meters (12.10 feet) from station in azimuth 25°20′. In 1936 an azimuth mark was established on a brushy flat about 0.1 mile west of an earth reservoir, 10 feet south of a track road, projecting about 8 inches above the ground and 3 miles from station in azimuth 235°19′42″.

Plane coordinates: (C), x=384,915.30 feet; y=334,710.55 feet; the grid azimuth to the azimuth mark=235°31′28″.*

Plain (Pima County, E. B. Latham, 1935; 1936).—On the Papago Indian Reservation, about 13½ miles east-southeast of Sells and about 4½ miles southwest of the Indian village of Big Fields, on the flat desert plain lying northwest of the Baboquivari Mountains, and just east of Kopa Peak, about one-eighth mile northeast of the Big Fields-Molenitus Road, on a slight rise of ground, on the west side of a shallow swale, 18 feet east of a stubby paloverde tree. Marked by standard disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 17.975 meters (58.97 feet) from station in azimuth 334°59′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 15.769 meters (51.74 feet) from station in azimuth 55°30′. The azimuth mark, a standard bronze disk, note 11a, is in azimuth 105°31′50″. The distance to the azimuth mark is not available and it was not recovered in 1936.

Plane coordinates: (C), x=441,829.13 feet; y=320,838.54 feet; the grid azimuth to the azimuth mark=105°37′46″.*

Lesna (Pima County, E. B. Latham, 1935).—On the summit of the high ridge comprising the northern part of the Lesna Mountains, 2½ miles, air line, northwest of the church and Indian dwellings called La Lesna. At La Lesna go through the gate at the corral and go northwest of the adobe and Ocotilla Indian shack, thence around the corral on old road for 1.9 miles, turn left, go cross-country 0.5 mile to foot of steep slope at base of ridge and end of truck travel. (Station is 290° magnetic bearing from end of truck travel.) Continue on foot northward up the slope to the northernmost summit of the ridge and station. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 4, is 8.688 meters (28.50 feet) from station in azimuth 156°51′. Reference mark No. 2, a standard bronze reference disk, note 4, is 11.808 meters (38.74 feet) from station in azimuth 274°55′. *Boundary monument No. 156* (*I. B. C.*) may be used as an azimuth mark.

Plane coordinates: (C), x=404,510.63 feet; y=271,287.43 feet; the grid azimuth to *boundary monument No. 156* (*I. B. C.*)=89°18′16″.9.

Alvarez (Pima County, E. B. Latham, 1935).—On the highest peak of the northern end of the Alvarez Mountains, 3¼ miles, air line, almost due south of Cowlic and 6 miles, air line, nearly northwest of Vamori, on the same range and about 2 miles north of station *Rocky Point*. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 8.626 meters (28.30 feet) from station in azimuth 169°46′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 7.393 meters (24.26 feet) from station in azimuth 69°55′. *Boundary monument No. 153* (*I. B. C.*) may be used as an azimuth mark.

Plane coordinates: (C), x=475,030.52 feet; y=273,635.59 feet; the grid azimuth to *boundary monument No. 153* (*I. B. C.*)=71°39′03″.1.

Indian Oasis (Pima County, G. D. Cowie, 1920; 1934; 1935; 1936).—On a small isolated conical hill 4.2 miles by road southwest of Sells. Reached from Sells via the main road from Sells as follows: From the post office go west on the Ajo road for 0.3 mile, turn left about 30 yards south of bridge at Ted's garage, go 0.9 mile on main-traveled road along fence line, turn left and continue on the main-traveled road for 3.3 miles to point where this road crosses graded road, at end of truck travel. From here climb southeasterly up hill to station. Marked by a standard bronze disk set in concrete, note 3. Reference mark No. 1, a standard bronze reference disk, note 12a, is 8.550 meters (28.05

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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feet) from station in azimuth 294°59′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 9.758 meters (32.01 feet) from the station in azimuth 20°07′. The azimuth mark, a standard bronze disk, note 11a, is about one-half mile from station in azimuth 231°44′35″.

Plane coordinates; (C), x=494,017.86 feet; y=319,298.98 feet; the grid azimuth to the azimuth mark=231°45′11″.*

Boundary monument No. 150, eccentric (Pima County, E. B. Latham, 1935; 1936).—On a low rocky hill east-southeast of *boundary monument No. 150 (I. B. C.)* and can be reached from Sells by going south to Vamori. The rocky ridge on which the station is located is conspicuous from Rocky Point Indian Village and bears 228°, magnetic, from the village. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 9.568 meters (31.39 feet) from station in azimuth 292°52′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.568 meters (14.99 feet) from station in azimuth 176°27′. *Boundary monument No. 150 (I. B. C.)* is one of the masonry type, 11 feet high and 3½ feet square at the base and is situated on the level ground approximately 100 feet northwest of the base of a small lava outcropping ledge which is approximately 30 feet in height. It is 60.14 meters (197.3 feet) from station in azimuth 164°37′08″.

Plane coordinates: (C), x=450,703.20 feet; y=236,515.63 feet.

Rocky Point (Pima County, G. D. Cowie, 1920; 1934; 1935; 1936).—On the Papago Indian Reservation 5 miles west of the Indian village of Vamori, about 2½ miles north of the village of Rocky Point, on the southerly and lower summit of a double peak at the south end of the Alvarez Mountain Range, about one-third mile south of the highest peak and separated from it by a saddle of 100 feet less elevation, on the central and highest part of the summit, about 50 feet northeast of a lone saguaro cactus, in an outcrop of ledge rock. Station is marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, in rock ledge, is 20 feet southeast of a lone saguaro at west edge of summit and 10.105 meters (33.15 feet) from station in azimuth 31°41′. Reference mark No. 2, a standard bronze reference disk, note 12a, in rock ledge, is near the south edge of the summit, 15.655 meters (51.36 feet) from station in azimuth 308°40′. The azimuth mark, a standard bronze disk, note 11a, is on the road leading to the foot of the station peak, one-half mile north along the road from a Y at the village of Rocky Point, 15 feet southwest of the center of the road, 10 feet north of corner fence post and 1½ miles from station in azimuth 4°19′26″.

Plane coordinates: (C), x=475,538.73 feet; y=260,739.19 feet; the grid azimuth to the azimuth mark=4°21′55″.*

Union (Pima County, E. B. Latham, 1935).—About 6 miles, air line, southwest of the village of San Miguel, on the highest and most northerly peak of the two summits between which passes the international boundary line. Boundary monument No. 146 (I. B. C.) lies in the low saddle between the two highest peaks. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 10.527 meters (34.54 feet) from station in azimuth 130°58′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 6.138 meters (20.14 feet) from station in azimuth 76°57′. Azimuth mark, a cairn on low hill, is 2 miles from station in azimuth 228°22′04″.

Plane coordinates: (C), x=512,416.04 feet; y=216,506.42 feet; the grid azimuth to cairn on low hill=228°20′49″.*

Comely (Pima County, E. B. Latham, 1935; 1936).—About 13½ miles south by east of Sells, 6 miles south of the Indian village of Topawa, 7 miles north of the village of San Miguel, on the Papago Indian Reservation, on the central and highest one of a group of low hills known as the Animas Mountains, lying about three-fourths mile west of the Topawa-San Miguel Road and telephone line, on the highest part, in the approximate center of the summit, in top of a small boulder which projects a few inches above ground. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12a, is down the north slope of the summit, in an outcrop of ledge rock, 9.789 meters (32.12 feet) from station in azimuth 188°15′. Reference mark No. 2, a standard bronze reference disk, note 12a, is on crest

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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of the summit at its north end, set in top of a small boulder and 9.978 meters (32.74 feet) from station in azimuth 292°57′. The azimuth mark, a standard bronze disk, note 11a, is on the Topawa-San Miguel Road, 0.7 mile south-southeast along the road from a surface water pond and corrals on west side of road, about 20 feet west of the center of the road, about under the telephone line and is about three-fourths mile from station in azimuth 230°52′50″.

Plane coordinates: (C), x=529,923.83 feet; y=264,151.49 feet; the grid azimuth to the azimuth mark=230°49′48″.*

Boundary monument No. 144 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, E. B. Latham, 1935; 1936).—On the United States-Mexico boundary line about 4 miles, air line, from the village of San Miguel. To reach the monument from San Miguel, go south for 0.3 mile and turn left around corral and reservoir (charco); continue south 1.1 miles, take left fork, go 0.6 mile and keep straight ahead for 2.1 miles to the gate in the boundary fence. Pass through the gate and turn to the left, following the dim tracks about one-half mile to station. Station is marked by a small cross made in the top of the monument by the observing party at the time station was occupied. Monument is metal with pyramid top. Reference Mark No. 1, a standard bronze reference disk, note 11a, is 31.426 meters (103.10 feet) from station in azimuth 143.52′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 21.440 meters (70.34 feet) from station in azimuth 237°33′. Azimuth mark, a standard bronze disk, note 11a, is on the south side of the international fence and 0.3 mile west of the station in azimuth 112°40′22″.

Plane coordinates: (C), x=548,452.97 feet; y=200,704.28 feet; the grid azimuth to the azimuth mark=112°35′30″.*

Choulic (Pima County, E. B. Latham, 1935; 1936).—About 5 miles north and about 8 miles east of the town of South San Miguel on the southern end of a long high ridge. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 9.490 meters (31,14 feet) from station in azimuth 210°11′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 14.420 meters (47.31 feet) from station in azimuth 329°18′. The azimuth mark, on a point of ridge a few feet higher than the station, is about one-half mile from station in azimuth 221°45′54″.

Plane coordinates: (C), x=583,788.70 feet; y=247,271.71 feet; the grid azimuth to the azimuth mark=221°37′25″.*

Presumido (Pima County, E. B. Latham, 1935).—To reach from Sasabe, go north for 4.6 miles and turn left at brown mail box with arrow pointing direction "Presumido Road," go 1.8 miles, turn sharp right and go 0.5 mile to gate (Game Reserve), continue on for 3.0 miles to end of truck travel. This point can also be reached from San Miguel by going south to the boundary fence; here turn left, go 3.6 miles to boundary monument No. 142, continue 6.4 miles to gate, continue 0.1 mile to store building, continue 3.9 miles to same end of truck travel. On foot go up the hill to the westward to the summit of the ridge, thence follow the ridge to the right to the first high summit and station. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 17.301 meters (56.76 feet) from station in azimuth 83°53′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 13.060 meters (42.85 feet) from station in azimuth 146°05′. *Boundary monument No. 142A (I. B. C.)* may be used as an azimuth mark.

Plane coordinates: (C), x=592,245.71 feet; y=206,214.72 feet; the grid azimuth to *boundary monument No. 142A (I. B. C.)*=69°45′05″.9.

Pozora (Pima County, E. B. Latham, 1935; 1936).—About 4.5 miles northwest of Sasabe, on the highest point of the highest mountain between the Presumido Road and the Mexico boundary line in that vicinity, in sec. 11, T. 22 S., R. 7 E. Ridges extend northeast, southwest, southeast and northwest from the highest point. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12a, is 8.200 meters (26.90 feet) from station in azimuth 219°15′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 11.295 meters (37.06 feet) from station in azimuth 333°50′. *Boundary monument No. 140 (I. B. C.)* may be used as an azimuth mark.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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Plane coordinates: (C), x=598,596.33 feet: y=190,859.66 feet; the grid azimuth to *boundary monument No. 140* (*I. B. C.*)=336°31'38".0.

Altar (Pima County, E. B. Latham, 1935).—To reach from Sasabe, go north 5.6 miles to Gill Ranch mail box (a large white wooden fixture on the right side of the road), continue on the Sasabe-Tucson Road for 2.4 miles, pass through cattle guard, go 1.8 miles to two "Game Refuge" signs on the left of the road, go straight ahead 1.5 miles, turn left and follow tracks cross-country on low ridge between two washes for 0.7 mile to station. Marked by a standard bronze disk as described in note 4a. Reference mark No. 1, a standard bronze reference disk, note 12c, is 21.212 meters (69.59 feet) from station in azimuth 180°38'. Reference mark No. 2, a standard bronze reference disk, note 12c, is 20.189 meters (66.24 feet) from station in azimuth 267°25'. Azimuth mark, a standard bronze disk, note 12c, is on the west side of highway and 0.7 mile from station in azimuth 284°32'00".

Plane coordinates: (C), x=628,355.92 feet; y=239,558.00 feet; the grid azimuth to the azimuth mark=284°19'00".*

Puertecito (U. S. A.) (Pima County, E. B. Latham, 1935).—About 9½ miles north and 1½ miles east of Sasabe, on a small hill covered with boulders. This is the only noticeable hill for a radius of several miles. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 11.600 meters (38.06 feet) from station in azimuth 3°02'. Reference mark No. 2, a standard bronze reference disk, note 12c, is 15.605 meters (51.20 feet) from station in azimuth 101°40'. Azimuth mark, a standard bronze disk, note 12c, is on a small rocky knoll and one-quarter mile from station in azimuth 352°03'16".

Plane coordinates: (C), x=632,479.91 feet; y=224,560.28 feet; the grid azimuth to the azimuth mark=351°49'53".*

Cumero (Pima County, E. B. Latham, 1935; 1936).—On what is known as Cumero Mountain, about 5½ miles, air line, east of the town of Sasabe at the southwest corner of sec. 28, T. 22 S., R. 9 E., on the highest point of the hill close to rock cairn. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 14.008 meters (45.96 feet) from station in azimuth 243°51'. Reference mark No. 2, a standard bronze reference disk, note 12c, is 4.928 meters (16.17 feet) from station in azimuth 316°00'. *Boundary monument No. 136* (*I. B. C.*) may be used as an azimuth mark.

Plane coordinates: (C), x=650,141.53 feet; y=175,150.39 feet; the grid azimuth to *boundary monument No. 136* (*I. B. C.*)=339°31'06".5.

Las Gijas (Pima County, E. B. Latham, 1935; 1936).—About 40 miles southwest of Tucson, air line, and about 4 miles northwest of Arivaca, on the highest peak of the southern part of the Las Gijas Mountains, on the summit of a sharp knoll of the high, V-shaped ridge, in the approximate center of the summit. Marked by a standard bronze disk as described in note 2, set in an outcrop of ledge rock, in a jumbled mass of small, reddish boulders. Reference mark No. 1, a standard bronze reference disk, note 12a, is at the southeast edge of the summit and about 1½ feet lower than and 6.405 meters (21.01 feet) from station in azimuth 334°30'. Reference mark No. 2, a standard bronze reference disk, note 12a, is on the southwest rim of the summit, slightly lower than the station and 6.850 meters (22.47 feet) from station in azimuth 45°52'. The azimuth mark, a standard bronze disk, note 12a, is on the summit of a sharp, lone peak which is joined to the station peak by a considerably lower, circular ridge, in the center of the sharp summit, in bedrock, one-half mile from station in azimuth 332°21'38".

Plane coordinates: x=671,428.70 feet; y=228,263.21 feet; the grid azimuth to the azimuth mark=332°04'18".*

Fraguita (U. S. A.) (Pima County, E. B. Latham, 1935).—On the summit of a high sharp peak, known locally as Yellow Jacket Mountain, about 5 miles, air line, due south of Arivaca, and the highest point in the vicinity. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 5.395 meters (17.70 feet) from station in azimuth 312°23'. Reference mark No. 2, a standard bronze refer-

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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ence disk, note 12c, is 7,720 meters (25.33 feet) from station in azimuth 142°50'. *Boundary monument No. 136 (I. B. C.)* may be used as an azimuth mark.

Plane coordinates: (C), x=682,187.38 feet; y=184,792.09 feet; the grid azimuth to *boundary monument No. 136 (I. B. C.)*=49°04'55".2.

Jalisco (Pima County, E. B. Latham, 1935; 1936).—About 5 miles, air line, east of Arivaca, 1 mile west-southwest of two small black buttes, known on the Army topographic sheets as Baston Buttes, 60 feet north of the road, and on the highest gravel-topped hill. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 16.577 meters (54.39 feet) from station in azimuth 123°16'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 22.805 meters (74.82 feet) from station in azimuth 355°11'. The azimuth mark, a standard bronze disk, note 11a, is 0.3 mile from station in azimuth 84°01'01".

Plane coordinates: (C), x=701,827.84 feet; y=211,574.03 feet; the grid azimuth to the azimuth mark=83°40'39".*

Montana (U. S. A.) (Pima County, E. B. Latham, 1935; 1936).—On the summit of the prominent rocky peak lying about 3 miles southeast of the gold mining camp of Ruby, known as Montana Mountain, in top of flat rock outcrop on the crest of the highest point of the rocky outcrop comprising the summit, and about 60 yards southeast of the northwest end of the summit. Marked by a standard U. S. Army Engineer Corps disk, stamped "U. S. C. & G. S. 1935" set in a drill hole in the rock, note 2. Reference mark No. 1, a standard bronze reference disk, note 12c, stamped "Montana 1935 No. 1," is in the top of a large boulder at north edge of the summit and 8.320 meters (27.30 feet) from station in azimuth 185°33'. Reference mark No. 2, a standard bronze reference disk, note 12c, is in top of a small boulder, on crest of the ridge and 7.580 meters (24.87 feet) from station in azimuth 300°09'. The azimuth mark, a standard bronze disk, note 12c, stamped "Montana 1935-1936," is on the Nogales-Ruby Road, 1.4 miles southeast along the road from its junction with the Arivaca Road at Ruby, 50 yards west of a road fork, 10 yards north of the center of the road where it crosses crest of first divide southeast of Ruby, 20 feet southeast of large red rock outcrop about 6 feet high, in top of reddish granite boulder and 2 miles from station in azimuth 191°22'33".

Plane coordinates: (C), x=715,045.65 feet; y=162,109.96 feet; the grid azimuth to the azimuth mark=191°00'58".*

Tumac (Santa Cruz County, E. B. Latham, 1935; 1936).—About 23 miles northwest of Nogales, near the line between sec. 33, T. 21 S. and sec. 4, T. 22 S., R. 12 E., on highest mountain of the Tumacacori Range with the exception of a dome-shaped reddish looking hill to the northeast. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 5.745 meters (18.85 feet) from station in azimuth 318°45'. Reference mark No. 2, a standard bronze reference disk, note 12c, is 5.718 meters (18.76 feet) from station in azimuth 52°16'. The azimuth mark, a standard bronze disk, note 12a, is on rocky peak 0.3 mile from station in azimuth 257°41'01".

Plane coordinates: (C), x=749,509.37 feet; y=201,110.67 feet; the grid azimuth to the azimuth mark=257°15'52".*

Tubac (U. S. A.) (Santa Cruz County, E. B. Latham, 1935).—About 6 miles northwest of Tubac (a small village on the Southern Pacific Railroad); on the highest, most northerly peak in that range or locality. To reach from Tubac, take U. S. Highway No. 89 north 1.3 miles, turn west off highway at sign reading "Puerto Canyon Ranch", pass through two gates and go west for 0.3 mile to ranch house and windmill (inquire about key to locked gate ahead). Continue west on road from ranch and go 1.0 mile to gate. Pass through gate and go 1.1 miles to national forest boundary and locked gate. Pass through gate, take right fork, and go 1.3 miles to another gate and shack house. From here one can drive about 0.2 mile further west to end of truck travel. From the shack the station lies 300° magnetic and the best route is to follow up canyon (wash), take the right fork through small pass between the rocks to crest of ridge, thence along north slope of ridge to top and station. Station mark is a U. S. Army triangulation disk set in drill hole in rock. Mark reads "U. S.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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Army, Fort Sam Houston, Texas". Reference mark No. 1, a standard bronze reference disk, note 12a, is 10.500 meters (34.45 feet) from station in azimuth 285°52′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 12.925 meters (42.40 feet) from station in azimuth 347°24′. *Tumacacori National Monument* may be used as an azimuth mark.

Plane coordinates: (C), x=746,942.02 feet; y=237,395.70 feet; the grid azimuth to *Tumacacori National Monument*=322°12′28″.0.

Slope (Santa Cruz County, E. B. Latham, 1935).—About 20 miles north of Nogales, in southeast corner of sec. 1, T. 21 S., R. 13 E., about 5 miles east of the town of Tubac on a long high ridge running east and west. Marked by a standard bronze disk as described in note 3. Reference mark No. 1, a standard bronze reference disk, note 12c, is 9.192 meters (30.16 feet) from station in azimuth 72°51′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 9.460 meters (31.04 feet) from station in azimuth 282°20′. *Tumacacori National Monument* may be used as an azimuth mark.

Plane coordinates: (C), x=797,475.99 feet; y=230,201.80 feet; the grid azimuth to *Tumacacori National Monument*=51°04′44″.1.

Cayetano (U. S. G. S.) (Santa Cruz County, E. B. Latham, 1935; 1936).—About 14 miles north of Nogales in NE. cor. sec. 12, T. 22 S., R. 13 E., about 4 miles east of U. S. Highway No. 89, on the northerly and highest one of the three peaks of the Cayetano Mountains, a prominent lone peak rising from the series of low, parallel ridges between the highway and the foothills of the Patagonia Mountains; in the approximate center of the crest of the oblong summit just south of a shallow saddle. Marked by a standard U. S. Geological Survey disk, stamped "Cayetano 1935," set in bedrock, note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, stamped "Cayetano 1935–1936 No. 1," is along crest of ridge, near its north end, in an outcrop of ledge rock and 13.352 meters (43.81 feet) from station in azimuth 201°49′. Reference mark No. 2, a standard bronze reference disk, note 12a, stamped "Cayetano 1935–1936 No. 2," is down northeast slope of summit, about 30 feet below station, in top of rock ledge and 18.860 meters (61.88 feet) from station in azimuth 263°28′. The azimuth mark, a standard bronze disk, is on U. S. Highway No. 89, about one-half mile north of a brick school building on west side of the road, about 100 yards northwest of an old adobe house, 50 yards north of overhead guy-wire, in top of the south end of the east headwall of a small concrete culvert under the highway and about 3 miles from station in azimuth 71°41′24″.

Plane coordinates: (C), x=797,527.89 feet; y=195,394.22 feet; the grid azimuth to the azimuth mark = 71°11′26″.*

Atacosa (Santa Cruz County, E. B. Latham, 1935; 1936).—About 13 miles, air line, northwest of Nogales; about 4½ miles, air line, north of the Mexican border; on what is locally known as Atascosa Peak in the Coronado National Forest. Station mark is located about 3.8 meters northeast of the northeast corner of the Forest Service lookout house on the same peak. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12 a, is 14.953 meters (49.06 feet) from station in azimuth 15°20′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.612 meters (15.13 feet) from station in azimuth 59°03′. *U. S. Army mark* is 3.875 meters (12.71 feet) from the station in azimuth 43°05′. A cairn is in azimuth 179°25′53″.

Plane coordinates: (C), x = 740,346.08 feet; y = 154,097.46 feet; the grid azimuth to cairn = 179°01′47″.*

Adobe (Santa Cruz County, E. B. Latham, 1935).—About 8 miles, air line, north of Nogales; about 0.2 mile west of U. S. Highway No. 89, on the top of a low hill or knoll. Marked by a standard bronze disk. Reference mark No. 1, a standard bronze reference disk, is 26.940 meters (88.39 feet) from station in azimuth 243°07′. Reference mark No. 2, a standard bronze reference disk, is 11.542 meters (37.87 feet) from station in azimuth 144°08′. Azimuth mark (reference mark No. 3), a standard bronze disk, is set in drill hole in culvert on the east side of U. S. Highway No. 89, 0.2 mile south of old adobe house and in azimuth 309°11′16″ from the station.

Plane coordinates: (C), x = 795,267.27 feet; y = 162,928.52 feet; the grid azimuth to the azimuth mark = 308°41′38″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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Benedict (U. S. G. S.) (Santa Cruz County, J. S. Hill, 1910; 1919; 1935; 1936).—About 5 miles south of Calabasas and 4 miles north of Nogales in sec. 27, T. 23 S., R. 14 E., on the highest round hill between the Santa Cruz River and Nogales Creek. The station, identical with the U. S. Geological Survey station of the same name, is marked with a standard disk station mark, cemented into the solid rock. The reference mark set in 1910, a cross cut in the top of a rock, is 14.37 meters (47.1 feet) from station in azimuth 230°36'. Reference mark No. 1 (1935) (marking not known) is 14.166 meters (46.48 feet) from station in azimuth 226°37'. Reference mark No. 2 (1935) (marking not known) is 4.092 meters (13.43 feet) from station in azimuth 346°10'. In 1936 an azimuth mark was established about 1½ miles west-northwest of the station on a ridge, just after emerging from the wash on coming to the station, 33 feet south of the centerline of a road, about 100 yards east of the wash, the disk being set in a rock outcrop and in azimuth from station 124°06'57".

Plane coordinates: (C), x=810,295.71 feet; y=145,510.59 feet; the grid azimuth to the azimuth mark=123°35'52".*

Boundary monument No. 128 eccentric (Sonora, Mexico, E. B. Latham, 1935).—About 8 miles, air line, west of Nogales, Ariz. To reach from Nogales, follow U. S. Highway No. 89 north for 6.8 miles, turn left at sign reading "Ruby 23, Bear Valley 19", go 6.6 miles, turn left off main road and go 0.05 mile, keep straight ahead for 2.5 miles to end of truck travel; from here hike up creek bottom for about one-third of a mile to second sharp left bend in creek, take trail up left side of canyon to crest of first ridge, then follow trail along ridge to station. Marked by a standard bronze disk as described in note 4a. Reference mark No. 1, a standard bronze reference disk, note 13a, is 7.50 meters (24.6 feet) from station in azimuth 241°33'. Reference mark No. 2, a standard bronze reference disk, note 13a, is 8.724 meters (28.62 feet) from station in azimuth 172°59'. *Boundary monument No. 128 (I. B. C.)* is 3.480 meters (11.42 feet) from station in azimuth 183°44'.

Plane coordinates: (C), x=761,779.67 feet; y=122,279.38 feet.

Baldy 2 (Santa Cruz County, E. B. Latham, 1935).—On old Baldy or Santa Rita Peak, a high peak near the south end of the Santa Rita Range, about 25.0 miles south of Tucson, 11.0 miles northwest of Crittenden, and 12.0 miles northwest of Patagonia, towns on the Southern Pacific Railroad. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.190 meters (20.31 feet) from station in azimuth 348°03'. *Baldy lookout house, center* is 22.9 meters (75 feet) from station in azimuth 215°32'29".

Plane coordinates: (C), x=832,506.19 feet; y=254,730.87 feet.

Yoas (Pima County, E. B. Latham, 1935).—To reach from Nogales, take U. S. Highway No. 89 north for 27.7 miles to a sign reading "Amado." Go east 0.8 mile, turn right and follow along west side of buildings, turn left, cross tracks and go into lane to a gate 0.6 mile; keep straight ahead through gate and continue 4.4 miles, take the left fork and go 0.4 mile and pass through wire gate, keep straight ahead for 0.6 mile to Mr. Yoas's ranch. From the ranch head due north, following the fence line to the east side of a cone-shaped hill and a wash. Follow this wash north to the top of the ridge, turn left and then right again on another ridge following this one to the station. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 12.950 meters (42.49 feet) from station in azimuth 324°57'. Reference mark No. 2, standard bronze reference disk, note 12c, is 9.410 meters (30.87 feet) from station in azimuth 37°19'. Azimuth mark, a standard bronze disk, note 12c, about 20 feet to right of road just before crossing wash that enters the ranch yard, is in azimuth 16°58'06".

Plane coordinates: (C), x=798,326.09 feet; y=260,984.96 feet; the grid azimuth to the azimuth mark=16°27'50".*

Sopori (Pima County, E. B. Latham, 1935).—About 29 miles, air line, north-northwest of Nogales; about 3½ miles, air line, west of U. S. Highway No. 89, and about 0.2 mile north of the Arivaca Road. From Kingsley service station at Arivaca Junction on U. S. Highway No. 89, go west on the Arivaca Road for 3.4 miles (1.0 mile west of second cattle guard), turn right, north, onto dim road and go 0.2 mile up to top of low ridge and station. Station mark is located about 7 paces east of road. Marked by a standard bronze disk as described in note 1a.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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Reference mark No. 1, a standard bronze reference disk, note 11a, is 19.845 meters (65.11 feet) from station in azimuth 174°20′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 19.700 meters (64.63 feet) from station in azimuth 71°14′. Azimuth mark (reference mark No. 3), is a U. S. Geological Survey and State survey disk set in concrete post. Mark is stamped "K 54 1934" and is seven-eighths of a mile from station in azimuth 83°37′54″.

Plane coordinates: (C), x=749,374.82 feet; y=266,501.09 feet; the grid azimuth to the azimuth mark=83°12′35″.*

Esperanza (Pima County, E. B. Latham, 1935).—About 26 miles, air line, south-southwest of Tucson, about 5 miles, air line, west of U. S. Highway No. 89, on a lava-covered knoll that extends eastward into the valley, which can be easily identified by a very sharp point that rises into the saddle, between station and hill to the northwest. From a point on the Twin Buttes road about 5 miles west of Highway No. 89, turn left at "Marconi Mine" sign and go 0.7 mile to "Esperanza Mine" sign. Turn left, go 1.0 mile, pass through gate and take left fork and go 0.9 mile to a fork. Take left fork and go 1.9 miles to a paloverde tree with a large blaze, on the left side of road. From here the knoll is due south about three-fourths mile. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 15.478 meters (50.78 feet) from station in azimuth 352°29′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 14.810 meters (48.59 feet) from station in azimuth 123°41′. A railroad water tank is in azimuth 301°39′06″ from the station.

Plane coordinates: (C), x=760,726.17 feet; y=301,472.80 feet; the grid azimuth to railroad water tank=301°12′32″.*

Reserve (Pima County, E. B. Latham, 1935).—Four miles east of the town of Continental, and 259 feet north of a road. Reached from the schoolhouse at Continental by going east on the graded road for 3.8 miles, turning left off the road to the station. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 26.200 meters (85.96 feet) from station in azimuth 213°33′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 22.940 meters (75.26 feet) from station in azimuth 294°30′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is 0.2 mile from station in azimuth 120°53′42″.

Plane coordinates: (C), x=810,151.71 feet; y=299,379.12 feet; the grid azimuth to the azimuth mark=120°22′06″.*

Rita (Pima County, E. B. Latham, 1935).—About 22 miles south of Tucson. To reach from Tucson, go south on U. S. Highway No. 89 for 16.1 miles to Sahuarita Railroad Station; continue south 0.4 mile to crossroads with two stores and filling station on the west side and turn left, cross railroad tracks and go 0.2 mile to high voltage transformers; continue straight ahead for 0.5 mile crossing cattle guard and turn right; go 1.0 mile and turn left off main-traveled road and take road to the right, passing to right of signs reading "Santa Rita Range Reserve Rulas Ranch 14.8 miles, Helvitia 13 miles." Continue 2.8 miles to station which is about 100 yards north of road on a flat sandy rise, some 15 feet higher than the surrounding country. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 21.679 meters (71.13 feet) from station in azimuth 227°59′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 23.571 meters (77.33 feet) from station in azimuth 301°40′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is on south side of road 0.3 mile from station in azimuth 320°05′59″.

Plane coordinates: (C), x=811,337.99 feet; y=335,245.58 feet; the grid azimuth to the azimuth mark=319°34′09″.*

Helmet Peak 2 (Pima County, E. B. Latham, 1935).—About 20 miles south of the city of Tucson in sec. 12, T. 17 S., R. 12 E. To reach from Tucson, go west on Congress Street from North Main 0.7 mile, turn left and go south 3.0 miles to Ajo Junction; continue south on paved road 5.8 miles to a sign reading "Twin Buttes 15 miles, Arivaca 55 miles, Nogales 64 miles, Tucson 9 miles;" continue south on dirt road 1.1 miles, and go through cattle guard; continue 8.8 miles to a large mine, continue 0.6 mile, turn left off highway and drive across country toward the low ridge and end of truck travel. Climb southeast to abrupt peak and station. Marked by a standard bronze disk as described in

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.248 meters (20.50 feet) from station in azimuth 16°24′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 13.225 meters (43.39 feet) from station in azimuth 119°55′. *Helmet Peak (U. S. G. S.)* is 0.640 meter (2.10 feet) from station in azimuth 60°34′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 13b, is 400 yards from station in azimuth 162° 23′11″.

Plane coordinates: (C), x=759,321.43 feet; y=352,634.20 feet; the grid azimuth to the azimuth mark=161°56′37″.*

Twin Buttes (U. S. G. S.) (Pima County, E. B. Latham, 1935).—In the country known locally as Twin Buttes, about 25 miles south and a little west of Tucson, near line between secs. 31 and 32, T. 17 S., R. 13 E., on the highest point of a hill. Mark is that of the U. S. Geological Survey. Reference mark No. 1, a standard bronze reference disk, note 12c, is 7.240 meters (23.75 feet) from station in azimuth 175°16′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 8.815 meters (28.92 feet) from station in azimuth 269°23′. Azimuth mark, a standard Coast and Geodetic Survey bench mark, is near the road in azimuth 138°32′28″ from station.

Plane coordinates: (C), x=770,616.24 feet; y=332,683.70 feet; the grid azimuth to the azimuth mark=138°04′48″.*

Flato (Pima County, E. B. Latham, 1935).—On a rather low gravel ridge about 10 miles south of Tucson. Reached as follows from Tucson: Go south on U. S. Highway No. 89 for about 8.4 miles to the north side of a wide dip in the highway where a paved strip leads to the left; follow this strip, cross the tracks and continue 1.6 miles on main road; on the top of the ridge turn left on well traveled road and go 2.2 miles to the station on the right side of the road about 10 paces from the center. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 22.000 meters (72.18 feet) from station in azimuth 236°46′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 19.995 meters (65.60 feet) from station in azimuth 333°24′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is on north side of road 0.3 mile from station in azimuth 114°11′16″.

Plane coordinates: (C), x=810,568.90 feet; y=382,230.18 feet; the grid azimuth to the azimuth mark=113°39′21″.*

Beach (Pima County, E. B. Latham, 1935; 1936).—On a lower summit of the northern end of the Santa Rita Mountains, 1½ miles northwest of Mount Fagan in sec. 31, T. 17 S., R. 16 E. Mark is a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 5.130 meters (16.83 feet) from station in azimuth 244°04′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 6,020 meters (19.75 feet) from station in azimuth 143°05′. *G. L. O. Station No. 1* may be used as an azimuth mark.

Plane coordinates: (C), x=863,738.33 feet; y=333,681.62 feet; the grid azimuth to *G. L. O. Station No. 1*=133°15′14″.9.

Vail (Pima County, E. B. Latham, 1935; 1936).—About 14.8 miles southeast of Tucson, and 4.9 miles northwest of the junction of U. S. Highway No. 80 and State Highway No. 83, about 100 feet south of center of Highway 80. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 19.546 meters (64.13 feet) from station in azimuth 4°05′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 16.100 meters (52.82 feet) from station in azimuth 106°36′. The azimuth mark, reference mark No. 3, a bronze disk of the Arizona State Highway Department stamped "Sta. 906, plus 13, 1928" and " U. S. C. & G. S. 1935," is in a culvert 0.6 mile from station in azimuth 297°11′43″.

Plane coordinates: (C), x=861,248.33 feet; y=382,959.53 feet; the grid azimuth to the azimuth mark=296°34′35″.*

Black Hills 2 (Pima County, E. B. Latham, 1935).—About 11½ miles, air line, southwest of Tucson, 3 miles west-southwest of San Xavier Mission and on the highest part of the lava-covered hills or long black ridge. From General Land Office corner secs. 20, 21, 28, 29, T. 15 S., R. 13 E. (azimuth mark), go west along fence ½ mile, turn left and go 1 mile to end of truck travel. From here pack about 1 hour to station. Marked by a standard bronze disk

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 13.741 meters (45.08 feet) from station in azimuth 319°32′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 11.162 meters (36.62 feet) from station in azimuth 231°51′. Azimuth mark (General Land Office corner secs. 20, 21, 28, and 29, T. 15 S., R. 13 E.) is in azimuth 211°39′57″ from station.

Plane coordinates: (C), x=765,787.95 feet; y=396,265.56 feet; the grid azimuth to the azimuth mark=211°12′36″.*

Lava Knoll (Pima County, E. B. Latham, 1935).—About 15 miles, air line, south and a little west of Tucson. To reach from Tucson, go west on Ajo road to Ajo Junction, then south 5.0 miles to end of pavement; continue south 0.7 mile, take left fork, pass two more left forks, and take third left fork (all within 200 feet). Go 0.5 mile to incline left around fence corner, go between Indian dwellings for 0.2 mile, keep left or straight, opposite second of dwellings, go 0.4 mile, and incline right immediately after crossing shallow dip. Go 1.2 miles, take right fork, go 0.4 mile to fence corner, take right fork, go 1.7 miles, keep straight ahead and go 0.6 mile to foot of knoll and end of truck travel. From here climb westerly to top of hill and station. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 9.487 meters (31.13 feet) from station in azimuth 146°48′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 14.891 meters (48.85 feet) from station in azimuth 247°01′.

Plane coordinates: (C), x=779,040.96 feet; y=376,036.75 feet.

Samaniego (U. S. G. S.) (Pima County, G. D. Cowie, 1920; 1935; 1936).—About 26 miles, air line, southwest of Tucson, on the summit of a prominent peak in the northeastern part of the Sierrita Mountains. This is not the highest peak of the range as there are several peaks as high or higher located to the southwestward. Marked by a standard U. S. Geological Survey disk. Reference mark No. 1, a standard bronze reference disk, note 12c, is 18.06 meters (59.3 feet) (slope) from station in azimuth 186°33′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 19.91 meters (65.3 feet) (slope) from station in azimuth 287°31′. Azimuth mark (reference mark No. 3) note 12c, is one-half mile from station in azimuth 208°28′32″.

Plane coordinates: (C), x=722,484.84 feet; y=332,232.82 feet; the grid azimuth to the azimuth mark=208°05′47″.*

Roskruge (Pima Couty, G. D. Cowie, 1920; 1935; 1936).—On the summit of the highest peak of the southeastern portion of the Roskruge Mountains (the low range of mountains lying west of the Tucson Mountains) and about 25 miles, air line, west of Tucson. Another peak of the Roskruge Mountains about 3 miles northwest of the station is probably a few feet higher than this one. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, is 3.185 meters (10.45 feet) (slope) from station in azimuth 255°57′. Reference mark No. 2, a standard bronze reference disk, is 4.41 meters (14.5 feet) (slope) from station in azimuth 33°20′. The azimuth mark, a standard bronze disk, note 11a, set in 1936, is 4 paces southwest of a T intersection on the road leading to the station and 2 miles from station in azimuth 358°41′43″.

Plane coordinates: (C), x=666,021.56 feet; y=426,305.63 feet; the grid azimuth to the azimuth mark=358°24′35″.*

Wasson (Pima County, G. D. Cowie, 1920; 1935).—About 10 miles west and a little north of the city of Tucson, on the border of secs. 29 and 30, T. 13 S., R. 12 E., in an area known locally as Tucson Mountain Park, about 1½ miles northeast from the Mile Wide copper mine. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 7.290 meters (23.92 feet) from station in azimuth 201°09′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 10.225 meters (33.55 feet) from station in azimuth 107°17′. Azimuth mark, a standard bronze disk, note 12a, is on a small ridge on the east side of the trail to the station, 250 yards from station in azimuth 57°49′51″. *Wasson* (*U. S. G. S.*) is 1.042 meters (3.42 feet) from station in azimuth 176°44′.

Plane coordinates: (C), x=738,055.74 feet; y=463,948.97 feet; the grid azimuth to the azimuth mark=57°25′10″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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Warner (Ariz. Geod. S.) (Pima County, E. B. Latham, 1935).—About 2 miles, air line, southwest of the center of Tucson on top of a hill locally known as "A" hill. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 3.633 meters (11.92 feet) from station in azimuth 238°31′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 1.926 meters (6.32 feet) from station in azimuth 127°12′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 12c, is in azimuth 172°54′06″ from station.

Plane coordinates: (C), x=786,103.59 feet; y=441,414.23 feet; the grid azimuth to the azimuth mark=172°24′30″.*

Graze (Pima County, E. B. Latham, 1935; 1936).—About 9 miles air line south-southeast of Tucson; about 2 miles, air line, east of U. S. Highway No. 89 on the mesquite covered ridges. Reached from the junction of U. S. Highways 80 and 89 (2.0 miles south of Tucson), by going south on U. S. Highway 89, 4.1 miles; turn left on unimproved road, cross railroad tracks and go east on main-traveled road 1.1 miles; turn right and follow main-traveled road 1.7 miles to station on left of road. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 20.057 meters (65.80 feet) from station in azimuth 136°47′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 23.284 meters (76.39 feet) from station in azimuth 43°31′. The azimuth mark, a standard bronze disk, note 11a, is 0.2 mile from station in azimuth 335°13′30″.

Plane coordinates: (C), x=810,414.85 feet; y=401,414.54 feet; the grid azimuth to the azimuth mark=334°41′33″.*

St. Johns (Maricopa County, E. B. Latham, 1935; 1936).—About 18 miles southwest of Phoenix, about 3 miles, air line, south-southwest of the St. John's Indian School about three-fourths mile southwest of the Santa Cruz River, on the west one of two ridges that extend into the valley to the north. This ridge overlooks a ridge to the eastward, or a fork of the same ridge, which forks about 200 yards south of the station. From canyon that forms the two ridges, the station is on the first bench below the head of the canyon and on the west ridge. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12a, is 16.90 meters (55.45 feet) from station in azimuth 246°21′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 16.405 meters (53.82 feet) from station in azimuth 335°43′. Azimuth mark (1936), a standard bronze disk, note 12a, is about 200 yards back from the extreme end of the rocky ridge just east of the station and one-fourth mile from station in azimuth 252°01′03″.

Plane coordinates: (C), x=414,719.71 feet; y=816,098.14 feet; the grid azimuth to the azimuth mark=252°10′14″.*

Cruz (Maricopa County, E. B. Latham, 1935).—About 17 miles southwest of Phoenix on the highest part of a flat gravel ridge west of the Gila River. There are washes on the south, west, and east sides of the ridge. Marked by a standard bronze disk as described in note 5. Reference mark No. 1, a standard bronze reference disk, note 12a, is 10.120 meters (33.20 feet) from station in azimuth 245°36′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 11.389 meters (37.37 feet) from station in azimuth 312°45′. The azimuth mark (reference mark No. 3), a standard bronze disk, note 12a, is in azimuth 272°07′50″ from the station.

Plane coordinates: (C), x=404,213.45 feet; y=834,664.89 feet; the grid azimuth to the azimuth mark=272°18′10″.*

Pima Butte (Pinal County, E. B. Latham, 1935).—About 16 miles southwest of Chandler; about 1½ miles southwest of the Gila River; on the eastern end of a prominent butte locally known as Pima Butte. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 9.449 meters (31.00 feet) from station in azimuth 167°59′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 11.205 meters (36.76 feet) from station in azimuth 275°37′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 12a, is near the base of the butte and in azimuth from station 304°56′56″.

Plane coordinates: (C), x=468,823.66 feet; y=781,072.49 feet; the grid azimuth to the azimuth mark=305°00′17″.*

Telegraph Pass (U. S. G. S.) (Maricopa County, E. B. Latham, 1935).—On the highest point of the range of hills, about 10 miles, air line, south of Phoenix,

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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and one-half mile south of Telegraph Pass. The U. S. Geological Survey mark was found out of place, and the Coast and Geodetic Survey mark was set in the same position as the original mark had occupied. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 23.742 meters (77.89 feet) from station in azimuth 203°13′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 16.521 meters (54.20 feet) from station in azimuth 348°15′.

Plane coordinates: (C), x=455,438.27 feet; y=848,897.23 feet.

Goodyear (Maricopa County, E. B. Latham, 1935).—About 4 miles southwest of the town of Chandler, on a small sandy rise in the middle of sec. 12, T. 2 S., R. 4 E. Marked by a standard bronze disk as described in note 1a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 24.780 meters (81.30 feet) from station in azimuth 266°57′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 18.660 meters (61.22 feet) from station in azimuth 10°33′.

Plane coordinates: (C), x=506,105.19 feet; y=824,132.41 feet.

Jackson (Maricopa County, E. B. Latham, 1935; 1936).—About 12 miles, air line, west by south from the town of Chandler; about 5 miles, air line, northeast of the Gila River; on a low lone butte locally known as Jackson Butte. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 7.464 meters (24.49 feet) from station in azimuth 245°34′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 3.633 meters (11.92 feet) from station in azimuth 139°40′. The azimuth mark, a standard bronze disk, note 11a, is 11 paces east of the centerline of the graded road at the junction of the graded road with an unimproved road that runs to the station, and is about 0.4 mile from station in azimuth 343°47′21″.

Plane coordinates: (C), x=464,815.69 feet; y=822,834.56 feet; the grid azimuth to the azimuth mark=343°51′08″.*

Sacaton Butte (Pinal County, E. B. Latham, 1935).—About 10 miles southeast of the Sacaton Indian Agency and about 200 yards east of the U. S. Geological Survey station. To reach from the town of Chandler, go south on State Highway No. 87 for 7.0 miles to a sign reading "Casa Blanca 7½ miles;" turn right and follow the graded road south 4.6 miles, crossing the Gila River, to a point where the road crosses two canals; turn right after crossing the second canal and follow the graded road west 2.8 miles; turn left, crossing a small ditch and go due south toward butte crossing a bridge at 2.2 miles; continue from bridge 1.2 miles, take right fork 0.4 mile and take another right fork 0.3 mile to a point opposite station. Station is on hill near the road. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 7.690 meters (25.23 feet) from station in azimuth 169°29′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 5.170 meters (16.96 feet) from station in azimuth 241°00′. The azimuth mark (reference mark No. 3), a standard bronze disk, note 12a, is on a low hill near road, 0.4 mile from station in azimuth 202°32′02″.

Plane coordinates: (C), x=506,584.03 feet; y=753,535.69 feet; the grid azimuth to the azimuth mark=202°31′20″.*

Gila Butte (Pinal County, E. B. Latham, 1935; 1936).—On the highest and most southeastern peak of Gila Butte, just north of the Gila River, about 10 miles, air line, south by west of the town of Chandler and 4 miles southwest of State Highway No. 87. Marked by a standard bronze disk as described in note 2a, just east of shallow saddle in bedrock, on top of rocky outcrop. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.693 meters (18.68 feet) from station in azimuth 220°59′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 15.284 meters (50.14 feet) from station in azimuth 300°19′. Reference mark No. 3, used as an azimuth mark, is a standard disk set in a culvert head about one-half mile from station in azimuth 242°50′47″.

Plane coordinates: (C), x=516,948.21 feet; y=784,156.82 feet; the grid azimuth to the azimuth mark=242°48′58″.*

Santan (Pinal Couity, E. B. Latham, 1935; 1938).—On the highest point of Santan Mountain, which is the highest mountain in the vicinity lying about 5 miles north of the Gila River, and about 20 miles northwest of Florence. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1,

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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a standard bronze reference disk, note 12c, is 4.089 meters (13.42 feet) from station in azimuth 346°20′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 6.246 meters (20.49 feet) from station in azimuth 67°53′. A U. S. Geological Survey mark, *Santan Peak*, now destroyed, was 1.200 meters (3.94 feet) from station in azimuth 296°51′, and *U. S. G. S. cross in rock* is 2.520 meters (8.27 feet) from station in azimuth 290°35′. An azimuth mark set in 1938, note 12c, is in a boulder 1,000 feet lower than the station, 80 yards south (up the canyon) from the end of truck travel, 10 yards southwest of a large paloverde tree, and 0.5 mile from station in azimuth 130°27′32″.

Plane coordinates: (C), x=563,681.81 feet; y=790,718.01 feet; the grid azimuth to the azimuth mark=130°20′42″.*

Signal Peak (U. S. G. S.) (Pinal County, E. B. Latham, 1935; 1936).—About 15 miles, air line, west-southwest of Florence, on a sharp peak, the highest in the near vicinity, and about 2 miles north of the Loma Verde Ranch. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 7.565 meters (24.82 feet) from station in azimuth 309°54′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.348 meters (20.83 feet) from station in azimuth 88°15′. The azimuth mark is a standard azimuth disk set in bedrock on the highest rocky knoll at the west end of the ridge that runs southwest from the station. It is about 100 feet above the road and 200 yards northeast of the road where it makes a turn around the end of the ridge, and is about 1.0 mile from station in azimuth 50°24′50″.

Plane coordinates: (C), x=579,143.69 feet; y=713,533.79 feet; the grid azimuth to the azimuth mark=50°16′24″.*

Sweet (Pinal County, E. B. Latham, 1935.)—About 7 miles north of Casa Grande on the second and highest hill east of the road, and about 0.3 mile from the road. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 15.298 meters (50.19 feet from station in azimuth 204°10′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 11.985 meters (39.32 feet) from station in azimuth 129°00′. *Sacaton, water tank* may be used as an azimuth mark.

Plane coordinates: (C), x=542,315.54 feet; y=737,777.81 feet; the grid azimuth to *Sacaton, water tank*=211°51′48″.8.

Mineral Butte (Pinal County, E. B. Latham, 1935; 1936; 1938).—About 13 miles, air line, northwest of Florence, about 4 miles, air line, north of the Gila River on the western and slightly higher of two reddish buttes. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, about 6 feet lower than station, is 4.401 meters (14.44 feet) from station in azimuth 158°10′. Reference mark No. 2, a standard bronze reference disk, note 12a, about 4 feet lower than station, is 10.474 meters (34.36 feet) from station in azimuth 53°36′. The azimuth mark (1936), a standard bronze disk, note 11a, about 250 feet lower than the station and 35 feet north of the road at a curve in one-half mile from station in azimuth 152°52′45″.

Plane coordinates: (C), x=601,570.40 feet; y=770,814.77 feet; the grid azimuth to the azimuth mark=152°41′53″.*

Randolph (Pinal County, E. B. Latham, 1935; 1936).—About 9 miles west and 6 miles south of Florence on the east side of State Highway No. 87, and about 125 feet east of the pavement, on a small sand ridge. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 16.552 meters (54.30 feet) from station in azimuth 179°32′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 16.975 meters (55.69 feet) from station in azimuth 80°06′. The azimuth mark, a standard bronze disk set in the west end of the south abutment of a rock culvert on the west side of the highway at crossroads, is one-fourth mile from station in azimuth 174°28′28″.

Plane coordinates: (C), x=623,589.43 feet; y=687,511.65 feet; the grid azimuth to the azimuth mark=174°15′20″.*

Posten (Pinal County, E. B. Latham, 1935; 1936).—About 2½ miles, air line, northwest of Florence on Poston Butte, on a prominent hill that is easily identified by the large pyramid on the top and by a large whitewashed letter "P" on the southern slope. The pyramid is the tomb of Arizona's pioneer states-

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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man, Charles D. Poston. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 7.918 meters (25.98 feet) from station in azimuth 183°54′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 10.260 meters (33.66 feet) from station in azimuth 289°15′. The azimuth mark (marking not known), is 1.8 miles along Highway No. 80 from Florence, at the north end of a bridge over the Gila River, and 1½ miles from station in azimuth 271°37′25″.

Plane coordinates: (C), x=655,776.23 feet; y=747,942.00 feet; the grid azimuth to the azimuth mark=271°20′47″.*

Casa Grande (Gila County, E. B. Latham, 1935; 1936).—On the highest and most northern point of the Casa Grande Mountains and about 4 miles southeast of the town of Casa Grande on the Southern Pacific Railroad. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 9.280 meters (30.45 feet) from station in azimuth 251°30′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 20.150 meters (66.11 feet) from station in azimuth 323°36′. The azimuth mark (1936), a standard bronze disk, note 12a, is about one-third mile from station in azimuth 194°51′40″, and is set in a rock outcrop about 100 yards west of the end of truck travel and southwest of the retaining wall at the top of the steep grade.

Plane coordinates: (C), x=562,720.39 feet; y=662,019.09 feet; the grid azimuth to the azimuth mark=194°45′02″.*

Peak (Pinal County, E. B. Latham, 1935).—About 5 miles north of Picacho, just west of the section house at Peak on the Phoenix branch of the Southern Pacific Railroad. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 26.972 meters (88.49 feet) from station in azimuth 258°07′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 27.425 meters (89.98 feet) from station in azimuth 353°41′. The azimuth mark, a State highway bench mark set in a culvert on the west side of the highway, is one-half mile from station in azimuth 47°34′42″.

Plane coordinates: (C), x=624,561.44 feet; y=650,473.64 feet; the grid azimuth to the azimuth mark=47°21′31″.*

Eloy (Pinal County, E. B. Latham, 1935).—On the flats, about 5 miles, air line, due south of the town of Eloy, on the south side of the road, about 0.4 mile west of a ranch house and 35 feet south of fence line. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 17.930 meters (58.83 feet) from station in azimuth 230°39′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 17.702 meters (58.08 feet) from station in azimuth 126°43′. Azimuth mark, a standard bronze disk, note 11a, is about 2 feet east of a fence corner and 0.2 mile from station in azimuth 90°58′06″.

Plane coordinates: (C), x=613,974.78 feet; y=607,217.64 feet, the grid azimuth to the azimuth mark=90°46′06″.*

Newman (Pinal County, E. B. Latham, 1935).—On the highest point of the Picacho Mountains which is known as Newman Peak, about 6 miles, air line, east by south from the town of Picacho. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 4.450 meters (14.60 feet) from station in azimuth 324°15′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 14.250 meters (46.75 feet) from station in azimuth 72°39′. *Beacon tower, center* is 7.468 meters (24.50 feet) from station in azimuth 209°03′.

Plane coordinates: (C), x=658,938.37 feet; y=625,498.49 feet.

Sasco (Pinal County, E. B. Latham, 1935).—About 6 miles southwest of Red Rock and about 1 mile south of the old town of Sasco, on a black rocky hill with a rock outcrop on the north side, the most northerly one of a group of hills extending east and west, south and east of Sasco. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 8.810 meters (28.90 feet) from station in azimuth 279°16′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 10.590 meters (34.74 feet) from station in azimuth 352°06′.

Plane coordinates: (C), x=651,543.09 feet; y=554,461.22 feet.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Picacho (Pinal County, E. B. Latham, 1935).—About 7 miles southeast of the town of Picacho, on the highest point of the most southwestern of the low ridges running south from the high ridge on the east end of which Picacho Peak is located. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.630 meters (18.47 feet) from station in azimuth 223°34′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 15.285 meters (50.15 feet) from station in azimuth 105°12′.

Plane coordinates: (C), x=649,544.02 feet; y=594,470.03 feet.

Red Rock (Pinal County, E. B. Latham, 1935).—About 6 miles, air line, east-northeast of Red Rock, on the highest and most southern point of the low ridge that stands alone. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze disk, note 12a, is 11.532 meters (37.83 feet) from station in azimuth 185°09′. Reference mark No. 2, a standard bronze disk, note 12a, is 26.110 meters (85.66 feet) from station in azimuth 342°31′. Nail in stake at center of a signal is 1.722 meters (5.65 feet) from station in azimuth 322°43′.

Plane coordinates: (C), x=706,679.22 feet; y=580,610.73 feet.

G. L. O. Station E (Pima County, E. B. Latham, 1935).—About 8½ miles, air line, south of the town of Red Rock, about 1 mile south of the Santa Cruz River, and about 100 feet north of the Tucson-Silverbell road, at the pipe marking the quarter of sections 22 and 27, T. 11 S., R. 10 E. A concrete post, stamped "U. S. C. & G. S.–1935," was built around the the General Land Office pipe marking the station. Reference mark No. 1, a standard bronze reference disk, note 11a, is 19.000 meters (62.34 feet) from station in azimuth 263°40′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 19.330 meters (63.42 feet) from station in azimuth 346°27′.

Plane coordinates: (C), x=686,468.16 feet; y=528,333.32 feet.

Tortollita (Pima County, E. B. Latham, 1935; 1936).—About 20 miles north by west of Tucson and about 5 miles north of the town of Rillito, on the northern and slightly lower one of two peaks which are about 200 yards apart and are on the western end of the Tortillita Mountains. Marked by a standard bronze disk as described in note 1a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 9.415 meters (30.89 feet) from station in azimuth 266°18′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 10.658 meters (34.97 feet) from station in azimuth 134°31′. The azimuth mark (1936), a standard bronze disk, note 12c, is 7 paces south of an east-west road, 24 paces west of a dim cross road, 4 paces south of a triangular trench which is just south of the road and three-fourths mile from station in azimuth 50°21′26″.

Plane coordinates: (C), x=741,732.49 feet; y=544,831.29 feet; the grid azimuth to the azimuth mark=49°56′09″.*

Center (Pima County, E. B. Latham, 1935).—About 26 miles, air line, northwest of Tucson, on the flats about 6 miles south of the Santa Cruz River. From Cortaro, go north 0.1 mile, turn left at sign "Camp–5–P–6–A," and go west 1.4 miles on graded road. Turn right on graded road and go 1.8 miles to fork. Take right fork 1.0 mile to another fork. Take left fork or main road for 4.9 miles to fork and sign reading "Glover Ranch." Take left fork and go 1.9 miles and turn sharp right. Go 0.2 mile to a U. S. Geological Survey bench mark stamped "Elev. 1991 feet." Follow the road along the north side of the fence line for 1.1 miles to a gate in fence. Pass through gate and take a right fork and go 1.3 miles to station. Station is about 35 feet east of the road and about 100 feet north of a small wash. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 22.518 meters (73.88 feet) from station in azimuth 246°12′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 20.740 meters (68.04 feet) from station in azimuth 307°24′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is on west side of road 0.15 mile from station in azimuth 230°27′12″.

Plane coordinates: (C), x=695,144.82 feet; y=503,506.07 feet; the grid azimuth to the azimuth mark=230°06′53″.*

Rillito (Pima County, E. B. Latham, 1935; 1936).—On the highest point of the low ridge which forms the most northern end of the chain of low ridges running north from the Tucson Mountains, about 1 mile, air line, south of the town of Rillito, which is on State Highway No. 84 about 23 miles northwest of

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Tucson. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 8.832 meters (28.98 feet) from station in azimuth 76°58′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 7.932 meters (26.02 feet) from station in azimuth 152°05′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 12a, is 0.1 mile south of railroad signal No. 967.3, on the south side of Highway No. 84, in a concrete culvert abutment and in azimuth 222°27′50″.

Plane coordinates: (C), x=737,891.44 feet; y=509,952.30 feet; the grid azimuth to the azimuth mark=222°03′03″.*

Pusch (U. S. G. S.) (Pima County, E. B. Latham, 1935; 1936).—About 7 miles, air line, north of Tucson on the southwest end of the Catalina Mountains. The station mark is a standard U. S. Geological Survey disk set in drill hole in large boulder. Reference mark No. 1, a standard bronze reference disk, note 12a, is 13.510 meters (44.32 feet) from station in azimuth 318°13′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 16.550 meters (54.30 feet) from station in azimuth 76°13′. The azimuth mark, a standard U. S. Coast and Geodetic Survey bench mark stamped "Q 19 1933" is at the west side of Highways Nos. 80 and 89 and at the northwest side of a road crossing, 0.85 mile north of the point of leaving the highway, 11 paces north of the Los Altos Road center and 13 paces west of the center of Highways 80 and 89. It is about 3 miles from station in azimuth 34°50′10″.

Plane coordinates: (C), x=802,015.68 feet; y=500,400.44 feet; the grid azimuth to bench mark Q 19=34°18′45″.*

Sahuaro (Pima County, E. B. Latham, 1935; 1936).—About 9 miles, air line, northeast of Tucson. To reach from Tucson, go east from the corner of Stone and Speedway for 6.5 miles, turn left (north) at end of pavement and go 0.4 mile, turn right (east) and go 1.1 miles, turn left on Sabino Canyon road and go 1.5 miles, turn left on river road and go 0.6 mile, turn right and go 0.7 mile to white stucco house and end of truck travel. Climb east about 200 yards to the station. Marked by a standard bronze disk as described in note 3. Reference mark No. 1, a standard bronze reference disk, note 13, is 15.460 meters (50.72 feet) from station in azimuth 19°18′. Reference mark No. 2, a standard bronze reference disk, note 13, is 10.920 meters (35.83 feet) from station in azimuth 286°45′. The azimuth mark, a standard bronze disk, note 13, is on slope of knoll, 300 yards from station in azimuth 38°54′42″.

Plane coordinates: (C), x=830,040.40 feet; y=467,467.97 feet; the grid azimuth to the azimuth mark=38°20′28″.*

Stack (G. L. O.) (Pinal County, E. B. Latham, 1935; 1936).—About 7 miles south and 2 miles east of Florence on brush-covered flats, on the east side of a north-south section-line track road, at the corner of secs. 5, 6, 7, and 8, T. 6 S., R. 10 E. The station mark is a pipe with standard General Land Office bronze cap stamped "S. 5, 6, 7, 8; T. 6 S., R. 10 E., 1930" and also "Stack U. S. C. & G. S.—1935". The mark projects 5 inches and is set in a 10-inch block of concrete. Reference mark No. 1, a standard bronze reference disk, note 11a, is 12.948 meters (42.48 feet) from station in azimuth 180°48′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 12.291 meters (40.32 feet) from station in azimuth 274°20′. The azimuth mark, a pipe with a standard General Land Office bronze cap at the ¼ sections of 5 and 6, is one-half mile from station in azimuth 179°58′19″.

Plane coordinates: (C), x=675,365.31 feet; y=699,673.95 feet; the grid azimuth to the azimuth mark=179°39′41″.*

Hole (Pinal County, E. B. Latham, 1935).—On a flat about 7 miles south and 5 miles west of the town of Florence, 2.8 miles from the ranch of Mr. Lindley and 20 feet east of the road. Marked by a standard bronze disk as described in note 1a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 10.655 meters (34.96 feet) from station in azimuth 229°26′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 12.802 meters (42.00 feet) from station in azimuth 153°21′. The azimuth mark, a standard bronze disk, note 11a, is on the west side of the road 0.4 mile toward the ranch house and in azimuth 192°54′07″.

Plane coordinates: (C), x=646,695.49 feet; y=702,775.58 feet; the grid azimuth to the azimuth mark=192°38′32″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Picture (Pinal County, E. B. Latham, 1935).—About 5 miles, air line, east by south from Florence, on the southern and highest end of Picture Rock Ridge, which lies just north of the Florence-Kelvin Road. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 12.053 meters (39.54 feet) from station in azimuth 333°39′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 10.334 meters (33.90 feet) from station in azimuth 61°18′. *Florence, State Prison, aluminum water tank* may be used as an azimuth mark.

Plane coordinates: (C), x=691,788.66 feet; y=730,758.49 feet; the grid azimuth to *Florence, State Prison, aluminum water tank*=104°42′47″.4.

North Butte (Pinal County, E. B. Latham, 1935; 1936).—On the highest point of North Butte, a prominent light-colored butte with a black layer on top, about 1.0 mile north of the Gila River, and about 12 miles northeast by east from Florence. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12a, is 11.018 meters (36.15 feet) from station in azimuth 262°09′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 12.231 meters (40.13 feet) from station in azimuth 336°36′. The azimuth mark, a standard bronze disk, set in outcrop about 100 feet south of the extreme north end of the mountain and lower, is one-half mile from station in azimuth 176°31′03″.

Plane coordinates: (C), x=720,890.40 feet; y=766,906.03 feet; the grid azimuth to the azimuth mark=176°07′24″.*

Loma (Pinal County, E. B. Latham, 1935; 1936).—On a low hill about 16 miles east-southeast of Florence. To reach from the State prison gate at Florence on the Florence-Winkelman Road, go easterly on highway for 8.3 miles to point where the old road leads off to the right, take old road 0.1 mile, take right fork and follow an unimproved road winding through cactus and washes 4.8 miles to a wire fence corral with a low barn. Take right fork in front of gate, go along outside of corral fence and drive 2.0 miles across country in an easterly direction toward the low hill. Marked by a standard bronze disk as described in note 3. Reference mark No. 1, a standard bronze reference disk, note 12a, is 16.570 meters (54.36 feet) from station in azimuth 57°04′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 21.578 meters (70.79 feet) from station in azimuth 173°39′. A new azimuth mark (standard disk in an 8-inch square concrete post) was established about 100 yards south of the above-mentioned barn and on the south side of the road leading around the corral fence, and is 2.25 miles from station in azimuth 110°05′46″.

Plane coordinates: (C), x=732,505.43 feet; y=705,410.02 feet; the grid azimuth to the azimuth mark=109°41′03″.*

Donelley (Pinal County, E. B. Latham, 1935; 1936).—On a small ridge 150 yards south of the Florence-Kelvin Road, near the summit between Donelley wash and Ripsey wash, and about 19 miles, air line, east of Florence. Marked by a standard bronze disk as described in note 2a. Reference mark No. 1, a standard bronze reference disk, note 12c, is 12.625 meters (41.42 feet) from station in azimuth 129°46′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 11.286 meters (37.03 feet) from station in azimuth 187°54′. The azimuth mark, a standard bronze disk, note 11a, approximately 150 yards north of the road that turns right off the main highway at a sign "Kelvin 10 miles" and about 10 yards east of the centerline of the main highway, is one-fourth mile from station in azimuth 195°00′36″.

Plane coordinates: (C), x=770,475.78 feet; y=738,588.40 feet; the grid azimuth to the azimuth mark=194°31′44″.*

Ripsey Hill (Pinal County, E. B. Latham, 1935).—About 26 miles east-southeast of Florence, 7 miles south of the Gila River, in the Tortilla Mountains, on what is locally known as Ripsey Hill. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 8.050 meters (26.41 feet) from station in azimuth 171°17′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 7.740 meters (25.39 feet) from station in azimuth 71°02′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 12a, is in rock outcrop about 10 feet from the road at the end of truck travel, one-fourth mile from station in azimuth 12°30′14″.

Plane coordinates: (C), x=789,883.69 feet; y=731,330.26 feet; the grid azimuth to the azimuth mark=11°59′19″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Granite Mountain (Pinal County, E. B. Latham, 1935; 1936).—About 10½ miles south-southeast of Superior and 3 miles west of the mining town of Ray, on the summit of the westerly and highest peak of Granite Mountain, a prominent and well-known peak lying at the north end of the extensive and rugged range known as The Spine and about 1½ miles south of the Ray-Superior Highway; in the center of the bare summit, about on the centerline of the shallow saddle to the north. Marked by a standard disk set in concrete in a depression in bedrock, note 3. Reference mark No. 1, a standard bronze reference disk, note 12a, is southeast of the station on a slight, rocky rise and 8.290 meters (27.20 feet) from station in azimuth 278°38′. Reference mark No. 2, a standard bronze reference disk, note 12a, is at south edge of the summit and 10.998 meters (36.08 feet) from station in azimuth 15°08′. The azimuth mark (1936), a standard bronze disk, note 12a, is 200 feet south of the Ray-Superior Highway, 140 feet east of dim track road leading towards base of ridge, on the lower summit at the north end of a small limestone knoll, on the ridge line, in a low, sharp, outcrop of bedrock and 2 miles from station in azimuth 148°12′50″.

Plane coordinates: (C), x=772,485.99 feet; y=787,700.81 feet; the grid azimuth to the azimuth mark=147°43′37″.*

Manhattan (Gila County, E. B. Latham, 1935; 1938).—About 7½ miles, air line, east by south from Ray, and about 7½ miles, air line, north of the Gila River, on a limestone peak about 1 mile south of Dripping Springs wash and about one-half mile west of and slightly lower than the peak which is locally known as Baldy Mountain. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 4.588 meters (15.05 feet) from station in azimuth 23°32′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 3.896 meters (12.78 feet) from station in azimuth 101°43′.

Plane coordinates: (C), x=820,458.78 feet; y=777,958.85 feet.

Dudley (Pinal County, E. B. Latham, 1935).—About 7 miles southwest of Winkelman, and about one-half mile northeast of Crozier Peak, on the shoulder of the ridge, on the highest point northeast of Crozier Peak, and about 150 yards from a dip in the ridge which is toward Crozier Peak. There is a canyon on the north and south sides of the ridge. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 23.685 meters (77.71 feet) from station in azimuth 67°28′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 12.930 meters (42.42 feet) from station in azimuth 210°53′. A large brick stack (largest of two) at Hayden is in azimuth 248°03′46″.

Plane coordinates: (C), x=818,865.93 feet; y=718,721.55 feet; the grid azimuth to largest of two brick stacks at Hayden=247°29′49″.*

Supplementary points

Flite (Pima County, E. B. Latham, 1935; 1936).—A supplemental triangulation station placed at Ajo for local convenience. To reach from the Ajo Post Office, take the graveled highway toward Gila Bend for 1.4 miles to point where the highway turns right (northeast). The station is about 100 feet west of the highway, opposite the above-mentioned curve. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 11a, is 23.180 meters (76.05 feet) from station in azimuth 185°39′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 19.795 meters (64.94 feet) from station in azimuth 269°03′. The azimuth mark, a standard station disk with an arrow chiseled thereon pointing toward the station, is set in a block of concrete about 0.35 mile down the road from the station, 20 paces east of the road and in azimuth 220°44′00″ from the station.

Plane coordinates: (C), x=205,109.53 feet; y=505,509.68 feet; the grid azimuth to the azimuth mark=221°14′43″.*

Tracy (Pima County, E. B. Latham, 1935).—About 34 miles east of Ajo, along the Ajo-Sells Highway near Tracy's Trading Post on the Papago Indian Reservation, about 100 yards west of the post and 28 paces from the road center to the south. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 21.700 meters (71.19 feet) from station in azimuth 5°30′. Reference mark No. 2, a

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

standard bronze reference disk, note 11a, is 22.645 meters (74.29 feet) from station in azimuth 99°20′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is 20 paces south of the road center and 220 paces from station in azimuth 100°32′36″.

Plane coordinates: (C), x=359,520.06 feet; y=431,354.67 feet; the grid azimuth to the azimuth mark=100°47′07″.*

Pisinemo (Pima County, E. B. Latham, 1935).—In the Indian village of Pisinemo which is about 25.0 miles, air line, west of Sells, 6 feet north of the eighth post of the fence around the church and schoolhouse or 12 posts east of the northwest corner of the enclosure. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 20.400 meters (66.93 feet) from station in azimuth 188°34′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 20.487 meters (67.21 feet) from station in azimuth 99°29′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is 85 paces from fence corner on same line of direction and 265 paces from station in azimuth 248°13′42″.

Plane coordinates: (C), x=375,995.70 feet; y=377,589.32 feet; the grid azimuth to the azimuth mark=248°26′27″.*

Harle (Pima County, E. B. Latham, 1935).—About one-fourth mile east-southeast of the village of Harlemuheta between Big Fields and Pisinemo, on the west side of the road and about 10 paces from the center of the main-traveled road. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.358 meters (60.23 feet) from station in azimuth 146°43′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 17.222 meters (56.50 feet) from station in azimuth 59°39′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is on east side of road and 0.4 mile from station in azimuth 328°19′34″.

Plane coordinates: (C), x=384,121.93 feet; y=364,621.99 feet; the grid azimuth to the azimuth mark=328°31′27″.*

Camino (Pima County, E. B. Latham, 1935).—Along the poorly graded road between Big Fields and Pisinemo, and 0.2 mile north from the small Indian village of Kopa (on the Papago Indian Reservation), at the cross road intersection and about 10 paces east of the respective centerlines of the intersecting roads. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 19.105 meters (62.68 feet) from station in azimuth 219°09′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 19.460 meters (63.85 feet) from station in azimuth 313°00′. No azimuth mark was established. Other stations are visible from the ground.

Plane coordinates: (C), x=409,512.42 feet; y=339,883.91 feet.

Boundary monument No. 156 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, E. B. Latham, 1935; 1936).—On the United States-Mexico boundary about 8 miles, air line, southwest of the Indian village of Molenitus, 11 miles, air line, southwest of the Sanford ranch on the level plain midway between the La Lesna and Nariz Mountain Ranges and 60 feet south of the boundary fence. Marked by a cross in the apex of the monument. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.350 meters (60.20 feet) from station in azimuth 209°27′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 26.712 meters (87.64 feet) from station in azimuth 151°57′. The azimuth mark, a standard bronze disk, note 11a, is about 0.4 mile from station in azimuth 285°27′32″.

Plane coordinates: (C), x=358,050.64 feet; y=270,723.59 feet; the grid azimuth to the azimuth mark=285°41′57″.*

Cowlic (Pima County, E. B. Latham, 1935).—In the Indian village of Cowlic (Papago Indian Reservation), about 6 feet south of the fence line surrounding the mission buildings, and about 35 feet south and west of the southwest corner of the mission. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 22.364 meters (73.37 feet) from station in azimuth 180°57′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 21.128 meters (69.32 feet) from station in azimuth 268°41′. Azimuth mark (reference mark No. 3), a

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

standard bronze disk, note 11a, is beyond the southern corner of a charco and is 283 paces from station in azimuth 256°35′45″.

Plane coordinates: (C), x=478,029.58 feet; y=293,508.38 feet; the grid azimuth to the azimuth mark=256°37′59″.*

Boundary monument No. 153 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, E. B. Latham, 1935).—Plane coordinates: (C), x=409,393.96 feet; y=251,865.89 feet.

Boundary monument No. 147 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, E. B. Latham, 1935).—On the United States-Mexico border about 5.5 miles south of San Miguel. From San Miguel take main-traveled road south for about 6.0 miles to the gate in the international fence. (There are several roads leading to the right and to the left, but the main-traveled road is very plain.) Pass through the gate and turn to the right following the dim tracks west, winding very much to the south, thence back to the fence and to the station. Station is about 1 mile west of the gate and about 4 paces south of the fence. Station mark is a cross made in the top of the pyramid-shaped top of the metal boundary monument. Reference mark No. 1, a standard bronze reference disk, note 11a, is 23.760 meters (77.95 feet) from station in azimuth 241°33′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 23.640 meters (77.56 feet) from station in azimuth 158°27′. *Boundary monument No. 150 eccentric* may be used as an azimuth mark.

Plane coordinates: (C) x=489,457.15 feet; y=222,410.04 feet; the grid azimuth to *boundary monument No. 150 eccentric*=110°00′01″.4.

Vamori (Pima County, E. B. Latham, 1935).—About 14 miles, air line, south-southeast of Sells, on the Papago Indian Reservation and in the little Indian village of Vamori, about 17.00 meters east of the southwest corner of fence enclosing a schoolyard, 5.0 meters south of fence line, and 9.0 meters north of track road. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.310 meters (60.07 feet) from station in azimuth 347°18′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 17,648 meters (57.90 feet) from station in azimuth 93°19′. Any station sighted from *Vamori* may be used as an azimuth mark.

Plane coordinates: (C) x=502,104.14 feet; y=261,848.41 feet.

San Miguel (Pima County, E. B. Latham, 1935).—About 1.8 miles north of San Miguel (a small village on the Papago Indian Reservation, located about 16 miles south of Sells); 14 paces west of the San Miguel-Sells Road and between telephone poles 612 and 613. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 22,410 meters (73.52 feet) from station in azimuth 341°28′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 21.190 meters (69.52 feet) from station in azimuth 68°11′. Azimuth mark (reference mark No. 3) a standard bronze disk, note 11a, is on the east side of the main road and 200 yards from station in azimuth 338°30′23″.

Plane coordinates: (C) x=540,384.47 feet; y=232,074.50 feet; the grid azimuth to the azimuth mark=338°26′18″.*

Sasabe (Pima County, E. B. Latham, 1935).—About 2.5 miles north of Sasabe, about 12 paces west of road, on the highest summit along the Sasabe-Robles road for some miles. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 22.883 meters (75.08 feet) from station in azimuth 4°36′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 19.680 meters (64.57 feet) from station in azimuth 96°44′. Azimuth mark (reference mark No. 3), is a standard bronze disk, note 11a, about 12 paces east of the road and about 5 paces north of the fence line, and 0.6 mile from station in azimuth 2°13′00″.

Plane coordinates: (C) x=617,050.32 feet; y=192,280.02 feet; the grid azimuth to the azimuth mark=2°01′13″.*

Arivaca (Pima County, E. B. Latham, 1935).—Along the Arivaca-Kinsley road, on the first rise after leaving Arivaca. To reach from the post office in Arivaca, take the Kinsley-Tucson road for 0.8 mile, turn left on the main traveled road and go 0.2 mile to top of rise and station. Station is about 10 feet off the east side of road. Marked by a standard bronze disk as described in

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

note 1a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 19.303 meters (63.33 feet) from station in azimuth 188°37′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 21.185 meters (69.50 feet) from station in azimuth 101°02′. Azimuth mark, a standard bronze disk, note 11a, is about 15 feet off of the west side of road and one-fourth mile from station in azimuth 168°59′19″.

Plane coordinates: (C), x=686,826.30 feet; y=211,435.71 feet; the grid azimuth to the azimuth mark=168°40′28″.*

Boundary monument No. 134, eccentric (Pima County, E. B. Latham, 1935).—About 11 miles, air line, south-southeast of Arivaca; 1½ miles, air line, southeast of the Tres Bellotas ranch; on the top of a rolling ridge and 62.54 meters north of boundary monument No. 134 (I. B. C.). The ridge is the fourth one southeast of the ranch. Pack horses and information as to monument No. 134 can be secured at the ranch. (About a 50-minute pack with pack horses.) Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 20.798 meters (68.23 feet) from station in azimuth 327°15′. Reference mark No 2, a standard bronze reference disk, note 12c, is 15.602 meters (51.19 feet) from station in azimuth 34°05′. *Boundary monument No. 136 (I. B. C.)* may be used as an azimuth mark.

Plane coordinates: (C), x=682,019.87 feet; y=151,811.02 feet; the grid azimuth to *boundary monument No. 136 (I. B. C.)*=109°48′37″.7.

Boundary monument No. 136 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, E. B. Latham, 1935).—Plane coordinates: (C), x=655,258.92 feet; y=161,451.11 feet.

Nogales No. 7 (I. B. C.) (Santa Cruz County, International Boundary Commission, United States and Mexico, 1893; 1910; 1935).—About 8 miles west by north of Nogales, about 2 miles north-northwest of the angle in the international boundary that is marked by *boundary monument No. 127 (I. B. C.)*, and on the more northern one of two prominent round-topped hills. Original marks were destroyed and new marks were set in 1935. Station is marked by a standard bronze disk set in a buried boulder. Reference mark No. 1, a standard bronze reference disk set in a buried boulder, is 6.470 meters (21.23 feet) from station in azimuth 219°03′. Reference mark No. 2, a standard bronze reference disk set in a buried boulder, is 9.188 meters (30.14 feet) from station in azimuth 305°51′.

Plane coordinates: (C), x=759,241.79 feet; y=132,045.13 feet.

Boundary monument No. 129 (I. B. C.) (Santa Cruz County, Ariz., Sonora, Mexico, E. B. Latham, 1935).—Plane coordinates: (C), x=744,428.79 feet; y=128,684.74 feet.

Boundary monument No. 130, eccentric (Santa Cruz County, E. B. Latham, 1935).—About 13 miles west and 2 miles north of Nogales. To reach from Nogales, take U. S. Highway No. 89 north to its junction with the Ruby Road, and then follow the Ruby Road for 14.0 miles to a summit and a sign reading "Summit Motorway"; follow the Summit Motorway for 3.4 miles to its end and 0.2 mile beyond to the end of truck travel. The monument is about 1.0 mile beyond in southwest direction and reached by following the drift fence to the summit of ridge in that direction, from where the monument can be seen on the spur of a ridge which leads south from the main ridge. About a 35-minute pack with load. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 9.557 meters (31.35 feet) from station in azimuth 219°03′. Reference mark No. 2, a standard bronze reference disk, note 12a is 6.667 meters (21.87 feet) from station in azimuth 113°52′. *Boundary monument No. 130 (I. B. C.)* is 4,495 meters (14.75 feet) from station in azimuth 192°37′. *Boundary monument No. 129 (I. B. C.)* may be used as an azimuth mark.

Plane coordinates: (C), x=733,150.54 feet; y=132,813.82 feet; the grid azimuth to *boundary monument No. 129 (I. B. C.)*=290°06′29″.3**

Cori (Pima County, E. B. Latham, 1935).—About 20 miles north of Nogales at town of Tubac, about 30 yards north of a sign reading "TU BAC Unincorporated" and two paces from fence. Marked by a standard bronze disk as described in note 1a. Reference mark No. 1, a standard bronze reference disk,

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

**This azimuth has been computed by the first formula (p. 67), using both terms.

For notes in regard to marking of stations, see page 63.

note 11a, is 14.378 meters (47.17 feet) from station in azimuth 167°47'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 16.750 meters (54.95 feet) from station in azimuth 355°54'. Azimuth mark (reference mark No. 3) is in the head of a concrete culvert; the mark is State highway department bench mark stamped "No. 50, Elevation 3223, 1047 plus 50, 1931" and is one-half mile from station in azimuth 349°32'24".

Plane coordinates: (C), x=769,207.36 feet; y=223,872.22 feet; the grid azimuth to the azimuth mark=349°05'12".*

Kinsley (Santa Cruz County, E. B. Latham, 1935).—About 28 miles north of Nogales on the Tucson Road, in sec. 30, T. 19 S., R. 13 E., on a hill just above the Kinsley Bros. store and about 35 feet west of the center line of the highway. Marked by a standard bronze disk as described in note 1a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 14.735 meters (48.34 feet) from station in azimuth 214°25'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 28.767 meters (94.38 feet) from station in azimuth 300°20'. Azimuth mark, a standard bronze disk, note 11a, is on the west end of a concrete bridgehead about 0.05 mile south of the store and in azimuth 23°43'27" from the station.

Plane coordinates: (C), x=766,828.29 feet; y=266,965.44 feet; the grid azimuth to the azimuth mark=23°16'22".*

Cut (Santa Cruz County, E. B. Latham, 1935).—About 2.5 miles south of Amado Road junction, 3.75 miles north of sign "Continental 11, Tucson 37," 25.2 miles from Nogales and in southwest corner of sec. 19, T. 20 S., R. 13 E. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 13.672 meters (44.86 feet) from station in azimuth 169°05'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 22.762 meters (74.68 feet) from station in azimuth 352°11'.

Plane coordinates: (C), x=765,746.58 feet; y=244,768.81 feet.

Baboquivari Peak, lookout house, center (Pima County, E. B. Latham, 1935).—Plane coordinates: (C), x=599,884.11 feet; y=280,581.26 feet.

Boundary monument No. 142A (I. B. C.) (Pima County, Ariz., Sonora, Mexico, E. B. Latham, 1935).—From station *San Miguel* (see description), go south 2.2 miles to forks of roads (a number of roads fork at this point), take the right fork that passes west of the schoolhouse, go 0.3 mile and take left fork around tank (east of large dirt tank), go 0.5 mile, take right fork, go 0.6 mile to fence corner and road forks, take left fork and follow the main traveled road 1.4 miles to forks, keep straight ahead and go 1.0 mile to gate in the boundary fence, turn left or east along the north side of fence and follow dim road 3.3 miles to boundary monument and gate in fence. The monument is about 60 feet south of the fence.

Plane coordinates: (C), x=562,904.06 feet; y=195,390.96 feet.

Boundary monument No. 139 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, E. B. Latham, 1935).—Plane coordinates:[1] (C), x=617,099 feet; y=175,476 feet.

Arivaca, water tank, apex (Pima County, E. B. Latham, 1935).—Plane coordinates:[1] (C), x=685,386 feet; y=209,570 feet.

Boundary monument No. 127 (I. B. C.) (Santa Cruz County, Ariz., Sonora, Mexico, E. B. Latham, 1935).—Plane coordinates:[1] (C), x=762,995 feet; y=121,843 feet.

Boundary monument No. 126 (I. B. C.) (Santa Cruz County, Ariz., Sonora, Mexico, E. B. Latham, 1935).—Plane coordinates (C), x=763,747.26 feet; y=121,849.92 feet.

Nogales, courthouse, dome (Santa Cruz County, E. B. Latham, 1935).—Plane coordinates: (C), x=805,797.98 feet; y=123,675.05 feet.

Tumacacori National Monument (Santa Cruz County, E. B. Latham, 1935).—Plane coordinates:[1] (C), x=769,831 feet; y=207,879 feet.

Boundary monument No. 128 (I. B. C.) (Santa Cruz County, Ariz., Sonora, Mexico, J. S. Hill, 1910; 1935).—About 8 miles west of Nogales, on the north slope of a ridge, the highest point of the boundary line in this vicinity and 394 meters west of the angle in the line which is marked by *boundary monument No. 127 (I. B. C.)*.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

Plane coordinates: (C), x=761,780.36 feet; y=122,290.79 feet.

Boundary monument No. 150 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, G. D. Cowie, 1920; 1935).—See description of station *boundary monument No. 150 eccentric.*

Plane coordinates: (C), x=450,651.18 feet; y=236,705.96 feet.

Boundary monument No. 130 (I. B. C.) (Santa Cruz County, Ariz., Sonora, Mexico, E. B. Latham, 1935).—See description of station *boundary monument No. 130 eccentric.*

Plane coordinates: (C), x=733,153.65 feet; y=132,828.20 feet.

U. S. Army mark (Santa Cruz County, E. B. Latham, 1935).—See description of station *Atacosa.*

Plane coordinates: (C), x=740,337.48 feet; y=154,088.11 feet.

Baldy lookout house, center (Santa Cruz County, E. B. Latham, 1935).—See description of station *Baldy 2.*

Plane coordinates: (C), x=832,549.22 feet; y=254,792.43 feet.

Continental (Pima County, E. B. Latham, 1935).—About 25 miles south of Tucson. To reach from Continental, continue west for 0.8 mile on U. S. Highway No. 89, past a concrete bridge across the Santa Cruz River and thence to a curve in the highway; the station lies in the center of the old roadbed in line with the projected center line of the pavement, and on the west side of highway. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 30.413 meters (99.78 feet) from station in azimuth 304°13′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 26.892 meters (88.23 feet) from station in azimuth 35°29′. Azimuth mark, a standard bronze disk, is in the southwest corner of a concrete bridge on Highway No. 89, and one-half mile from station in azimuth 258°30′54″.

Plane coordinates: (C), x=787,125.48 feet; y=310,782.81 feet; the grid azimuth to the azimuth mark=258°01′38″.*

K-49 (U. S. G. S.) (Pima County, E. B. Latham, 1935).—About 4 miles, air line, west of Continental, about 3 miles, air line, west of U. S. Highway No. 89, and about 18 feet southwest of road. To reach from Continental, go south on U. S. Highway No. 89 for 1.7 miles to the Twin Buttes Road, then right and go 3.6 miles to station site. Station mark is standard U. S. Geological Survey disk set in concrete post.

Plane coordinates:[1] (C), x=769,052 feet; y=313,761 feet.

Snyder's Hill (Pima County, G. D. Cowie, 1920; 1934; 1935).—About 10 miles southwest of Tuscon on Snyder's Hill, a small, lone, low, volcanic hill, on border of secs. 3 and 4, T. 15 S., R. 12 E. Marked by a standard U. S. Coast and Geodetic Survey and State Survey disk. Reference mark No. 1, a standard bronze reference disk, note 12a, is 17.552 meters (57.59 feet) from station in azimuth 165°35′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 10.095 meters (33.12 feet) from station in azimuth 264°34′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 12a, is on the high point of the south end of the ridge, 250 yards from station in azimuth 358°06′43″.

Plane coordinates: (C), x=748,566.59 feet; y=422,139.91 feet; the grid azimuth to the azimuth mark=357°41′04″.*

K-23 (U. S. G. S.) (Pima County, E. B. Latham, 1935).—About 19 miles southwest of Tucson, and about 0.2 mile north of the Tucson-Ajo road, on the only noticeable rise between Snyder's Hill and the hills to the west, and about 8½ miles beyond Snyder's Hill, near line between secs. 29 and 32, T. 15 S., R. 11 E. Marked by a standard U. S. Geological Survey disk set in an 8-inch cylindrical concrete post. Reference mark No. 1 is 16.729 meters (54.89 feet) from station in azimuth 321°28′. Reference mark No. 2 is 12.475 meters (40.93 feet) from station in azimuth 73°03′. *G. L. O. section corner* is 8.11 meters (26.6 feet) from station in azimuth 274°08′. Azimuth mark (reference mark No. 3), a standard bronze disk set in a concrete dip in the highway, is 0.3 mile from station in azimuth 21°07′09″.

Plane coordinates: (C), x=706,156.84 feet; y=401,954.42 feet; the grid azimuth to the azimuth mark=20°45′55″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

Sahuarita (Pima County, E. B. Latham, 1935).—About 16 miles south of Tucson on U. S. Highway No. 89 at the Sahuarita Railroad Station, 86.48 feet west of the large black water tank and on the west side of the highway. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk set in drill hole in the northwestern leg of the water tank, is 25.280 meters (82.94 feet) from station in azimuth 269°51′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 17.810 meters (58.43 feet) from station in azimuth 4°39′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is on west side of highway and 0.15 mile from station in azimuth 184°37′00″.

Plane coordinates: (C), x=798,287.39 feet; y=352,356.36 feet; the grid azimuth to the azimuth mark=184°06′26″.*

Xavier (Pima County, E. B. Latham, 1935).—About 8 miles south of the center of Tucson, on U. S. Highway No. 89, in sec. 31, T. 15 S., R. 14 E., near an adobe and stuccoed building with an enclosed yard. The station is 5 paces north of the northeast corner of the yard. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 17.782 meters (58.34 feet) from station in azimuth 149°01′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 17.808 meters (58.43 feet) from station in azimuth 86°56′. The apex of the conical-shaped top of a white water tank, which is on the side of a hill above a large group of buildings about 2 miles from the station, is in azimuth 122°41′31″.

Plane coordinates: (C), x=796,564.98 feet; y=399,219.66 feet; the grid azimuth to white water tank, apex=122°10′59″.*

Wilmot (Pima County, E. B. Latham, 1935).—About 10 miles southeast from the center of Tucson at the intersection of U. S. Highway No. 80 and Wilmot Road in the northwest corner of the intersection. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 15.166 meters (49.76 feet) from station in azimuth 192°52′ Reference mark No. 2, a standard bronze reference disk, note 11a, is 17.185 meters (56.38 feet) from station in azimuth,116°45′. Azimuth mark, a State highway bench mark, is 600 feet from station in azimuth 311°01′29″.

Plane coordinates: (C), x=827,945.34 feet; y=407,119.72 feet; the grid azimuth to the azimuth mark=310°27′42″.*

Magnetic (Pima County, E. B. Latham, 1935).—About 7 miles east of Tucson on the property of the magnetic observatory station of the U. S. Coast and Geodetic Survey, west of the buildings, along the north and south fence on the west side of the observatory grounds. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 23.415 meters (76.82 feet) from station in azimuth 179°36′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 26.470 meters (86.84 feet) from station in azimuth 268°41′. Azimuth mark, a standard bronze disk, note 11a, is 300 yards from station in azimuth 268°40′49″. Station mark, reference mark No. 2, and the azimuth mark were placed in line for the convenience of the magnetic observatory.

Plane coordinates: (C), x=833,766.69 feet; y=454,925.95 feet; the grid azimuth to the azimuth mark=268°11′16″.*

Jaynes (Pima County, E. B. Latham, 1935).—About 9 miles northwest of Tucson, 2.1 miles northwest of Jaynes Railroad Station, and 0.7 mile from Rillito Creek bridge, on State Highway No. 84. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 27.243 meters (89.38 feet) from station in azimuth 224°52′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 21.131 meters (69.33 feet) from station in azimuth 137°49′. Azimuth mark (reference mark No. 3), a standard bronze disk, is on right side of road in concrete culvert, 0.1 mile from station in azimuth 315°11′00″.

Plane coordinates: (C), x=767,592.36 feet; y=482,509.37 feet; the grid azimuth to the azimuth mark=314°43′12″.*

University (Pima County, E. B. Latham, 1935).—On the grounds of the University of Arizona in Tucson, in T. 14 S., R. 14 E., near line between secs. 6 and 7, in the southeast corner of parking space west of the gymnasium. Marked by standard bronze disks as described in notes 1a and 7a. Reference

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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mark No. 1, a standard bronze reference disk, note 11a, is 18.200 meters (59.71 feet) from station in azimuth 89°37′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 18.380 meters (60.30 feet) from station in azimuth 181°32′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 13b, is approximately 75 meters from station in azimuth 182°34′08″.

Plane coordinates: (C), x=798,955.94 feet; y=449,315.88 feet; the grid azimuth to the azimuth mark=182°03′12″.*

Station "A" (University of Arizona) (Pima County, E. B. Latham, 1935).—Plane coordinates: (C), x=798,970.45 feet; y=449,756.23 feet.

Tucson, University of Arizona, western radio mast (Pima County, E. B. Latham, 1935).—Plane coordinates[1]: (C), x=798,011 feet; y=449,719 feet.

Tucson, University of Arizona, observatory dome (Pima County, E. B. Latham, 1935).—Plane coordinates[1]: (C), x=799,416 feet; y=449,869 feet.

Golden Gate Mountain (Pima County, E. B. Latham, 1935).—Plane coordinates: (C), x=750,914.56 feet; y=440,700.00 feet.

Cat Mountain (U. S. G. S.), (Pima County, E. B. Latham, 1935).—Plane coordinates: (C), x=765,002.00 feet; y=431,728.95 feet.

E 4 (Ariz. Geod. S.) (Pima County, E. B. Latham, 1935).—On the south-southeast outskirts of Tucson, about one-half mile northeast of U. S. Highway No. 80. Reached from Tucson as follows: Go south on U. S. Highway No. 80 to the Casa Grande Tourist Camp and Joy's Cafe, turn left (east) and go 1.6 miles. Turn due south and go 0.7 mile, turn left, approximately 100 feet past concrete posted gate, and go 0.2 mile to station, which is about 12 paces north of road. The station mark is a State Survey and Coast and Geodetic Survey standard disk set in a 6- by 6-inch concrete post. Reference mark No. 1 (1935), a standard bronze reference disk, note 11a, is 19.802 meters (64.97 feet) from station in azimuth 27°45′. Reference mark No. 2 (1935), a standard bronze reference disk, note 11a, is 14.290 meters (46.88 feet) from station in azimuth 117°36′. A large black water tank is in azimuth 200°00′22″ from the station.

Plane coordinates: (C), x=802,840.87 feet; y=430,749.55 feet; the grid azimuth to large black water tank=199°29′06″.*

Tucson, Consolidated National Bank Building, north radio mast (Pima County, E. B. Latham, 1935).—Plane coordinates: (C), x=792,616.87 feet; y=445,648.45 feet.

Tucson, Consolidated National Bank Building, south radio mast (Pima County, E. B. Latham, 1935).—Plane coordinates: (C), x=792,658.57 feet; y=445,545.84 feet.

Santa Cruz, Catholic Church, north spire (Pima County, E. B. Latham, 1935).—Plane coordinates: (C), x=792,610.99 feet; y=444,830.42 feet.

Santa Cruz, Catholic Church, south spire (Pima County, E. B. Latham, 1935).—Plane coordinates:[1] (C), x=792,618 feet; y=444,775 feet.

San Xavier Mission (Pima County, G. D. Cowle, 1920; 1935).—Plane coordinates: (C), x=781,550.77 feet; y=403,816.32 feet.

C. W. A. (Ariz. Geod. S.) (Pima County, E. B. Latham, 1935).—About 10 miles southeast from the center of Tucson. To reach from intersection of U. S. Highway No. 80 and Wilmot Road, turn left from the highway and go 1.0 mile; cross railroad tracks and continue 0.3 mile to station which is 40 feet west of center of road. Marked by a standard bronze disk as described in note 1a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.420 meters (60.43 feet) from station in azimuth 347°10′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 17.295 meters (56.74 feet) from station in azimuth 84°27′. Azimuth mark, a standard bronze disk, note 11a, is on east side of road 200 yards from station, in azimuth 354°47′20″.

Plane coordinates: (C), x=827,856.09 feet; y=414,010.25 feet; the grid azimuth to the azimuth mark=354°13′31″.*

C. W. A. No. 2 (Ariz. Geod. S.) (Pima County, E. B. Latham, 1935).—About 2½ miles, air line, south of Tucson, and about one-half mile, air line, east of U. S. Highway No. 89. To reach from the junction of Highway No. 89 and Drexel Road, go east for 0.5 mile, turn right (south) and go 0.2 mile and turn left (east) and go 0.1 mile to station on south side of road. Station mark is standard disk of the Coast and Geodetic Survey and State survey stamped "#2", set in con-

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

crete post. Reference mark No. 1 (1935), a standard bronze reference disk, note 11a, is 15.168 meters (49.76 feet) from station in azimuth 14°32′. Reference mark No. 2 (1935), a standard bronze reference disk, note 11a, is 29.335 meters (96.24 feet) from station in azimuth 99°05′. Azimuth mark (1935) (reference mark No. 3), a standard bronze disk, note 11a, is on the north side of road 0.4 mile from station in azimuth 260°42′53″.

Plane coordinates: (C), x=798,578.23 feet; y=417,692.85 feet; the grid azimuth to the azimuth mark=260°12′05″.*

Tucson, Veterans Hospital No. 51, water tank (Pima County, E. B. Latham, 1935).—Plane coordinates: (C), x=795,482.87 feet; y=432,105.52 feet.

Marana (Pima County, E. B. Latham, 1935).—About 13 miles from Tucson and about 3 miles southeast of the town of Marana, on the west side of State Highway No. 84, about one-fourth mile west of railroad block signal No. 9650, and 25 yards southeast of a telephone pole near a bridge. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 19.390 meters (63.62 feet) from station in azimuth 313° 51′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 20.700 meters (67.91 feet) from station in azimuth 43°51′. Azimuth mark, a standard bronze disk set in south end of concrete bridge, is in azimuth 304°25′23″ from station.

Plane coordinates: (C), x=729,516.28 feet; y=521,496.84 feet; the grid azimuth to the azimuth mark=304°01′27″.*

Naviska (Pinal County, E. B. Latham, 1935).—About 6 miles southeast of the town of Red Rock, on the west side of State Highway No. 84, and one-fourth mile north of the Pinal-Pima county line. Marked by a standard bronze disk as described in note 1a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 15.661 meters (51.38 feet) from station in azimuth 325°29′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 15.235 meters (49.98 feet) from station in azimuth 55°21′.

Plane coordinates: (C), x=701,570.92 feet; y=547,199.25 feet.

Airway beacon on Picacho Peak (Pinal County, E. B. Latham, 1935).—Plane coordinates: (C), x=659,086.16 feet; y=595,133.53 feet.

Airport No. 38 (Pinal County, E. B. Latham, 1935).—On airport No. 38, about 2.1 miles northwest of the town of Red Rock. Station mark is standard bronze disk set in a concrete arrow. *Airport beacon, center of tower* is 5.824 meters (19.11 feet) from station in azimuth 136°08′. Reference mark No. 1, a standard bronze reference disk, note 11a, is 21.783 meters (71.47 feet) from station in azimuth 172°43′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 27.235 meters (89.35 feet) from station in azimuth 99°12′. A railroad water tank 2 miles south of the station is in azimuth 320°51′10″.

Plane coordinates: (C), x=675,089.38 feet y=583,183.48 feet; the grid azimuth to railroad water tank=320°32′47″.*

Airway beacon west of Airport No. 38 (Pinal County, E. B. Latham, 1935).—Plane coordinates: (C), x=660,942.59 feet; y=570,255.74 feet.

Over (Pinal County, E. B. Latham, 1935).—About 14 miles south of Coolidge, on the west side of State Highway No. 87, and about 2½ miles north of the overpass across the Southern Pacific Railroad. Station is about 50 feet from the road and is marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 15.450 meters (50.69 feet) from station in azimuth 4°10′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 17.840 meters (58.53 feet) from station in azimuth 91°39′.

Plane coordinates: (C), x=623,443.44 feet; y=644,836.65 feet.

Dip (Pinal County, E. B. Latham, 1935).—On the west side of State Highway No. 87, 5½ miles south of Randolph, and 9½ miles south of Coolidge. Station is 50 feet from road and 30 feet south of a small levee. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 15.401 meters (50.53 feet) from station in azimuth 14°30′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 20.893 meters (68.55 feet) from station in azimuth 97°01′. Azimuth mark (reference mark No. 3, a standard bronze disk, note 12c, is one-fourth mile from station in azimuth 183°59′24″.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Plane coordinates: (C), x=623,406.80 feet; y=667,964.34 feet; the grid azimuth to the azimuth mark=183°46'19".*

Junction (Pinal County, E. B. Latham, 1935).—About 8 miles west of Florence at junction of State Highways 87 and 287, 85 feet south of the east-west road of the triangle and 200 feet west of the east angle of the triangle. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 14.628 meters (47.99 feet) from station in azimuth 268°56'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 15.767 meters (51.73 feet) from station in azimuth 30°50'. The azimuth mark is an Arizona Highway Department bench mark stamped "1931, Elev. 1420.3, Station 418/02", and is in the first concrete culvert east of the railroad, 0.2 mile from station in azimuth 267°24'13".

Plane coordinates: (C), x=621,034.71 feet; y=728,595.43 feet; the grid azimuth to the azimuth mark=267°11'18".*

Airways (Pinal County, E. B. Latham, 1935).—At the southwest corner of the field house just outside of the fence at the U. S. Department of Commerce Day Landing Field at Sacaton. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, is in the paved walk just under the beacon tower and 12.092 meters (39.67 feet) from station in azimuth 268°56'. Reference mark No. 2, a standard bronze reference disk, note 11a, is in the square concrete post at the southwest corner of the fence and 12.885 meters (42.27 feet) from station in azimuth 21°01'. The azimuth mark, a standard bronze disk, is in the concrete floodgate just north of the canal bridge that can be seen south of the station, on the east side of the road, and about 0.6 mile distant in azimuth 2°58'28".

Plane coordinates: (C), x=555,204.27 feet; y=750,461.14 feet; the grid azimuth to the azimuth mark=2°52'34".*

Airway beacon at Airport No. 34a (Pinal County, E. B. Latham, 1935).—Plane coordinates:[1] (C), x=557,824 feet; y=752,966 feet.

Sacaton, water tank (Pinal County, E. B. Latham, 1935).—Plane coordinates: (C), x=554,202.58 feet; y=756,902.24 feet.

Boswell (Maricopa County, E. B. Latham, 1935).—Six and one-tenth miles south of Chandler, on the west side of State Highway No. 87 near pump house No. 15, 1.9 meters south of the southwest corner of the pumphouse, 1.2 meters north of the north side of the main ditch, and 1.0 meter east of the east side of the spur ditch. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk set in west side of culvert on Highway No. 87, is 22.204 meters (72.85 feet) from station in azimuth 242°45'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 9.336 meters (30.63 feet) from station in azimuth 133°34'. The azimuth mark (reference mark No. 3), a disk set in drill hole in the gate of main ditch at the first spur west of station, is about 500 feet from station in azimuth 88°13'36".

Plane coordinates: (C), x=523,225.40 feet; y=805,664.39 feet; the grid azimuth to the azimuth mark = 88°11'06".*

Chandler, water tank (Pinal County, E. B. Latham, 1935).—Plane coordinates: (C), x=524,272.34 feet; y=836,784.60 feet.

Goodyear, water tank (Pinal County, E. B. Latham, 1935).—Plane coordinates:[1] (C), x=516,560 feet; y=815,392 feet.

Ray (Maricopa County, E. B. Latham, 1935).—About 5.5 miles due west of the town of Chandler, about 8.0 miles due south of the town of Tempe, and 1.5 miles west of the Ray Estrella store, just south of the south ditch south of the road. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, set in concrete culvert under road northeast of station, is 22.333 meters (73.27 feet) from station in azimuth 221°27'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 18.437 meters (60.49 feet) from station in azimuth 292°47'. Azimuth mark (reference mark No. 3) set in concrete culvert northwest of pumphouse (22 E. 5½ S.), is one-half mile from station in azimuth 312°43'16".

Plane coordinates: (C), x=493,894.59 feet; y=838,531.03 feet; the grid azimuth to the azimuth mark = 312°43'56".*

Catherine (Maricopa County, E. B. Latham, 1935).—To reach from St. Johns Indian Mission, go east 1.2 miles to a school, turn left off graded road and

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

go north, passing a small sun dial, 0.1 mile to a six-point fork; take the road leading east and go 0.35 mile to another cross road; continue straight ahead for 0.3 mile (east); take right fork east for 0.1 mile; go straight ahead east for 0.3 mile to a log corral; at the northeast corner of corral, take the left fork, go 0.1 mile to a cross road; from this cross road, go straight ahead for 0.1 mile to the station on the left side of the road. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 8.728 meters (28.64 feet) from station in azimuth 48°56′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 10.442 meters (34.26 feet) from station in azimuth 138°59′.

Plane coordinates: (C), x=430,025.91 feet; y=824,872.80 feet.

Mission (Maricopa County, E. B. Latham, 1935).—About 3.5 miles northwest of St. Johns Indian Mission, on a graded dirt road, 100 feet west of the road, and 100 feet south of where the road turns west. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 16.803 meters (55.13 feet) from station in azimuth 295°48′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 10.880 meters (35.70 feet) from station in azimuth 171°16′. The azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is on the north side of the road about 30 feet from the center and 0.3 mile from station in azimuth 265°43′06″.

Plane coordinates: (C), x=412,900.01 feet; y=849,008.10 feet; the grid azimuth to the azimuth mark=265°52′30″.*

Dadams (Pinal County, E. B. Latham, 1935).—About 1 mile, air line, southwest of Florence and about 100 feet north of State Highway No. 287. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 17.618 meters (57.80 feet) from station in azimuth 167°55′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 18.148 meters (59.54 feet) from station in azimuth 71°59′. Azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is 50 feet south of Highway No. 287 and 0.4 mile from station in azimuth 254°14′14″.

Plane coordinates: (C), x=659,512.29 feet; y=734,174.53 feet; the grid azimuth to the azimuth mark=253°57′13″.*

Florence (Pinal County, E. B. Latham, 1935).—About 2½ miles east of Florence, on the north side of the Florence-Kelvin Road, 0.6 mile east of the Florence Canal, on top of a small rise, and about 10 feet from road. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 16.662 meters (54.67 feet) from station in azimuth 220°12′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 16.124 meters (52.90 feet) from station in azimuth 289°47′. The azimuth mark (reference mark No. 3), a standard bronze disk, note 11a, is on south side of road, 0.2 mile from station in azimuth 302°52′16″.

Plane coordinates: (C), x=675,705.99 feet; y=738,852.12 feet; the grid azimuth to the azimuth mark=302°33′32″.*

Florence, State Prison, aluminum water tank (Pinal County, E. B. Latham, 1935).—Plane coordinates: (C), x=667,051.89 feet; y=737,254.14 feet.

Florence, black water tank (Pinal County, E. B. Latham, 1935).—Plane coordinates: (C), x=662,113.44 feet; y=737,620.23 feet.

South Butte (U. S. G. S.) (Pinal County, E. B. Latham, 1935).—Plane coordinates:[1] (C), x=721,360 feet; y=758,193 feet.

Wolley (Pinal County, E. B. Latham, 1935).—About 6 miles, air line, southwest of Kelvin, on the east side of the Florence-Kelvin Road, at a point about one-half mile south of where the road starts down into Ripsey wash, and 70 feet north of a side road leading to Wooley, on a knoll covered with small rock. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.715 meters (61.40 feet) from station in azimuth 282°00′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 16.328 meters (53.57 feet) from station in azimuth 331°01′. Azimuth mark, a standard bronze disk, note 11a, is on east side of road one-fourth mile from station in azimuth 348°41′40″.

Plane coordinates: (C), x=769,337.44 feet; y=743,755.03 feet; the grid azimuth to the azimuth mark=348°12′55″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

Kelvin (Pinal County, E. B. Latham, 1935; 1936).—On a ridge south of the Kelvin-Winkelman Road, 4.3 miles east by road from Kelvin. To reach, follow the Kelvin-Winkelman Road east for 3.5 miles, cross three wooden bridges close together, and continue for 0.7 mile to a sharp left turn. Station is on the ridge running south, slightly lower than the road, and about 50 feet south of the road center on the turn. Marked by a standard bronze disk as described in note 4a. Reference mark No. 1, a standard bronze reference disk, note 12c, is 7.314 meters (24.00 feet) from station in azimuth 263°23′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 10.255 meters (33.64 feet) from station in azimuth 358°45′. The azimuth mark, a standard bronze disk, note 12c, is reference mark No. 3, and is about 300 yards from station in azimuth 281°17′13″.

Plane coordinates: (C), x=805,536.29 feet; y=763,450.97 feet; the grid azimuth to the azimuth mark=280°44′32″.*

Beacon tower, center (Pinal County, E. B. Latham, 1935).—See description of station *Neuman*.

Plane coordinates:[1] (C), x=658,950.14 feet; y=625,519.96 feet:

Airport beacon, center of tower (Pinal County, E. B. Latham, 1935).—See description of station *Airport No. 38*.

Plane coordinates:[1] (C), x=675,076.05 feet; y=583,197.15 feet.

G. L. O. section corner (Pima County, E. B. Latham, 1935).—See description of station *K–23 (U. S. G. S.)*.

Plane coordinates:[1] (C), x=706,183.43 feet; y=401,952.67 feet.

Helmet Peak (U. S. G. S.) (Pima County, E. B. Latham, 1935).—See description of station *Helmet Peak 2*.

Plane coordinates:[1] (C), x=759,319.81 feet; y=352,632.87 feet.

Santan Peak (U. S. G. S.) (Pinal County, E. B. Latham, 1935; 1938).—This U.S. Geological Survey mark was destroyed to make room for the new station, which is stamped "Santan" (see description thereof). The U. S. Geological Survey mark was not suitable for the new station as it was in a small and loose rock.

Plane coordinates:[1] (C), x=563,685.30 feet; y=790,716.21 feet.

U. S. G. S. cross in rock (Pinal Countty, E. B. Latham, 1935).—See description of station *Santan*.

Plane coordinates:[1] (C), x=563,690 feet; y=790,715 feet.

NOGALES AREA

Principal points

Boundary monument No. 121 (I. B. C.) (Santa Cruz County, Ariz., Sonora, Mexico, J. S. Hill, 1910).—On the north slope of a sharp ridge about 200 meters southeast of the principal street of Nogales. A standard iron monument of the United States-Mexico Boundary Commission. Reference mark (boundary monument No. 121 eccentric), is a standard disk station mark cemented in the top of a 1-inch pipe. It is 2.777 meters (9.11 feet) from station in azimuth 96°25′.

Plane coordinates: (C), x=805,460.14 feet; y=122,345.01 feet.

Nogales, Mexican Customhouse, flagstaff (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893).—Plane coordinates: (C), x=803,878.41 feet; y=121,771.30 feet.

Boundary monument No. 120 (I. B. C.) (Santa Cruz County, Ariz., Sonora, Mexico, J. S. Hill, 1910).—On the north slope of the sharp bald ridge three-fourths mile east of Nogales. On the highest point in the vicinity, and overlooks a wide extent of the country. A standard iron monument of the United States-Mexico Boundary Commission. Reference mark (boundary monument No. 120 eccentric), a standard disk station mark cemented in the top of a 1-inch pipe, is 1.250 meters (4.10 feet) from station in azimuth 89°46′.

Plane coordinates: (C), x=808,981.98 feet; y=122,419.41 feet.

Nogales No. 5 (I. B. C.) (Santa Cruz County, International Boundary Commission, United States and Mexico, 1893).—On the ridge between Ephraims Canyon and Mariposa Canyon and 300 meters north of the international boundary line. Station is marked by a ¼-inch drill hole in the center of a 4- by 4-inch pine stake. Four reference marks, each consisting of a nail in the center of a 2- by

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

2-inch pine stub, are at the following distances from the station: Reference mark No. 1, 1.008 meters (3.31 feet) north; reference mark No. 2, 1.171 meters (3.84 feet) east; reference mark No. 3, 1.102 meters (3.62 feet) south, and reference mark No. 4, 1.041 meters (3.42 feet) west.

Plane coordinates: (C), x=790,312 feet; y=123,297 feet.

Nogales No. 8 (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893).—On the highest peak south of an angle in the international boundary line, marked by boundary monument No. 127. The station is marked by a ⅝-inch iron rod driven in the ground. Reference mark No. 1, a nail driven in a tree, is 3.757 meters (12.33 feet) southeast and reference mark No. 2, a nail driven in a tree, is 6.570 meters (21.56 feet) southwest. Witness mark, a nail in a stump, is 1.254 meters (4.11 feet) northwest.

Plane coordinates: (C), x=762,944 feet; y=119,756 feet.

Nogales No. 6 (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893).—On the northwest end of a high ridge southwest of Nogales, and near the head of canyon leading southwest from the Mexican cemetery. (This Mexican cemetery is in the canyon running west from the Mexican custom house in Nogales.) The station is marked by a ⅝-inch iron rod driven in the ground. Four reference marks, similar to the station mark, are as follows: Reference mark No. 1, 1.140 meters (3.74 feet) north; reference mark No. 2, 1.113 meters (3.65 feet) east; reference mark No. 3, 1.128 meters (3.70 feet) south; and reference mark No. 4, 1.225 meters (4.02 feet) west.

Plane coordinates: (C), x=789,731 feet; y=113,540 feet.

Nogales No. 4 (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893).—On one of the highest peaks of a group of hills southwest of Nogales. Station is marked by a ⅝-inch iron rod driven in the ground. Four reference marks, similar to the station mark, are as follows: Reference mark No. 1, 0.972 meter (3.19 feet) north; reference mark No. 2, 0.976 meter (3.20 feet) east; reference mark No. 3, 1.017 meters (3.34 feet) south, and reference mark No. 4, 1,070 meters (3.51 feet) west.

Plane coordinates: (C), x=809,920 feet; y=116,224 feet.

Nogales No. 3 (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893).—On the round-topped reddish hill, 1 mile east of Nogales. (The international boundary line crosses this hill on the north slope.) Station is marked by a ⅝-inch iron rod driven in the ground. Four reference marks, similar to the station mark, are as follows Reference mark No. 1, 1.140 meters (3.74 feet) north; reference mark No. 2, 1.080 meters (3.54 feet) east; reference mark No. 3, 0.966 meter (3.17) feet south; and reference mark No. 4, 1.110 meters (3.64 feet) west.

Plane coordinates: (C), x=809,248 feet; y=121,894 feet.

Nogales No. 1 (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893).—On the first hill west of the Sonora Railroad south of Nogales. Station is marked by a 2- by 4-inch pine stake. Four reference marks, each consisting of a ⅝-inch iron rod driven in the ground, are as follows: Reference mark No. 1, 1.082 meters (3.55 feet) north; reference mark No. 2, 1.182 meters (3.88 feet east; reference mark No. 3, 1.182 meters (3.88 feet) south; and reference mark No. 4, 1.220 meters (4.00 feet) west.

Plane coordinates: (C), x=802,668 feet; y=121,404 feet.

Nogales azimuth station (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893).—On the top of the first ridge east of Nogales and almost in line with International Street produced. Station is marked by a ¼-inch drill hole in top of a 2- by 4-inch pine stake. Four reference marks, each consisting of a nail in the top of a 1- by 1-inch pine stub, are as follows: Reference mark No. 1, 0.831 meter (2.73 feet) north; reference mark No. 2, 0.989 meter (3.24 feet) east; reference mark No. 3, 1.025 meters (3.36 feet) south; and reference mark No. 4, 0.844 meter (2.77 feet) west.

Plane coordinates: (C), x=805,468 feet; y=122,298 feet.

Nogales astronomic station (I. B. C.) (Santa Cruz County, International Boundary Commission, United States and Mexico, 1893; 1923).—In the grounds at the rear of the Montezuma Hotel at Nogales. Station is marked by a nail in the top of a rectangular stake. An old brick latitude pier, 17 inches square and 3 feet high, is 2.22 meters (7.3 feet) north and 1.28 meters (4.2 feet) west of the station. An old brick longitude pier 17 by 25 inches in cross section is

For notes in regard to marking of stations, see page 63.

due north of the station. The longitude pier is 1.27 meters (4.2 feet) east of the latitude pier. Station reported lost in 1923.

Plane coordinates: (C), x=805,180 feet; y=122,737 feet.

Nogales No. 2 (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893).—On the first hill west of the Sonora Railroad south of Nogales, on a small peak a few feet lower and about 100 meters east of a more prominent peak. Station is marked by a ⅝-inch iron rod driven in the ground. Four reference marks, similar to the station mark, are as follows: Reference mark No. 1, 1.088 meters (3.57 feet) north; reference mark No. 2, 0.971 meter (3.19 feet) east; reference mark No. 3, 0.923 meter (3.03 feet) south, and reference mark No. 4, 0.926 meter (3.04) feet west.

Plane coordinates: (C), x=802,317 feet; y=118,856 feet.

Nogales north base (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893).—In the switchyard of the Sonora Railroad just south of the Mexican customhouse at Nogales, and on the prolongation of the last tangent of the main track before it enters the switchyard. Station is marked by a hole in the top of a 2- by 4-inch pine stub. Three reference marks, similar to the station mark, are as follows: Reference mark No. 1, 0.975 meter (3.20 feet) north; reference mark No. 2, 1.077 meters (3.53 feet) south, and reference mark No. 3, 0.899 meter (2.95 feet) west.

Plane coordinates: (C), x=803,760 feet; y=121.318 feet.

Nogales south base (I. B. C.) (Sonora, Mexico, International Boundary Commission, United States and Mexico, 1893). On the point of a small ridge, 9.58 meters east of the center of the track of the Sonora Railroad, about midway between two trestles. Station is marked by a hole in the top of a 2- by 4-inch pine stub. Three reference marks, similar to the station mark, are as follows: Reference mark No. 1, 0.765 meter (2.51 feet) north; reference mark No. 2, 0.845 meter (2.77 feet) east, and reference mark No. 3, 0.784 meter (2.57 feet) west.

Plane coordinates: (C), x=803,499 feet; y=118,953 feet.

Supplementary points

Montezuma Hotel, flagpole (I. B. C.) (Santa Cruz County, International Boundary Commission, United States and Mexico, 1893).—Plane coordinates: (C), x=805,024 feet; y=122,883 feet.

Levy's Store, flagpole (I. B. C.) (Santa Cruz County, International Boundary Commission, United States and Mexico, 1893).—Plane coordinates: (C), x=804,789 feet; y=122,481 feet.

Nogales, Catholic Church (I. B. C.) (Santa Cruz County, International Boundary Commission, United States and Mexico, 1893).—Plane coordinates:[1] (C), x=804,908 feet; y=124,098 feet.

Nogales, public school (I. B. C.) (Santa Cruz County, International Boundary Commission, United States and Mexico, 1893).—Plane coordinates:[1] (C), x=804,797 feet; y=123,918 feet.

PAPAGO INDIAN RESERVATION AREA

(Not divided into principal and supplementary points)

Black Mountain (Pinal County, G. D. Cowie, 1920; 1936).—Located on the southern edge of the highest peak, the most easterly of the two high peaks, of what is locally known as the Black Mountains. The station is about 25 miles, air line, almost due north of Tucson, and is best reached by taking the Florence Road from Tucson for 41 miles to a point 4 miles past a white schoolhouse, and then turning east up a dim ranch road which is 0.5 mile south of road sign "Florence 25 miles—Phoenix 93 miles". Several miles up this road there is a cross road; here take the right-hand road which leads to Plummer's ranch at the foot of the Black Mountains on the west side. From the ranch house a trail leads to a windmill and well at the foot of the peak. When this station was recovered in 1936 the station mark was found to be stamped "Mt. Catherin 1919" and the reference mark was not stamped, but "Black 1919" was etched in the concrete around the mark. Station is marked by a standard bronze disk set in concrete as described in

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

note 2. The reference mark, a standard bronze reference disk, note 12a, is 7.425 meters (24.36 feet) from station in azimuth 182°18′. *Black Mountain (U. S. G. S.)*, a large cairn 4 feet high and 6 feet in diameter, on the summit of the peak, is 5.5 meters (18 feet) from station in azimuth 169°20.

Plane coordinates: (C), x=793,199.26 feet; y=648,369.37 feet.

Rocky Butte (Pinal County, J. Bowie, Jr., 1936).—About 32 miles north of Tucson and about 2 miles southwest of U. S. Highway No. 80, on the summit of a small, rocky knob rising from the brushy flat south of the foothills of the Tortillita Mountains, about one-fourth mile north of the track road leading across the flat to Red Rock, at the east edge of a broad, dry wash, on the highest point of the rocky, semidetached fragment at the west edge of the summit. Marked by a standard bronze disk, set in top of a crumbling rock outcrop, as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is on the highest point of the main portion of the summit and 6.542 meters (21.46 feet) from station in azimuth 201°49′. Reference mark No. 2, a standard bronze reference disk, note 12a, is at the north end of the same portion of the summit and 3.065 meters (10.06 feet) from station in azimuth 125°45′. The azimuth mark, a standard bronze disk, note 12a, is in rock outcrop at the north end of the low ridge between the road and a dry wash to the west, about 50 yards north of the forks of the road at an old camp site, 100 feet west of the center of the dim road leading toward station, and 0.15 mile from station in azimuth 20°13′10″.

Plane coordinates: (C), x=763,055.19 feet; y=594,789.87 feet; the grid azimuth to the azimuth mark=19°45′31″.*

Lita (Pima County, J. Bowie, Jr., 1936).—About 19 miles north of Tucson, 3½ miles west of U. S. Highway No. 80, 1 mile south of the Pima-Pinal county line, on the highest point of a rocky knob, 20 yards west of a track road, and 70 yards east of a wash. There is a prominent lone hill about 1 mile northeast of the station, the ground to west and south being higher, the ground to the east being lower. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.382 meters (17.66 feet) from station in azimuth 207°35′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 10.800 meters (35.43 feet) from station in azimuth 359°34′. The azimuth mark, a standard bronze disk, note 12a, is on the south end of a 10-foot high rock outcrop in the form of a ridge, 65 feet east of the centerline of the track road and 0.35 mile from station in azimuth 169°28′15″.

Plane coordinates: (C), x=788,243.21 feet; y=546,222.75 feet; the grid azimuth to the azimuth mark=168°58′07″.*

Big Wash (Pima County, J. Bowie, Jr., 1936).—Station is 21 miles, air line, north of Tucson, 30.1 meters west of center line of U. S. Highway No. 80, and 0.7 mile south of the Pima-Pinal county line. There are two iron pipes projecting 4 feet out of the ground near the station. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 17.310 meters (56.79 feet) from station in azimuth 178°02′. Reference mark No. 2, a standard bronze disk, note 11a, is 10.822 meters (35.51 feet) from station in azimuth 70°14′. The azimuth mark, a standard bronze disk projecting 6 inches, note 11a, is located 16.6 meters east of the center line of U. S. Highway No. 80, and is about 0.35 mile from station in azimuth 356°56′54″.

Plane coordinates: (C), x=805,491.71 feet; y=547,384.32 feet; the grid azimuth to the azimuth mark=356°24′58″.*

Freeman (Pinal County, J. Bowie, Jr., 1936).—On the north end and highest point of a low north-south ridge (ridge about three-fourth mile in length and broken by three "camel" humps to south of station), in sec. 28, T. 7 S., R. 13 E., approximately 3 miles west-northwest (281° magnetic) from the highest peak of the Black Mountains; 0.5 mile northwest of track road to gold mine; 0.3 mile northwest of General Land Office pipe marking the corner of secs. 27, 28, 33, and 34; approximately 33 miles north of Tucson. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 11.600 meters (38.06 feet) from station in azimuth 268°05′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 3.720 meters (12.20 feet) from station in azimuth 349°21′. The azimuth

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

mark, a standard bronze disk, note 12a, is about 30 feet east of track road, 0.2 mile south of mine and 50 feet west of dry creek bed; mark set in outcropping rock very near a group of large boulders and 0.5 mile from station in azimuth 319°14′ 12″.

Plane coordinates: (C), x=781,177.34 feet; y=652,770.64 feet; the grid azimuth to the azimuth mark=318°44′28″.*

Roll (Pinal County, J. Bowie, Jr., 1936).—Thirty miles north of Tucson and 7 miles north of Oracle Junction on the east side of the right-of-way of U. S. Highway No. 80, on the crest of a small rise covered with ocatilla and cactus. The highway is gravel at this point and there is higher ground to the south and west of the station. The station is 0.7 mile south of a cattleguard, 0.2 mile north of a curve in the highway and 12 paces northeast of the center line of the highway. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 28 paces northeast of the center line of the highway and 13.980 meters (45.87 feet) from station in azimuth 230°32′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 17 paces northeast of the center line of the highway and 14.647 meters (48.05 feet) from station in azimuth 152°26′. The azimuth mark, a standard bronze disk, note 11a, is 14 paces northeast of the center line of the highway, 6 paces west of the center line of an old road leading to the north, 0.3 mile south of the cattleguard mentioned above and 0.35 mile from station in azimuth 136°16′10″.

Plane coordinates: (C), x=779,553.11 feet; y=596,329.62 feet; the grid azimuth to the azimuth mark=135°46′46″.*

Boundary monument No. 140, eccentric (Pima County, J. Bowie, Jr., 1936).—On the United States-Mexico boundary about 2½ miles, air line, west-northwest of Sasabe Post Office (formerly known as San Fernando), in a small saddle of a rocky hill, the highest point of which is to the south. It is 5.8 meters northwest of a wire fence line, and 15.6 meters southwest of a fence corner. Marked by a standard bronze disk as described in note 2. Reference mark No. 1 is in a fence corner, 2.9 meters southwest of one fence line, 2.6 meters northwest of the other fence line and 11.920 meters (39.11 feet) from station in azimuth 231°32′. *Boundary monument No. 140 (I. B. C.)*, a hollow silver-colored iron post about 10 inches square near the top, about 7 feet high, pointed on the very top and set on a concrete base is 4.798 meters (15.74 feet) from station in azimuth 353°51′. Boundary monument No. 141 (I. B. C.), used as an azimuth mark, appears to be the same type of monument as No. 140. It is on the crest of a ridge but on the south side of the highest point of same. It shows plainly against the skyline and is about 2 miles from station in azimuth 110°13′20″.

Plane coordinates: (C), x=603,032.07 feet; y=180,656.47 feet; the grid azimuth to boundary monument No. 141 (I. B. C.)=110°02′58″.*

Boundary monument No. 138 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936.—A monument of the United States-Mexico boundary, between the States of Arizona, United States, and Sonora, Mexico. It is on Sasabe ranch, about 2¾ miles east-southeast of the town of Sasabe, 0.3 mile east-southeast of the ranch buildings, and about 100 feet south of the ranch pasture fence. Marked by a tapering cast iron monument of square cross section, about 7 feet high, which comes to a point on top. The number 138 is inscribed in raised numerals on the east side of the monument. The azimuth mark, a standard bronze disk, note 11a, is at the ranch, on the fence line along the north side of the road leading through the pasture to the monument, 40 yards north of the east one of the two ranch houses, 25 yards southwest of pasture gate and 0.3 mile from station in azimuth 116°47′14″.

Plane coordinates: (C), x=628,153.25 feet; y=171,412.19 feet; the grid azimuth to the azimuth mark=116°34′21″.*

Boundary monument No. 140 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—See description of *boundary monument No. 140 eccentric.*

Plane coordinates: (C), x=603,033.84 feet; y=180,640.81 feet.

B. M. U 76 (Santa Cruz County, J. Bowie, Jr., 1936).—About 8½ miles northeast of Nogales, 10.4 miles by Highway No. 82 from Nogales Post Office, at the Nogales Airport, on the right-of-way fence line of the road and the airport, 50 feet southeast of the centerline of Highway No. 82 and 46.6 feet southwest of the southwest gatepost with a sign over the gate of the airport.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

The station mark is a standard U. S. Coast and Geodetic Survey bench mark stamped "U 76 1934," set in a concrete post. Reference mark No. 1, a standard bronze reference disk, note 11a, is 12.697 meters (41.66 feet) from station in azimuth 34°26′ and is set on the right-of-way fence line. Reference mark No. 2, a standard bronze reference disk, note 11a, is 29.477 meters (96.71 feet) from station in azimuth 119°21′ and is on the right-of-way fence line on the north side of highway. The azimuth mark, a standard bronze disk, is in the concrete slab at the entrance to the airport hangar, 59.5 feet north of the southwest corner of the hangar, 47.9 feet west-northwest of the northeast corner of the hangar, 13 feet north of the door to the hangar and is about one-fourth mile from station in azimuth 233°29′54″.

Plane coordinates: (C), x=832,137.53 feet; y=153,409.68 feet; the grid azimuth to the azimuth mark=232°56′36″.*

Boundary monument No. 119, eccentric (Santa Cruz County, J. Bowie, Jr., 1936).—On a low bare gravelly hill on the border, about 2.0 miles east of Nogales. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 9.198 meters (30.18 feet) from station in azimuth 238°49′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 15.110 meters (49.57 feet) from station in azimuth 136°58. *Boundary monument No. 119 (I. B. C.)* is 67.492 meters (221.43 feet) from station in azimuth 11°32′21.″4. The azimuth mark, *boundary monument No. 120 (I. B. C.)* is a regular United States-Mexico metal boundary monument about 1½ miles from station in azimuth 87°46′19″.9.

Plane coordinates: (C), x=817,122.64 feet; y=122,811.30 feet; the grid azimuth to *boundary monument No. 120 (I. B. C.)*=87°14′38″.1.

Boundary monument No. 132, eccentric (Santa Cruz County, J. Bowie, Jr., about 5 miles, air line, southwest of the mine at Ruby, and about 2 miles southwest of the old Black Diamond Mining Camp. It is on the crest of a low ridge which overlooks the country to the south and west, but the country to the north is higher. The station is marked by a ¾-inch drill hole, 1 inch deep, in an outcrop of hard red rock. *Boundary monument No. 132 (I. B. C.)* is 66.26 meters (217.4 feet) from station in azimuth 220°37′57″. The number of the boundary monument used for an azimuth mark was not recorded. It is the first monument visible to the east, on the south slope of a conspicuous peak and about 3 miles from station in azimuth 289°50′32″.

Plane coordinates: (C), x=699,063.45 feet; y=145,136.72 feet; the grid azimuth to the azimuth mark=289°30′36″.*

Boundary monument No. 119 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—See description of *boundary monument No. 119 eccentric.*

Plane coordinates:[1] (C), x=817,080.32 feet; y=122,593.96 feet.

Boundary monument No. 132 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—See description of *boundary monument No. 132 eccentric.*

Plane coordinates:[1] (C), x=699,204.03 feet; y=145,302.54 feet.

Gunsight (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, about 11½ miles southeast of Ajo, 1½ miles south of the Ajo-Tucson Highway, on the summit of the central and highest one of a group of hills lying just above (south of) the Gunsight mine, on the highest point of the narrow ridge forming the summit, at its west edge, 15 feet north of a drift fence, in top of ledge. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12c, in top of a small boulder, is 2.380 meters (7.81 feet) from station in azimuth 236°06′. Reference mark No. 2, a standard bronze reference disk, note 12a, in top of a broken outcrop of ledge rock, is 3.240 meters (10.63 feet) from station in azimuth 291°40′. The azimuth mark, a standard U. S. Coast and Geodetic Survey bench mark, W 36, is on the Ajo-Tucson Highway, in the southeast angle of the junction of the highway and the Gunsight mine road, 40 feet south of the center of the highway, 30 feet east of the center of the mine road and 1½ miles from station in azimuth 173°48′33″. *G. L. O. ¼ corner, secs. 16 and 21,* a standard General Land Office disk stamped "¼ $\frac{S16}{S21}$," screwed on top of a 1-inch iron pipe, projecting about 2½ feet above ground and surrounded

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

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by a pile of small rocks, is 5.478 meters (17.97 feet) from station in azimuth 184°35′.

Plane coordinates: (C), x=262,479.17 feet; y=437,480.63 feet; the grid azimuth to bench mark W 36=174°13′06″.*

Del (Pima County, J. Bowie, Jr., 1936).—On the highest point of the west end of the west foothills of the Sierra Del Ajo Range, about 20 miles south-southeast of Ajo and one mile west of the Ajo-Sonoyta road. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.267 meters (20.56 feet) from station in azimuth 153°27′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.880 meters (22.57 feet) from station in azimuth 83°33′. The azimuth mark, a standard Coast and Geodetic Survey bench mark, U 110 1935, set in top of a concrete post, is 1 mile from station in azimuth 292°50′50″.

Plane coordinates: (C), x=230,385.20 feet; y=397,910.90 feet; the grid azimuth to bench mark U 110=293°18′36″.*

Cane (Pima County, J. Bowie, Jr., 1936).—On the west boundary; on the flat plain, covered with cane cactus and paloverde, west of the Sierra del Ajo Range. It is about 3 miles west-southwest of the tall spire of that range and about 19 miles southeast of Ajo. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 9.530 meters (31.27 feet) from station in azimuth 266°01′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 9.915 meters (32.53 feet) from station in azimuth 358°16′. Station *Del* used as an azimuth mark.

Plane coordinates: (C), x=240,859.54 feet; y=401,753.65 feet; the grid azimuth to station *Del*=69°51′11″.8.

Sage (Pima County, J. Bowie, Jr., 1936).—On the west boundary of the Papago Indian Reservation, about 10 miles southeast of the city of Ajo, 1 mile south of the Sells-Ajo Road, 0.5 mile west of the Sonoyta Road, on a flat brushy ridge, 20 feet north of the centerline of a track road. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is on the north side of the track road, 16.530 meters (54.23 feet) from station in azimuth 295°30′. Reference mark No. 2, a standard bronze reference disk, note 11a, is south of the road and 17.413 meters (57.13 feet) from station in azimuth 29°26′. The azimuth mark, a standard bronze disk, note 11a, is 25 feet south of the centerline of the track road, 0.25 mile west of the Sonoyta Road and 0.25 mile from station in azimuth 303°01′57″.

Plane coordinates: (C), x=240,569.79 feet; y=525,660.59 feet; the grid azimuth to the azimuth mark=303°28′49″.*

Bat (Pima County, J. Bowie, Jr., 1936).—About 9 miles northeast of Ajo, on the south end of a cactus-covered ridge that extends in a north and south direction, the station being on the low end of the ridge, which is east of a ridge and high hills and is west of very high and rocky ridge. The station is surrounded by higher ground except to the south and southwest. A giant saguaro was blazed with a triangle for a witness mark. Mark is a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is in a boulder projecting 3 inches above the ground and 10.210 meters (33.50 feet) from station in azimuth 167°48′. Reference mark No. 2, a standard bronze reference disk, note 12c, is in a boulder flush with the ground, 6.274 meters (20.58 feet) from station in azimuth 346°33′. The azimuth mark, a standard bronze disk, note 12c, is set in a boulder, projects 6 inches above the ground and is about 0.3 mile from station in azimuth 74°52′38″.

Plane coordinates: (C), x=240,569.79 feet; y=525,660.59 feet; the grid azimuth to the azimuth mark=75°19′42″.*

Dust (Pima County, J. Bowie, Jr., 1936).—About 7 miles, air line, southeast of Ajo, 15.0 meters south of the centerline of the Sells-Ajo Highway, and 4.6 miles along the Sells-Ajo Highway, in the direction of Ajo from the Papago Indian Reservation boundary fence. Surface and underground marks are standard bronze disks as described in notes 1a and 7a. Surface-station and reference marks are set in 8- by 8-inch posts projecting 6 inches above surface of ground. Reference mark No. 1, a standard bronze reference disk, note 11a, is

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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13.490 meters (44.26 feet) from station in azimuth 65°39'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 15.510 meters (50.89 feet) from station in azimuth 149°26'. The azimuth mark, a standard bronze disk, note 11a, is about 0.3 mile from station in azimuth 329°13'28".

Plane coordinates: (C), x=239,778.96 feet; y=475,611.76 feet; the grid azimuth to the azimuth mark=329°40'28".*

Kerwo (Pima County, J. Bowie, Jr., 1936).—On the highest conical hill on the south end of a lava ridge about 2½ miles northwest of the Indian village of Kerwo, about 25 miles southeast of the town of Ajo and about 0.3 mile east of the graded road leading to Kerwo. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 8.005 meters (26.26 feet) from station in azimuth 252°19'. Reference mark No. 2, a standard bronze reference disk, note 12a, is 5.674 meters (18.62 feet) from station in azimuth 351°23'. The azimuth mark, a standard bronze disk, note 11a, is 75 feet east of the centerline of the Kerwo-Ajo graded road, projects about 4 inches above the ground and is 0.4 mile from station in azimuth 63°24'02".

Plane coordinates: (C), x=292,337.73 feet; y=393,648.48 feet; the grid azimuth to the azimuth mark=63°45'24".*

Sweetwater (Pima County, J. Bowie, Jr., 1936).—About 8 miles south of Kerwo or Cubo, 15 miles southwest of Pisinemo, and 1½ miles northwest of the Indian village known locally as Sweetwater, on the high point on the south end of a lava ridge. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 3.560 meters (11.68 feet) from station in azimuth 177°06'. Reference mark No. 2, a standard bronze reference disk, note 12c, is 3.858 meters (12.66 feet) from station in azimuth 250°17'. The azimuth mark, a standard bronze disk, note 11a, is about 1.2 miles northeast of the village of Sweetwater, 21 feet west of the track road to the northeast from the village and 0.8 mile from station in azimuth 275°55'38".

Plane coordinates: (C), x=303,229.53 feet; y=351,180.24 feet; the grid azimuth to the azimuth mark = 276°15'47".*

Poso (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, about 13 miles west-southwest of Ajo, about 1½ miles southwest of the Indian village of Poso Redonde, on the south end of a low spur of volcanic rock extending out from the main body of the ridge to the north at the extreme southwest point of the mass of lava ridges, on a small, boulder-strewn prominence, about 10 feet south of a gnarled paloverde tree, in bedrock in the center of the narrow summit. Marked by a standard bronze disk as described in note 2. Reference mark No. 1 a standard bronze reference disk, note 12a, in bedrock on the crest of the summit, is 4.001 meters (13.13 feet) from station in azimuth 210°37'. Reference mark No. 2, a standard bronze reference disk, note 12a, is in top of the rock mass forming the west face of the ridge and 2.963 meters (9.72 feet) from station in azimuth 130°57'. The azimuth mark, a standard bronze disk, note 11a, 20 feet north of the center of the road leading past the base of the station ridge, in range with the station and the high, skyline peak to the west, is 0.15 mile from station in azimuth 90°49'08".

Plane coordinates: (C), x=272,414.88 feet; y=473,701.78 feet; the grid azimuth to the azimuth mark=91°12'45".*

Target No. 1 (Pima County, J. Bowie, Jr., 1936).—About 15 miles, air line, southeast of Ajo, in the vicinity of the Gunsight mine, at a highway intersection, marked by a sign "Cubo 14, Walls Well 6 mi.", 17.6 meters south of the centerline of the Sells-Ajo Highway, and 8.0 meters west of the centerline of a north-south road. Marked by a nail in a concrete post 6 inches square, over which is a target.

Plane coordinates: (C), x=265,398.70 feet; y=445,625.94 feet.

G. L. O. Station No. 6 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 36, T. 13 S., R. 5 W., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range and date 1936–1918. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 37.29 meters (122.3 feet) south (magnetic). Reference mark No. 2,

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 39.507 meters (129.62 feet) west (magnetic).

Plane coordinates: (C), x=249,561.76 feet; y=453,459.11 feet.

Target No. 2 (Pima County, J. Bowie, Jr., 1936).—About 11 miles, air line, southeast of Ajo, at a T-road intersection marked by a sign "Sonoyta, Mexico, 27 miles," just west of the Papago Indian Reservation boundary fence on the Sells-Ajo Highway in the vicinity of the Gunsight mine. Marked by an old survey mark stamped "U. S. Geological Survey Govt. with State R 26–1930" over which is a target. The target is 53.3 meters south of the centerline of the Sells-Ajo Highway and 7.5 meters east of the centerline of the Sonoyta Road.

Plane coordinates: [1] (C), x=247,466 feet; y=458,236 feet.

Ajo, Phelps and Dodge Corp., copper smelter, stack (Pima County, J. Bowie, Jr., 1936).—Plane coordinates: (C), x=209,759.75 feet; y=499,097.91 feet.

J. C. Greenway Memorial, cross (Pima County, E. B. Latham, 1935; 1936).—Plane coordinates: (C), x=203,197.61 feet; y=497,630.66 feet.

Kerwo, white chapel, cross (Pima County, J. Bowie, Jr., 1936).—Plane coordinates: [1] (C), x=303,384 feet; y=388,244 feet.

Poso Redondo, white cross (Pima County, J. Bowie, Jr., 1936).—A small white cross set in a semiconical base of whitewashed adobe on the mission grounds, in the Indian village of Poso Redondo, on the Papago Indian Reservation, about 200 feet southeast of the mission proper.

Plane coordinates: [1] (C), x=267,577 feet; y=479,089 feet.

G. L. O. ¼ corner secs. 16 and 21 (Pima County, J. Bowie, Jr., 1936).—See description of *Gunsight*.

Plane coordinates: [1] (C), x=262,481 feet; y=437,498 feet.

Boundary monument No. 168 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, G. D. Cowie, 1920; 1936).—See description of *boundary monument No. 168 eccentric*.

Plane coordinates: (C), x=212,635.08 feet; y=324,150.00 feet.

Boundary monument No. 166 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—On the United States-Mexico border, about 2½ miles northeast of Sonoyta, Mexico, on the desert plain lying south of the Sierra Del Ajo Range, about 3 miles east-southeast along the boundary from the Mexican customhouse on the Sonoyta-Ajo Road, about 1 mile southeast of a deserted ranch and windmill and about 60 feet south of the boundary fence. Station is the tip of a standard cast-iron aluminum-colored boundary marker, about 7 feet high and bolted to a concrete base. The numerals "166" are affixed to its east side. Reference mark No. 1, a standard bronze reference disk, note 11a, is on the boundary fence line, 26.630 meters (87.37 feet) from station in azimuth 236°42′. Reference mark No. 2, a standard bronze reference disk, note 11a, is also on the boundary fence line, 25.915 meters (85.02 feet) from station in azimuth 160°20′. The azimuth mark, a standard bronze disk, note 12c, is on top of a small hill just northwest of a shack on the highest point of the hill and on the longitudinal center of the summit. It is about 0.7 mile from station in azimuth 251°35′03″.

Plane coordinates: (C), x=234,900.75 feet; y=315,971.75 feet; the grid azimuth to the azimuth mark=252°02′06″.*

Shack (Pima County, J. Bowie, Jr., 1936).—On the highest point of the southeast and higher one of two low hills, 4.0 miles east of the Sonoyta Customhouse. The boundary road passes between the two hills. There is a cultivated field at the east base of the hill on which the station is located and a tin shack 0.3 mile northeast of station. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 22.070 meters (72.41 feet) from station in azimuth 316°17′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.864 meters (15.96 feet) from station in azimuth 119°30′. *Boundary monument No. 166 (I. B. C.)* may be used as an azimuth mark.

Plane coordinates: (C), x=239,816.05 feet; y=315,785.09 feet; the grid azimuth to *boundary monument No. 166 (I. B. C.)*=92°10′26″.5.**

Low Hill (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, about 1½ miles east of its west boundary, 28 miles south-southeast of Ajo, 10 miles north-northeast of Sonoyta, Sonora, Mexico, just southwest of the base

[1] No check on this position.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

**This azimuth has been computed by the first formula (p. 67), using both terms.

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of the Sierra Del Ajo, about 1¼ miles east of the Ajo-Sonoyta Road, on the summit of a low brushy hill at its south end and about 50 yards south of and 5 feet lower than its highest point, in top of one of the black basaltic boulders which cover the summit and in the center of a half circle of loose boulders. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 2.972 meters (9.75 feet) from station in azimuth 274°36′. Reference mark No. 2, a standard bronze reference disk, note 12c, at the south end of the summit, is 13.215 meters (43.36 feet) from station in azimuth 40°03′. The azimuth mark, a standard bronze disk, note 12c, is on the summit of the first hill to the west across the wash, about 75 yards north of the south end of the hill, on its longitudinal center and one-half mile from station in azimuth 75°47′28″.

Plane coordinates: (C), x=241,592.96 feet; y=361,489.68 feet; the grid azimuth to the azimuth mark=76°13′58″.*

Gravel (Pima County, J. Bowie, Jr., 1936).—On a gravel ridge in the brushy plains about 4½ miles, air line, northeast of *boundary monument No. 166 (I. B. C.)*, about 4 miles east of the main highway from Ajo to Sonoyta, Mexico, about 6 miles, air line, northeast of Sonoyta Customhouse on the boundary; on the northwest bank of a broad wash, and about 100 feet northwest of an old track road which formerly was used to travel from vicinity of *boundary monument No. 166 (I. B. C.)*, to a well at the foot of the Ajo Mountains. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 15.864 meters (52.05 feet) from station in azimuth 219°46′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 14.149 meters (46.42 feet) from station in azimuth 136°21′. The azimuth mark, a standard bronze disk, note 11a, was set on the same ridge as the station about one-fourth mile south of it, about 15 feet southeast of the stock trail and in azimuth 26°20′04″.

Plane coordinates: (C), x=247,818.58 feet; y=335,865.31 feet; the grid azimut ht othe azimuth mark=112°25′04″.*

Boundary monument No. 164 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936). On the United States-Mexico bounary about 9.0 miles along the border east from the Sonoyta Customhouse. It is the center of the top of a regular iron boundary monument, 7.0 feet in height, situated on a small knoll that is slightly higher than the surrounding plain. Reference mark No. 1, a standard bronze reference disk, note 11a, is 25.270 meters (82.91 feet) from station in azimuth 158°00′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 27.715 meters (90.93 feet) from station in azimuth 244°06′. The azimuth mark, a standard bronze disk, note 11a, is 30 feet north of the boundary fence and 0.3 mile from station in azimuth 112°00′52″.

Plane coordinates: (C), x=262,671.58 feet; y=305,769.70 feet; the grid azimuth to the azimuth mark=112°25′04″.*

Boundary monument No. 165 (I. B. C.) (Pima, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—Plane coordinates: (C), x=243.939 feet; y=312,658 feet.

Boundary monument No. 168, eccentric (Pima County, J. Bowie, Jr., 1936).—About 2 miles north of Sonoyta, Mexico, about 2 miles west-northwest of Sonoyta Customhouse, on the crest of the highest ridge of the Sonoyta Mountains (but not on the highest point of the ridge) and 5.032 meters (16.51 feet) from *boundary monument No. 168 (I. B. C.)* in azimuth 183°46′. Marked by a standard bronze disk as described in note 2. *Boundary monument No. 168 (I. B. C.)* is a concrete pyramid about 12 feet high, pointed at the extreme top, and about 4 feet square at the base. Reference mark No. 1, a standard bronze reference disk, note 12a, is 18.427 meters (60.46 feet) from station in azimuth 207°55′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.445 meters (21.14 feet) from station in azimuth 310°39′. Boundary monument No. 167 (I. B. C.) was used as an azimuth mark. It is about 100 yards west of the Ajo-Sonoyta Highway where it crosses the boundary at the customhouse, and about 2 miles from station in azimuth 289°47′31″.

Plane coordinates:[1] (C), x=212,636.34 feet; y=324,166.46 feet; the grid azimuth to boundary monument No. 167 (I. B. C.)=290°16′52″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

Colorado (U. S. A.) (Pima County, J. Bowie, Jr., 1936).—On the highest point of the Cerro Colorado Mountains, about 40 miles, air line, southwest of the city of Tucson, and about 13 miles, air line, west of Kinsley store and dance hall on the Tucson-Nogales Highway No. 89. On a high lone mountain, overlooking the country on all sides, which appears as a bare round dome from the east, and as a rocky bluff from the west. The ascent on the east side would be easier but a truck cannot be driven very close to the mountain on that side. On the west side a truck can be taken to the foot of the mountain; from there it is a straight hard climb to the summit. Marked by a standard bronze United States Army disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, stamped "Colorado U. S. A. No. 1," is 13.66 meters (44.8 feet) from station in azimuth 3°52′. Reference mark No. 2, a standard bronze reference disk, note 12a, stamped "Colorado U. S. A. No. 2," is 12.06 meters (39.6 feet) from station in azimuth 138°49′. The azimuth mark, a standard bronze disk, note 12a, was set on a dome-shaped bump on the same ridge as the station, and about 300 feet below it. This dome is prominent and difficult of access and the mark is 0.4 mile from station in azimuth 349°05′27″.

Plane coordinates: (C), x=703,768.44 feet; y=259,555.84 feet; the grid azimuth to the azimuth mark=348°44′47″.*

Baldy Peak (Pima County, J. Bowie, Jr., 1936).—On the summit of a prominent, lone peak, known as Baldy Peak, lying about 7 miles northwest of the main range of mountains, about 5 miles southeast of the Palo Alto guest ranch, 4 miles east of the road leading south past Palo Alto ranch, and about 2 miles northwest of a prominent double peak which is somewhat higher, on the highest part of the bare summit, about 20 feet east of the sharp declivity at its west edge, set in an outcrop of ledge rock in a jumbled mass of small boulders. Mark is a bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is south of the station, set in a ledge a few feet lower than the station and is 7.120 meters (23.36 feet) from station in azimuth 64°31′. Reference mark No. 2, a standard bronze reference disk, note 12a, is west of the station, set in the bedrock at the west edge of the summit and is 5.600 meters (18.37 feet) from station in azimuth 144°57′. The azimuth mark, a standard bronze disk, note 12a, is set in bedrock flush with the ground. It is down the long slope from the summit of the peak and on the northeast side of an easily distinguishable summit where the slope breaks to the southeast. Azimuth mark is about 0.2 mile from station in azimuth 3°49′24″.

Plane coordinates: (C), x=680,720.39 feet; y=308,076.24 feet; the grid azimuth to the azimuth mark=3°30′58″.*

Sycamore (Pima County, J. Bowie, Jr., 1936).—About 45 miles southwest of Tucson, 26 miles south of Robles Junction, 10 miles south-southwest of the Palo Alto ranch and 93 feet west of the centerline of the highway, on a low grassy divide on the east side of the Baboquivari Mountains, the ground to west getting gradually higher to the base of the mountains. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is on the west side of the highway and 30.161 meters (98.95 feet) from station in azimuth 211°02′. Reference mark No. 2, a standard bronze reference disk, note 11a, is on the east side of the highway and 46.147 meters (151.40 feet) from station in azimuth 301°00′. The azimuth mark, a standard bronze disk, note 11a, is on the second ridge south of the station, about 20 feet east of the highway, and 0.3 mile from station in azimuth 14°36′27″.

Plane coordinates: (C), x=635,929.09 feet; y=274,337.88 feet; the grid azimuth to the azimuth mark=14°22′39″.*

Leon (Pima County, J. Bowie, Jr., 1936).—On a grassy brushy bench on the east side of Baboquivari Mountain, 8 miles southwest of the King ranch house, 7 miles northwest of the Palo Alto ranch house, 13 miles, air line, southwest of Robles Junction, and about 38 miles southwest of Tucson. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 33 feet east of the road and 16.245 meters (53.30 feet) from station in azimuth 296°39′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 15 feet west of the road

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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and 17.670 meters (57.97 feet) from station in azimuth 27°35′. The azimuth mark, a standard bronze disk, note 11a, is 15 feet west of the north and south road, and 0.3 mile from station in azimuth 218°38′44″.

Plane coordinates: (C), x=635,640.08 feet; y=337,997.57 feet; the grid azimuth to the azimuth mark=218°24′52″.*

King (Pima County, J. Bowie, Jr., 1936).—About 28 miles, air line, southwest of the city of Tucson, about 7 miles south-southwest of Robles Junction (on the Tucson-Sells Road), and about one-half mile east of the King ranch house; 0.3 mile southwest of a cattle guard, 0.4 mile northeast of a jogged cross roads at King's mail box, 29 paces southeast of the center line of a gravel highway, in cactus brush on a low rise. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 48 paces southeast of center line of highway and 17.010 meters (55.81 feet) from station in azimuth 296°43′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 21 paces southeast of the highway and 16.407 meters (53.83 feet) from station in azimuth 51°10′. The azimuth mark, a standard bronze disk, note 11a, is 9 paces northwest of the center line of the main gravel road, 9 paces southwest of the center line of the gravel T-road leading northwest to King's ranch house, 3 paces west of King's mail box, and 0.4 mile from station in azimuth 32°59′41″.

Plane coordinates: (C), x=668,579.84 feet; y=357,882.12 feet; the grid azimuth to the azimuth mark=32°42′24″.*

Vaca (Pima County, J. Bowie, Jr., 1936).—About 24 miles north and 10 miles east of Sells, about 10 miles north-northwest of the Santa Rosa ranch, and 16 miles southwest of Silverbell mine, on the southeast and highest point of the Vaca Hills (hill is steep on the south and east sides and slopes gradually to the north and west). Marked by a standard bronze disk as described in note 2b. Reference mark No. 1, a standard bronze reference disk, note 12a, is 8.397 meters (27.55 feet) from station in azimuth 226°48′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 8.040 meters (26.38 feet) from station in azimuth 118°06′. The azimuth mark, a standard bronze disk, note 11a, is 1½ miles from station in azimuth 246°33′19″.

Plane coordinates: (C), x=557,098.67 feet; y=454,184.85 feet; the grid azimuth to the azimuth mark=246°27′24″.*

Como (Pima County, J. Bowie, Jr., 1936).—On a black lava knob at the northeast end and highest point of the South Comobabi range; about 8 miles northeast of the village of Sells; about 50 miles west-southwest of Tucson; and about 3 miles southwest of the Indian village of Comobabi. Marked by a standard bronze disk as described in note 2b. Reference mark No. 1, a standard bronze reference disk, note 12a, is 4.820 meters (15.81 feet) from station in azimuth 70°16′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 7.710 meters (25.30 feet) from station in azimuth 136°05′. The azimuth mark, a standard bronze disk, note 12a, is about 1 mile from station in azimuth 295°12′29″.

Plane coordinates: (C), x=533,362.94 feet; y=376,306.99 feet; the grid azimuth to the azimuth mark=295°09′03″.*

Artesia (Pima County, J. Bowie, Jr., 1936).—On the highest point of a lone rocky hill, which is the highest one of two lone small hills lying to the northeast of the main Artesia Range of low mountains; about 5.0 miles, air line, east of the village of Sells; about 1.5 miles south of the Tucson-Ajo Highway. Marked by a standard bronze disk as described in note 2b. Reference mark No. 1, a standard bronze reference disk, note 12a, is 13.997 meters (45.92 feet) from station in azimuth 352°28′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.737 meters (22.10 feet) from station in azimuth 90°43′. The azimuth mark, a standard U. S. Coast and Geodetic Survey level bench mark disk set in the top of an 8-inch concrete post, and stamped "E 38 1933," is on the Tucson-Ajo road, 3.7 miles northeast of Sells, 50 feet south of center of the highway, and about 1.1 miles from station in azimuth 122°30′00″.

Plane coordinates: (C), x=535,012.30 feet; y=329,866.73 feet; the grid azimuth to bench mark E 38=122°26′25″.*

Topawa (Pima County, J. Bowie, Jr., 1936).—About 10 miles south-southeast of Sells, on the Papago Indian Reservation about 2 miles south of the Indian settlement known as Topawa, on the southeasterly and highest one of a group

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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of low hills rising from the extensive flat along the southwest side of the Baboquivari Range, on the highest part of the summit, about 15 yards southeast of its northwest end, 15 feet east of the longitudinal center, near a pile of small rocks, in a small outcrop of ledge rock flush with the ground. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is about 50 feet northwest of the southeast end of the summit, on the longitudinal center of the ridge, and 9.498 meters (31.16 feet) from station in azimuth 13°35′. Reference mark No. 2, a standard bronze reference disk, note 12a, is about 15 feet northeast of a clump of chaparral and 8.970 meters (29.43 feet) from station in azimuth 120°40′. The azimuth mark, a standard bronze disk, note 11a, is about 0.4 mile south along the main road and telephone line from the small schoolhouse at Topawa, 135 feet north along the road from the center of a narrow dry wash, 30 feet east of the center of the road leading past base of the station hill and 0.8 mile from station in azimuth 183°47′27″.

Plane coordinates: (C), x=520,350.38 feet; y=285,003.09 feet; the grid azimuth to the azimuth mark=183°45′22″.*

Sells (Pima County, J. Bowie, Jr., 1936).—About 6 miles northwest of Sells on the eastern end of the more easterly of two prominent buttes, which are on the west side of the Sells-Ajo Highway. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 5.281 meters (17.33 feet) from station in azimuth 27°48′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 4.880 meters (16.01 feet) from station in azimuth 107°30′. The azimuth mark, a standard bronze disk, note 11a, is 3.5 miles via road, north of Sells, 30 feet west of the centerline of the Sells-Ajo Highway and 1 mile from station in azimuth 320°35′40″.

Plane coordinates: (C), x=495,041.59 feet; y=357,319.97 feet; the grid azimuth to the azimuth mark=320°36′11″.*

Wahoo (Pima County, J. Bowie, Jr., 1936).—About 0.5 mile, air line, northwest of Sells Post Office and 0.2 mile east of Sells-Ajo Highway, on a small, lone, rocky knoll, about 150 feet higher than surrounding flats. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 4.050 meters (13.29 feet) from station in azimuth 261°42′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.910 meters (22.67 feet) from station in azimuth 37°57′. The azimuth mark is a standard U. S. Coast and Geodetic Survey bench mark disk set in top of concrete post and stamped "C 38 1933," 21 yards east of centerline of Sells-Ajo Highway and 0.2 mile from station in azimuth 39°34′53″.

Plane coordinates: (C), x=509,291.40 feet; y=334,472.52 feet; the grid azimuth to bench mark C 38=39°33′56″.*

Aspass (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, 6 miles south of Sells and 3 miles northwest of Topawa Indian Village, on the southwesterly and highest peak of the Artesia Range, on the easterly and highest summit of the double peak, and on the high point at the northwest end of the summit. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is along the longitudinal center of the summit, 8.940 meters (29.33 feet) from station in azimuth 291°25′. Reference mark No. 2, a standard bronze reference disk, note 12c, is southwest of the station at the southwest edge of the summit, and is 4.469 meters (14.66 feet) from station in azimuth 23°32′. The azimuth mark, a standard bronze disk, note 12a, is on the first knoll to the north, set in bedrock on the southeast slope of the 75-foot high knoll, about 125 feet southeast of the highest point and 6 feet lower, and is approximately 0.3 mile from station in azimuth 204°59′14″.

Plane coordinates: (C), x=508,944.95 feet; y=300,353.20 feet; the grid azimuth to the azimuth mark=204°58′19″.*

Fresnal (Pima County, J. Bowie, Jr., 1936).—On a low, lone, lava hill, about 6 miles west of the crest of the Baboquivari Range and about 7 miles westnorthwest of Baboquivari Peak, about 2 miles south of the experiment station at the Fresnal Wells, about 55 miles, air line, southwest of Tucson, and on the highest point of the only hill in the vicinity which is covered with small brush and cactus. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 4.01 meters

*This azimuth has been computed by the first formula (p. 67) neglecting the second term.

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(13.2 feet) from station in azimuth 338°40′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 3.801 meters (12.47 feet) from station in azimuth 43°37′. The azimuth mark, a standard bronze disk, note 11a, is set at road forks northeast of the hill that the station is on, about 17 paces north of the center line of the road where it forks, three paces southwest of the closest telephone pole to the forks, and is 0.75 mile from station in azimuth 243°40′56″.

Plane coordinates: (C), x=565,893.84 feet; y=287,836.36 feet; the grid azimuth to the azimuth mark=243°34′14″.*

Babo (Pima County, J. Bowie, Jr., 1936).—In the Papago Indian Reservation, about 10 miles, air line, south of Sells, about 3½ miles, air line, south of Topawa Indian Village, at a graded T-road intersection. The station is in the center of a triangular strip of ground, 8.7 meters southwest of the center line of the through road which runs approximately northwest and southeast, 4.3 meters northwest of the extended center line of the T-road to the southwest, 10.6 meters east of center line of curved road, and 17.0 meters southwest of a metal signpost "Customs Penalty." Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 7.8 meters southeast of the metal signpost, 6.4 meters northeast of the center line of the through road and is 15.785 meters (51.79 feet) from station in azimuth 240°23′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 23.1 meters west of the metal sign post, 5.3 meters west of center line of curved road, 1.8 meters southeast of telephone pole, and is 19.089 meters (62.63 feet) from station in azimuth 133°40′. The azimuth mark, a standard bronze disk, note 11a, is 585 paces southwest of the center line of the through road, 5 paces southeast of the center line of the road that goes southwest to Vamori and about 575 paces from station in azimuth 57°06′14″.

Plane coordinates: (C), x=525,791.98 feet; y=276,763.04 feet; the grid azimuth to the azimuth mark=57°03′36″.*

Water (Pima County, J. Bowie, Jr., 1936).—About 25 miles west and 6 miles north of Tucson and 12 miles southeast of the Silverbell mine, in the east side of T. 13 S., R. 9 E., on the top of a lone hill about 300 feet high that lies at the southeast edge of the Waterman Mountains, the farthest southeast of several hills. Marked by a standard bronze disk as described in note 2b. Reference mark No. 1, a standard bronze reference disk, note 12a, is 3.250 meters (10.66 feet) from station in azimuth 255°23′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.370 meters (14.34 feet) from station in azimuth 348°09′. The azimuth mark, a standard bronze disk, note 11a, is 1 mile from station in azimuth 293°34′03″.

Plane coordinates: (C), x=664,787.92 feet; y=472,192.45 feet; the grid azimuth to the azimuth mark=293°16′58″.*

Avra (Pima County, J. Bowie, Jr., 1936).—About 17 miles west and 2 miles north of Tucson, in the Avra Valley at the west base of the Tucson Mountains, in the south edge of T. 13 S., R. 11 E., on the low brush-covered flats. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 9.291 meters (30.48 feet) from station in azimuth 277°40′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 9.250 meters (30.35 feet) from station in azimuth 1°33′. The azimuth mark, a standard bronze disk, note 11a, approximately 250 yards south-southeast of station and about 6 feet south of center line of dim east and west road, is in azimuth 323°36′23″.

Plane coordinates: (C), x=711,049.36 feet; y=455,113.15 feet; the grid azimuth to the azimuth mark=323°14′32″.*

Chuapa (Pima County, J. Bowie, Jr., 1936).—On the west side of the Baboquivari Mountain Range in a temporary Indian settlement on the top of a bare top ridge, at the base of the main ridge, at a large horseshoe curve in the graded road, 180 feet east of the center line of the road, 15 miles east of Sells, and about 45 miles southwest of Tucson. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 5.007 meters (16.43 feet) from station in azimuth 206°42′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 7.411 meters (24.31 feet) from station in azimuth 306°13′. The azimuth mark, a

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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standard bronze disk, note 11a, is 15 feet east of the center line of the road and 0.8 mile from station in azimuth 10°24′29″.

Plane coordinates: (C), x=586,085.81 feet; y=322,255.33 feet; the grid azimuth to the azimuth mark=10°15′42″.*

B. M. A 121 (Pima County, J. Bowie, Jr., 1936).—About 12 miles by highway northeast of Sells and about 50 miles by highway southwest of Tucson, at the intersection of the Ajo-Tucson Highway with the Baboquivari Foothill Trail and the Comobabi Foothill Trail, in the south corner of same, 16.6 meters southeast of the center line of the main highway, 10.5 meters west of the center line of the Baboquivari Road, 19 meters south of a sign "Baboquivari Foothill Trail," and 15.4 meters west of telephone pole No. 308. The station is marked by a standard U. S. Coast and Geodetic Survey bench mark disk stamped "A 121 1935," projecting about 10 inches above the ground. Reference mark No. 1, a standard bronze reference disk, note 11a, is 6.1 meters east of center line of Baboquivari Road, 1.9 meters southeast of telephone pole No. 308, 30.0 meters southeast of center line of Ajo-Tucson Highway, 23.6 meters southeast of the sign mentioned above and 16.649 meters (54.62 feet) from station in azimuth 290°33′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 9.9 meters west of the center line of Baboquivari Road, 21.4 meters southwest of telephone pole No. 308, 24.6 meters southeast of Ajo-Tucson Highway and 13.693 meters (44.92 feet) from station in azimuth 20°02′. The azimuth mark, a standard bronze disk, note 11a, is west of the highway intersection mentioned above, 10 paces northwest of center line of Ajo-Tucson Highway, 52 paces northwest of telephone pole No. 300, and 0.35 mile from station in azimuth 59°12′47″.

Plane coordinates: (C), x=566,935.25 feet; y=360,592.28 feet; the grid azimuth to the azimuth mark=59°05′55″.*

School (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, 21¼ miles west by north of Robles ranch, 13 miles northeast of Sells, on the brushy flats west of the Roskruge Mountains on the west side of T. 15 S., R. 7 E., at the Indian school at Santa Rosa ranch, 101.4 feet east of the southeast corner of the easterly one of the two small, white, school buildings, and 40 feet east of the center of the road leading past the school. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 30 feet east of the center of the road leading past school and 25.512 meters (83.70 feet) from station in azimuth 182°16′. Reference mark No. 2, a standard bronze reference disk, note 11a, is at the southeast corner of the easterly one of the two school buildings and 30.895 meters (101.36 feet) from station in azimuth 110°34′. The azimuth mark, a standard bronze disk, note 11a, is at the southeast corner of the water well derrick at the Santa Rosa ranch, 2½ feet east of its southeast footing and 0.2 mile from station in azimuth 191°39′58″.

Plane coordinates: (C), x=573,046.14 feet; y=407,058.71 feet; the grid azimuth to the azimuth mark=191°32′27″.*

San Pedro (Pima County, J. Bowie, Jr., 1936).—About 33 miles west and 9 miles south of Tucson and about 12 miles west of Van Camp's filling station at Robles Junction. In the south side of T. 15 S., R. 8 E., on the Papago Indian Reservation, on a small ridge about 30 feet higher than the surrounding area. Marked by standard bronze disks as described in notes 4a and 8a. Reference mark No. 1, a standard bronze reference disk, note 12c, is 10.941 meters (35.90 feet) from station in azimuth 289°47′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 14.438 meters (47.37 feet) from station in azimuth 8°43′. The azimuth mark, a standard bronze disk, note 11a, is in a brush-covered flat a little north of the line to Cone Mountain to the east and 0.3 mile from station in azimuth 299°11′39″.

Plane coordinates: (C), x=623,286.64 feet; y=391,189.05 feet; the grid azimuth to the azimuth mark=298°58′58″.*

Hut (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, about 34 miles west of Tucson, 30 miles northeast of Sells, 14 miles south of Silverbell mine, on the brushy flats just west of the Roskruge Mountains, in T. 14 S., R. 8 E., about three-fourths mile northwest of a small wattle hut, on the track road leading across the flats, on a slight rise of ground, and 20 feet north of the center of the road. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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reference disk, note 11a, is 11.200 meters (36.75 feet) from station in azimuth 220°11′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 13.590 meters (44.59 feet) from station in azimuth 311°56′. The azimuth mark, a standard bronze disk, note 11a, is 65 yards east of the road leading to station in a small open space on a slight rise of ground and 0.2 mile from station in azimuth 306°24′56″.

Plane coordinates: (C), x=617,624.68 feet; y=446,896.55 feet; the grid azimuth to the azimuth mark=306°12′46″.*

B. M. A. 113 (Pima County, J. Bowie, Jr., 1936).—About 25 miles southwest of Tucson at Robles Junction on the Ajo Highway at the fork of the gravel road leading southwest to King's ranch, 170 feet north of the junction of the traveled ways, 153½ feet north-northeast of the northeast corner of Van Camp's store and filling station and 3 feet southwest of a strand wire fence. Marked by a standard U. S. Coast and Geodetic Survey bench mark disk, stamped "A 113 1935," set in top of an 8- by 8-inch concrete post. Reference mark No. 1, a standard bronze reference disk, note 11a, is on the fence line 16.098 meters (52.81 feet) from station in azimuth 249°18′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 12.422 meters (40.75 feet) from station in azimuth 337°41′. The azimuth mark, a standard bronze disk, note 11a, is about 70 yards south of the center of the Ajo Highway, 30 yards south of the drainage ditch along the south side of the highway, in range with the station and the fourth telephone pole west of the station and 0.3 mile from station in azimuth 74°23′49″.

Plane coordinates: (C), x=687,451.34 feet; y=392,315.67 feet; the grid azimuth to the azimuth mark=74°04′32″.*

Pino Blanco (Pima County, J. Bowie, Jr., 1936).—On a low but prominent granite hill lying about 2 miles north of the base of the main Samaniego Peak Range, about 20 miles southwest of Tucson, 10 miles northwest of Twin Buttes mining camp, about 10 miles southeast of Robles Junction and 0.2 mile east of Pino Blanco ranch house. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 9.838 meters (32.28 feet) from station in azimuth 188°20′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.275 meters (20.59 feet) from station in azimuth 265°44′. The azimuth mark, a standard bronze disk, note 12a, in a large flat rock outcrop, 240 feet south of a lone northeast fence corner, and 55 feet west of a north and south fence, is about 0.3 mile from station in azimuth 344°58′43″.

Plane coordinates: (C), x=721,357.79 feet; y=364,261.15 feet; the grid azimuth to the azimuth mark=344°36′00″.*

Batamote (Pima County, J. Bowie, Jr., 1936).—On the flat divide about midway between the Cerro Colorado and the Sierrita Samaniego Range and about 1 mile north of the Batamote ranch. It is about 12 miles west-northwest of Kinsley store on the Tucson-Nogales Highway (U. S. No. 89), about 7 miles north of the highway from Kinsley to Arivaca and is about 30 miles south-southwest of Tucson. Station marks are standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 24.740 meters (81.17 feet) from station in azimuth 3°14′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 26.455 meters (86.79 feet) from station in azimuth 88°47′. The azimuth mark, a standard bronze disk, note 11a, is about 0.2 mile south of station and 20 feet west of fence in azimuth 0°30′01″.

Plane coordinates: (C), x=712,899.84 feet; y=286,838.12 feet; the grid azimuth to the azimuth mark=0°08′21″.*

Brown (Pima County, J. Bowie, Jr., 1936).—On the point of the ridge forming the north canyon wall of Brown Canyon, 0.25 mile north of the Brown Canyon Road, 2.5 miles west of the Tucson-San Fernando Road and about 6.0 miles west of Baboquivari Peak. Marked by a standard bronze disk welded to a bronze rod, 3.0 feet in length and placed in about a 5-inch square hole filled with concrete, and with top of the mark about 2.0 inches above surface of the ground. Reference mark No. 1, a standard bronze reference disk, set same as the station mark, is 6.648 meters (21.81 feet) from station in azimuth 15°37′. Reference mark No. 2, a standard bronze reference disk, set same as the station mark, is

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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10.044 meters (32.95 feet) from station in azimuth 90°16′. Triangulation station *Sycamore* was used as the azimuth mark.

Plane coordinates: (C), x=625,905.86 feet; y=275,390.64 feet; the grid azimuth to station *Sycamore*=275°59′45″.3.

Boundary monument No. 151 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—On the United States-Mexico boundary line about 13.5 miles, air line, southwest of the Indian village of Vamori. Station is the center of the top of the monument which is a 7-foot iron shaft about 60 feet south of the boundary fence. Reference mark No. 1, a standard bronze reference disk, note 11a, is 23.665 meters (77.64 feet) from station in azimuth 237°36′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 24.505 meters (80.40 feet) from station in azimuth 161°02′. *Boundary monument No. 150 eccentric* may be used as an azimuth mark.

Plane coordinates: (C), x=439,542.25 feet; y=240,786.83 feet; the grid azimuth to *boundary monument No. 150 eccentric*=290°56′29″.1.

Boundary monument No. 149 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—On the United States-Mexico boundary, about 4 miles, air line, south-southwest of Rocky Point Indian Village, about 16 miles, air line, west of the village of San Miguel, on a brushy plain, and 18 meters south of the barbwire boundary fence. The boundary monument is a steel shaft about 7 feet high, 12 inches square at the bottom, about 10 inches square at the top, pointed at the extreme top, and set in a concrete base. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.540 meters (60.83 feet) from station in azimuth 216°42′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 28.788 meters (94.45 feet) from station in azimuth 148°21′.

Plane coordinates: (C), x=463,161.30 feet; y=232,097.06 feet.

Boundary monument No. 145 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—On the United States-Mexico boundary in the brushy plains about 3.5 miles southwest of the village of San Miguel. The monument is an iron shaft about 7.0 feet in height. A small groove in the top of the monument was used as the triangulation station. Reference mark No. 1, a standard bronze reference disk, note 11a, is 24.575 meters (80.63 feet) from station in azimuth 239°36′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 23.015 meters (75.51 feet) from station in azimuth 167°05′. Boundary monument No. 146 (I. B. C.) is used as an azimuth mark and appears on the skyline in a saddle of a ridge, about 3 miles from station in azimuth 110°14′15″.

Plane coordinates: (C), x=531,443.77 feet; y=206,957.86 feet; the grid azimuth to boundary monument No. 146 (I. B. C.)=110°11′04″.*

Target on peak south of Baldy Peak (Pima County, J. Bowie, Jr., 1936).—Plane coordinates: (C), x=687.380.20 feet; y=300,675.35 feet.

Palo Alto Ranch, well (Pima County, J. Bowie, Jr., 1936).—Plane coordinates:[1] (C), x=661,477 feet; y=321,563 feet.

Palo Alto Ranch, water tank (Pima County, J. Bowie, Jr., 1936).—Plane coordinates:[1] (C), x=662,541 feet; y=321,155 feet.

Poso Nuevo Ranch, well (Pima County, J. Bowie, Jr., 1936).—Plane coordinates:[1] (C), x=667,973 feet; y=286,860 feet.

Dim (Maricopa County, J. Bowie, Jr., 1936).—On the west boundary line and on the flat desert about 7 miles southerly from Hat Mountain, and about 14 miles north-northeast from Ajo. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 10.304 meters (33.81 feet) from station in azimuth 189°15′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 11.164 meters (36.63 feet) from station in azimuth 321°03′. The azimuth mark, a standard bronze disk, note 11a, is 0.15 mile from station in azimuth 202°24′35″.

Plane coordinates: (C), x=239,353.99 feet; y=560,929.62 feet; the grid azimuth to the azimuth mark=202°51′53″.*

Hat Brim (Maricopa County, J. Bowie, Jr., 1936).—About 19 miles south-southeast of Gila Bend, 7 miles east of the Ajo-Gila Bend Highway, on Hat Mountain (a prominent and rocky peak topped by a cubical crown having vertical sides about 200 feet in height), on a triangular shoulder projecting southeast

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

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from the base of the Hat, about 75 yards southeast of the southeast base of the high cliff, about 40 feet northwest of the apex of the triangular shoulder, on crest of shoulder, in rock ledge. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is near the east edge of the shoulder and is 2.279 meters (7.48 feet) from station in azimuth 47°08′. Reference mark No. 2, a standard bronze reference disk, note 12a, in apex of triangle, is 3.388 meters (11.12 feet) from station in azimuth 158°58′. The azimuth mark, *Hat Brim azimuth*, a standard bronze disk, note 12a, is on the summit of a small, rocky peak at the south end of the ridge lying just west of the main peak and joined to it by a saddle, on the high point, on the approximate center of the peak. (This peak is not the highest point of the ridge but is the most southerly.) It is 868.0 meters (2,848 feet) from station in azimuth 71°25′27″.0**

Plane coordinates: (C), x=246,390.03 feet; y=595,540.95 feet; the grid azimuth to *Hat Brim azimuth*=71°52′06″.5.

Moivavi (Maricopa County, J. Bowie, Jr., 1936).—On a high prominent red dome lying on the divide about 32 miles southeast of Gila Bend, about 6 miles southeast of Sauceda Wells, and about 2½ miles south of the summer camp of the Kaka Indians at Moivavi, on the highest point in this vicinity and visible for a great distance on all sides. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.023 meters (16.48 feet) from station in azimuth 36°14′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 2.301 meters (7.55 feet) from station in azimuth 149°37′. The azimuth mark, a standard bronze disk, note 12a, is on a rocky ridge, 200 feet north of the road that leads to the station, 0.15 mile from the junction of this road and the road to the Sauceda Wells and 0.4 mile from station in azimuth 84°11′35″.

Plane coordinates: (C), x=332,310.95 feet; y=557,706.67 feet; the grid azimuth to the azimuth mark=84°29′09″.*

Maricopa 2 (Maricopa County, J. Bowie, Jr., 1936).—On the highest point of the Maricopa Mountains, which is the peak at the west end of the spur range that extends to the eastward from the main range. It is about 38 miles west of Casa Grande; about 6 miles south of Highway No. 84 and about 3.0 miles northwest of Clemmens Well and Camp. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 7.500 meters (24.61 feet) from station in azimuth 171°54′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.446 meters (21.15 feet) from station in azimuth 252°30′. The azimuth mark, a standard bronze disk, note 12a, on a small, rocky knoll, 75 yards east of end of truck travel and 100 yards north of center line of track road, is 0.6 mile from station in azimuth 5°05′17″.

Plane coordinates: (C), x=357,824.12 feet; y=637,690.58 feet; the grid azimuth to the azimuth mark=5°20′18″.*

Bitter (Pima County, J. Bowie, Jr., 1936).—Located on the northwest peak, the higher of two peaks about 1.4 miles northwest of Bitter Wells, 14 miles west and 3 miles south of Jack Rabbit store. The twin peak mountain, prominent from all sides, has a saddle between the peaks which are about 0.2 mile apart. Mark is a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 2.298 meters (7.54 feet) from station in azimuth 214°24′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 2.815 meters (9.24 feet) from station in azimuth 285°44′. The azimuth mark, a standard bronze disk, note 12c, is on the highest point of the peak about 0.2 mile from station in azimuth 334°10′13″.

Plane coordinates: (C), x=433,081.59 feet; y=593,667.20 feet; the grid azimuth to the azimuth mark=334°17′15″.*

Kaka (Pinal County, J. Bowie, Jr., 1936).—On the southwest and highest point of a low, black, lava range that extends to the southward from the Indian village of Kaka. It is about 2 miles, air line, south of Kaka, about 5 miles, air line, west-northwest of Ventana and about 21 miles, air line, northwest of Santa Rosa. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 9.257 meters (30.37 feet) from station in azimuth 210°37′. Reference mark No. 2, a standard

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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bronze reference disk, note 12c, is 6.856 meters (22.49 feet) from station in azimuth 34°34′. The azimuth mark, a standard bronze disk, note 12c, is on the first hill to the east of the station, about 75 yards south of the north rim of the hill and one-fourth mile from station in azimuth 265°11′08″.

Plane coordinates: (C), x=373,691.23 feet; y=539,332.74 feet; the grid azimuth to the azimuth mark=265°24′20″.*

Sheridan (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, about 7 miles northwest of the Santa Rosa Indian Village, on the highest peak of a group of peaks of the Sheridan Mountains. There are two peaks almost the same height, which are about one-half mile apart, the station being on the higher one to the northwest. The peak is very prominent, the sides being very steep and rocky. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.567 meters (18.26 feet) from station in azimuth 274°06′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 7.477 meters (24.53 feet) from station in azimuth 312°40′. The azimuth mark, a standard bronze disk, note 12a, is at the old ruins of a prospector's shack, which is at the end of a road plainly visible from the station. It is 1 mile from station in azimuth 228°33′13″.

Plane coordinates: (C), x=439,757.25 feet; y=509,541.74 feet; the grid azimuth to the azimuth mark=228°39′30″.*

Komelih (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, about 13 miles north-northeast of Santa Rosa Indian Village, one-half mile east of Komelih Indian Village, near the north side of T. 11 S., R. 4 E., on the summit of a low, rocky, and isolated hill about 300 feet high, at the east end of the hill, on the semidetached knoll which forms the highest point of the summit, about 40 yards east of a small divide, 20 yards west of the sharp drop at the east end of the summit, 10 feet north of the south edge of the summit, in flat rock ledge. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is on the longitudinal center of the summit in top of a small boulder and 3.592 meters (11.78 feet) from station in azimuth 178°21′. Reference mark No. 2, a standard bronze reference disk, note 12c, is near east end of the summit, in rock ledge and 6.440 meters (21.13 feet) in azimuth 285°48′. The azimuth mark is on the Santa Rosa-Casa Grande Highway, 0.15 mile north-northeast along the highway from the north end of a large wooden bridge, about 120 yards north by west of the village windmill, and 30 feet east of the center of the highway, marked by a standard U. S. Coast and Geodetic Survey bench mark tablet, stamped "T 84 1935," set in top of a concrete post and 0.6 mile from station in azimuth 153°06′41″.

Plane coordinates: (C), x=491,943.28 feet; y=544,762.90 feet; the grid azimuth to bench mark T 84=153°07′31″.*

Wind (Pima County, J. Bowie, Jr., 1936).—About 13 miles northwest of Santa Rosa, and about 14 miles northwest of Covered Wells, on the north peak of Window Mountain, on the highest peak about 1 mile north of the peak with the small window in it and about 1½ miles north of the large window. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 5.779 meters (18.96 feet) from station in azimuth 328°12′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 4.088 meters (13.41 feet) from station in azimuth 156°55′. The azimuth mark, a standard bronze disk, note 12a, is on the road to the station, in a large outcrop of lava rock about 5 feet high and about 20 feet square, and 2 miles from station in azimuth 223°44′29″.

Plane coordinates: (C), x=399,337.01 feet; y=493,926.87 feet; the grid azimuth to the azimuth mark=223°54′57″.*

Rosa (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, to the eastward of Santa Rosa, about 8 miles east and 1 mile north of the Indian village, on the highest point of a lone detached hill at the southwest base of the Santa Rosa Mountain. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.250 meters (20.51 feet) from station in azimuth 264°24′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 3.227 meters (10.59 feet) from station in azimuth 56°27′. The azimuth mark, a standard

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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bronze disk, note 11a, is on the northwest corner of an earthen reservoir (charco), 60 feet west of the road to the station and 1½ miles from station in azimuth 82°35'06".

Plane coordinates: (C), x=504,689.80 feet; y=485,383.40 feet; the grid azimuth to the azimuth mark=82°34'37".*

Brownell (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation about 11 miles southwest of Santa Rosa Indian Village and about 3 miles north of the Indian village of Covered Wells on the Sells-Ajo Highway. On the highest peak of the Brownell Mountains, at the southwest extremity of a high, rolling ridge which rises in steps to the peak, on the high point of the summit and in its approximate center. Marked by a standard bronze disk as described in note 3. Reference mark No. 1, a standard bronze reference disk, note 12a, is in ledge at northwest edge of the summit, 5.392 meters (17.69 feet) from station in azimuth 146°15'. Reference mark No. 2, a standard bronze reference disk, note 12a, is in the ledge at north edge of the summit, 4.965 meters (16.29 feet) from station in azimuth 190°32'. The azimuth mark, a standard bronze disk, note 11a, is at the village of Covered Wells, 0.3 mile west along the highway from the junction of the Casa-Grande Road, 50 yards west of the southwest corner of the Rio Grande service station and store, 30 feet north of the center of the highway and about 2 miles from station in azimuth 341°28'31".

Plane coordinates: (C), x=428,438.74 feet; y=438,162.77 feet; the grid azimuth to the azimuth mark=341°35'55".*

Bee (Pima County, J. Bowie, Jr., 1936).—About 8 miles southeast of Santa Rosa Indian Village, 10½ miles east and 4½ miles north of Covered Wells, on low, flat, brush flats, 5.8 meters southwest of the center line of a track road across the desert, and 11.6 meters southwest of a triangle blaze on a small tree. Marked by a standard bronze disk, note 1d, which projects about 12 inches above the ground. Reference mark No. 1, a standard bronze reference disk, note 11e, is 11.492 meters (37.70 feet) from station in azimuth 255°49'. Reference mark No. 2, a standard bronze reference disk, note 11e, is 10.985 meters (36.04 feet) from sation in azimuth 151°36'. The azimuth mark, a standard bronze disk, note 11a, projecting about 8 inches above the ground, is about 100 yards north of the track road, and about 0.2 mile from station in azimuth 172°01'53".

Plane coordinates: (C), x=486,410.28 feet; y=448,335.83 feet; the grid azimuth to the azimuth mark=172°03'17".*

Hat Brim azimuth (Maricopa County, J. Bowie, Jr., 1936).—This is the azimuth mark of station *Hat Brim* and is fully described in the description of that station.

Plane coordinates: (C), x=243,683.56 feet; y=594,654.71 feet.

Dry (Maricopa County, J. Bowie, Jr., 1936).—On the flat desert plain lying between the Sauceda and Maricopa Mountain Ranges, about 14 miles south-southeast of Gila Bend, on the Gila Bend-Sauceda Wells Road, near the south edge of a slight rise of ground, about 50 yards north of a shallow wash, and 25 feet southwest of the center of the road. Station and underground marks are standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 6.418 meters (21.06 feet) from station in azimuth 242°33'. Reference mark No. 2, a standard bronze reference disk, note 11a, is 6.915 meters (22.69 feet) from station in azimuth 152°54'. The azimuth mark is along the road, 21½ feet southwest of the center of the road and about one-quarter mile from station in azimuth 171°30'36".

Plane coordinates: (C), x=268,184.70 feet; y=639.413.66 feet; the grid azimuth to the azimuth mark=171°55'05".*

Desolate (Maricopa County, J. Bowie, Jr., 1936).—About 18 miles southeast of Gila Bend and 9 miles south of State Highway No. 84, on the summit of the highest peak of a range of low, barren hills lying about 6 miles west of the Maricopa Mountains, 2 miles south of a high, lava mesa and about 1 mile east of a prominent, lone peak; on the summit of the first peak northeast of the most southwesterly one of the group, in the approximate center of the sharp, barren summit which is covered with small grayish rocks, and 4 feet northeast of a rock cairn. Marked by a standard bronze disk set in bedrock about 6 inches below surface of ground, as described in note 3. Reference mark No. 1,

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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a standard bronze reference disk, note 12c, is in top of small boulder at south edge of summit and 4.559 meters (14.96 feet) from station in azimuth 336°19' Reference mark No. 2, a standard bronze reference disk, note 12c, is in range with the ridge line, in top of small boulder at edge of the summit and 3.61 meters (11.84 feet) from station in azimuth 39°40'. The azimuth mark, a standard bronze disk, note 12b, is on the high point of a small hill covered with grayish rock, the most southerly entirely detached one of the numerous small hills of this type and about 0.8 mile from station in azimuth 186°23'06''.

Plane coordinates: (C), x=314,632.51 feet; y=636,696.33 feet; the grid azimuth to the azimuth mark=186°42'41''.*

Saw (Maricopa County, J. Bowie, Jr., 1936).—About 6 miles northwest of the Sauceda Wells, and about 25 miles southeast of Gila Bend, on a low sharp butte, the south side being very steep, and the north side having a more gentle slope. The station is about 2 miles west of the Sauceda-Gila Bend Road and about 1 mile south of a prominent black lava mountain on the west side of the road, in a flat to the south of the mountain. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.936 meters (22.76 feet) from station to azimuth 268°45'. Reference mark No. 2, a standard bronze reference disk, note 12a, is 9.751 meters (31.99 feet) from station in azimuth 95°54'. The azimuth mark a standard bronze disk, note 11a, is about 60 feet east of a wash (the first wash reached in coming off the butte) and 0.25 mile from station in azimuth 285°31'59''.

Plane coordinates: (C), x=290,712.84 feet; y=584,709.07 feet; the grid azimuth to the azimuth mark=285°53'57''.*

Noroad (Maricopa County, J. Bowie, Jr., 1936).—On a low range of foothills on the west side of the Maricopa or Sawtooth Range; about 24 miles southeast of Gila Bend, about 6.0 miles north of the old village of Moivavi, about 5.0 miles north-northwest of a high sawtooth dome that appears to be the highest point of the range, and about 3.0 miles west of the bluffs on the crest of the main range. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 4.312 meters (14.15 feet) from station in azimuth 163°20'. Reference mark No. 2, a standard bronze reference disk, note 12a, is 5.246 meters (17.21 feet) from station in azimuth 263°22'. The azimuth mark, a standard bronze disk, note 12a, at the highest point on top of a low small hill, is 0.7 mile from station in azimuth 34°11'08''.

Plane coordinates: (C), x=336,241.92 feet; y=607,170.19 feet; the grid azimuth to the azimuth mark=34°28'22''.*

Peri (Pima County, J. Bowie, Jr., 1936).—On a prominent rocky ridge that extends to the southwest from the main range of the Cimarron Mountains, about 6 miles west of South Well, and about 7 miles, air line, southeast of the white mission in the Indian village of Road Runner. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.288 meters (20.63 feet) from station in azimuth 214°04'. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.831 meters (22.41 feet) from station in azimuth 150°29'. The azimuth mark, a standard bronze disk, note 12a, is on the north side of the road going from South Well to the village of Road Runner, at the point where a dim track road leaves this road and goes northwest toward the station, and 2 miles from station in azimuth 40°42'17''.

Plane coordinates: (C) x=344,225.76 feet; y=501,226.93 feet; the grid azimuth to the azimuth mark=40°58'30''.*

Quajote (Pima County, J. Bowie, Jr., 1936).—On a low brush-covered flat in the west side of T. 9 S., R. 4 E., about 3 miles north of Quajote Wells, an Indian village, and about 6 miles west-northwest of Jack Rabbit store. Marked by a standard bronze disk welded to a 1-inch rod, 3 feet long, placed in center of a 6-inch hole filled with concrete, projecting 12 inches above surface of ground. Reference mark No. 1, same type as station mark, is 13.544 meters (44.44 feet) from station in azimuth 260°45'. Reference mark No. 2, same type as station mark, is 10.370 meters (34.02 feet) from station in azimuth 350°46'. The azimuth mark, a standard bronze disk, note 11a, is about 12

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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feet west of center line of dim road leading to station and 0.2 mile from station in azimuth 334°13′26″.

Plane coordinates: (C), x=475,376.55 feet; y=589,685.05 feet; the grid azimuth to the azimuth mark=334°16′01″.*

Osity (Pima County, J. Bowie, Jr., 1936).—About 2½ miles south of Copperosity Wells (a small Indian village), 13 miles north and 7½ miles west of Santa Rosa, in the south edge of T. 10 S., R. 2 E., on the highest point of a small cone-shaped hill which is approximately 400 feet high. There are hills to the west and north of this point but none to the east. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12b, is 3.862 meters (12.67 feet) from station in azimuth 343°22′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.063 meters (13.33 feet) from station in azimuth 97°40′. The azimuth mark, a standard bronze disk, note 12a, is on the first peak to the east of the station, on the same ridge as the station and about 200 yards from station in azimuth 270°37′57″.

Plane coordinates: (C), x=425,887.70 feet; y=548,141.43 feet; the grid azimuth to the azimuth mark=270°45′42″.*

Stanley (Pima County, J. Bowie, Jr., 1936).—About 10 miles northwest of Covered Wells, about 14 miles southwest of Santa Rosa, and about 5 miles south of Window Mountain, in the flats about 1 mile north of the northernmost peak of the Blanco Range, 40 yards east of the dim track road that passes by the station and 100 yards south of a saguaro with triangular blaze. The station mark is a standard disk cast in a bronze rod that tapers to a 1-inch rod as it enters the concrete, the disk projecting above the ground about 8 inches. Reference mark No. 1, similar to station mark, is 8.501 meters (27.89 feet) from station in azimuth 254°31′. Reference mark No. 2, similar to station mark, is 9.585 meters (31.45 feet) from station in azimuth 2°00′. The azimuth mark, a standard bronze disk, note 11a, is in a brush-covered flat, about 125 yards west of the road that passes 40 yards west of the station and 165 yards from station in azimuth 181°53′19″.

Plane coordinates: (C), x=393,562.35 feet; y=471,526.70 feet; the grid azimuth to the azimuth mark=182°04′21″.*

B. M. A 85 (Pima County, J. Bowie, Jr., 1936).—About 1.5 miles northwest of Santa Rosa, in road triangle formed by the junction of the Casa Grande and the Ventana Roads. Station is a standard U. S. Coast and Geodetic Survey level bench-mark disk set in top of concrete post, about 40 feet west of centerline of Casa Grande Road, and about halfway between the two Y's formed by the road junction. Reference mark No. 1, a standard bronze reference disk, note 11a, is 7.667 meters (25.15 feet) from station in azimuth 213°09′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 14.672 meters (48.14 feet) from station in azimuth 112°30′. The azimuth mark, a standard bronze disk, note 11a, is 35 feet west of the centerline of the Casa Grande Road and about 0.25 mile from station in azimuth 212°11′10″.

Plane coordinates: (C), x=455,849.74 feet; y=486,727.88 feet; the grid azimuth to the azimuth mark=212°15′45″.*

Santa (Pima County, J. Bowie, Jr., 1936).—At the village of Santa Rosa on the Papago Indian Reservation, about 0.15 mile south of the Casa Grande Highway, about 100 yards south by west of the well and water tanks, on the village church grounds, about 60 yards east of the northeast corner of the church building, 30 feet north of the northwest corner of the cemetery fence, and about 10 feet northwest of an old monument base. Marked by a standard disk station mark welded to top of a 3-foot iron rod, projecting about 8 inches above ground. Reference mark No. 1, a standard reference disk welded to top of a 3-foot iron rod, is about 30 feet north of the north fence of cemetery and 12.346 meters (40.51 feet) from station in azimuth 271°48′. Reference mark No. 2, a standard reference disk welded to top of a 3-foot iron rod, is 22 feet south of the northwest corner of the cemetery fence, 7 feet west of the west fence of the cemetery and 17.585 meters (57.69 feet) from station in azimuth 17°12′. The azimuth mark, a standard bronze disk, note 11a, is midway between two adobe shacks to the south, 22 feet east of the center of the track road leading south through the village and 0.35 mile from station in azimuth 30°53′10″.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Plane coordinates: (C), x=462,118.92 feet; y=481,818.05 feet; the grid azimuth to the azimuth mark=30°57′06″.*

Covered (Pima County, J. Bowie, Jr., 1936).—In the Indian village of Covered Wells, which is about 13 miles southwest of Santa Rosa and about 25 miles northwest of Sells, on the highest part of a hill about 0.2 mile north of the school buildings and 50 feet north of the Sells Highway. Mark is a standard disk welded to a 1-inch round pipe placed in an 8-by-8-inch hole, 2½ feet deep filled with concrete. Disk stands 10 inches above ground. Reference mark No. 1 is same type of mark with arrow pointing to station and 18.124 meters (59.46 feet) from station in azimuth 267°13′. Reference mark No. 2 is a standard U. S. Coast and Geodetic Survey level bench mark disk placed on top of concrete post, stamped "P 37 1933," on south side of Covered Wells-Sells Highway and 42.230 meters (138.55 feet) from station in azimuth 335°52′. The azimuth mark, a standard bronze disk, note 11a, is at the junction of two highways; 33 feet west of center line of Santa Rosa-Sells Road; 130 feet north of Covered Wells-Sells Road and 0.2 mile from station in azimuth 124°33′01″.

Plane coordinates: (C), x=435,177.55 feet; y=424,490.15 feet; the grid azimuth to the azimuth mark=124°39′43″.*

Lorenzo (Pima County, J. Bowie, Jr., 1936).—About 16 miles east of Covered Wells, 15 miles southeast of Santa Rosa Indian Village, 4½ miles west and 1 mile north of Mountain Devine (North Comobabi Mountains), near the west edge of the foothills of Mountain Devine on low, flat ground that slopes down to the west. Marked by a standard bronze disk in the top of a pipe set in round mass of concrete 12.3 meters southwest of the center line of the main gravel road at a curve. Reference mark No. 1, a standard bronze reference disk in the top of a pipe set in round mass of concrete, is 8.297 meters (27.22 feet) from station in azimuth 331°53′. Reference mark No. 2, a standard bronze reference disk in the top of a pipe set in round mass of concrete is 10.336 meters (33.91 feet) from station in azimuth 68°53′. The azimuth mark, a standard bronze disk, note 11a, is 7 paces south of the center line of the main road, 6 paces east of a large saguaro and 0.15 mile from station in azimuth 313°02′35″.

Plane coordinates: (C), x=509,489.01 feet; y=417,713.66 feet; the grid azimuth to the azimuth mark=313°01′37″.*

Cababi (Pima County, J. Bowie, Jr., 1936).—On a low rocky hill at the west side of the Cababi Mountains, which is a range of low hills lying about 13 miles northwest of Sells and about 13 miles southeast of Covered Wells. Station site is on a low hill that is separated from the main range by about 0.5 mile of brushy flats. It is about 3 miles south of the Sells-Covered Wells Highway, and about 3 miles west of the Cababi Trading Post. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 6.900 meters (22.64 feet) from station in azimuth 31°11′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 5.443 meters (17.86 feet) from station in azimuth 134°09′. Azimuth mark, a standard bronze disk, note 11a, is located on a low flat ridge, across wash from station and about 0.2 mile from station in azimuth 141°17′08″.

Plane coordinates: (C), x=475,647.72 feet; y=387,740.96 feet; the grid azimuth to the azimuth mark=141°19′38″.*

G. L. O. Station No. 16 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 33, T. 10 S., R. 4 E., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range and date 1936–1914. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 43.402 meters (142.39 feet) north (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 23.50 meters (77.1 feet) west (magnetic).

Plane coordinates: (C), x=490,941.32 feet; y=547,996.88 feet.

G. L. O. Station No. 19 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 36, T. 12 S., R. 4 E., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 30 inches in ground. The cap is stamped with the section, township, range and date 1936–1924. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 14.51 meters (47.6 feet) N. 45° W. (magnetic). Reference mark

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 13.26 meters (43.5 feet) S. 45° E. (magnetic).

Plane coordinates: (C), x=502,522.56 feet; y=484,034.48 feet.

G. L. O. Station No. 15 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 34, T. 15 S., R. 4 E., marked by a 2-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 22 inches in ground. The cap is stamped with the section, township, range, and date 1936–1924. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 360.481 meters (1,182.68 feet) N. 45°22′ W. (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 106.358 meters (348.94 feet) S. 88°09′ E. (magnetic).

Plane coordinates: (C), x=491,157.57 feet; y=389,790.71 feet.

G. L. O. Station No. 21 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 13, T. 17 S., R. 4 E., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 34 inches in ground. The cap is stamped with the section, township, range and date 1936–1911. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 69.605 meters (228.36 feet) south (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 64.234 meters (210.74 feet) S. 60° E. (magnetic).

Plane coordinates: (C), x=511,848.15 feet; y=343,293.84 feet.

Mica (Maricopa County, J. Bowie, Jr., 1936).—About 35 miles southwest of Phoenix, about 7 miles north of Rainbow Valley grocery store, about 6 miles south of U. S. Highway 80 between Phoenix and Yuma and about 5 miles south of the Gila River, in sec. 36, T. 1 S., R. 3 W., on the top of a prominent high hill which is the most easterly of a group of high hills in that vicinity. Marked by a standard bronze disk as described in note 2. Reference mark (no number), a standard bronze reference disk, note 12a, is 3.025 meters (9.92 feet) from station in azimuth 290°40′. The azimuth mark, a standard bronze disk, note 11a, is on the road into the station, at the site of an old camp, 6 paces south of an iron well pipe 6 feet high, 3 paces west of the center line of the track road, 9 paces northeast of the northeast corner of a concrete slab and 1.5 miles from station in azimuth 180°33′37″.

Plane coordinates: (C), x=315,666.36 feet; y=836,456.30 feet; the grid azimuth to the azimuth mark=180°53′29″.*

Spur (Maricopa County, J. Bowie, Jr., 1936).—About 4½ miles east and 2½ miles north of Rainbow Valley grocery store, in sec. 2, T. 2 S., R. 1 W., on the middle one of three peaks on a spur extending west from the Sierra Estrella Mountains. This peak appears to be very sharp and steep from the northwest or the southeast. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.595 meters (18.36 feet) from station in azimuth 237°54′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.588 meters (21.61 feet) from station in azimuth 303°49′. The azimuth mark, a standard bronze disk, note 12a, is on the southwest side of the canyon and flats where the canyon emerges into the flats, on a small rocky knoll at the end of a ridge and 1 mile from station in azimuth 357°41′11″.

Plane coordinates: (C), x=372,674.25 feet; y=832,636.95 feet; the grid azimuth to the azimuth mark=357°54′54″.*

Ora (Maricopa County, J. Bowie, Jr., 1936).—About 14.5 miles, air line, south of Liberty, about 5.5 miles southwest of Rainbow Valley grocery store, in the southeast corner of sec. 9, T. 3 S., R. 2 W., on the highest point of a group of mountains in that vicinity. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 2.878 meters (9.44 feet) from station in azimuth 156°56′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 2.317 meters (7.60 feet) from station in azimuth 323°17′. The azimuth mark, "G. L. O. Section Corner 35–34–3–2", an iron pipe 45 yards southwest of a house, is 2 miles from station in azimuth 212°36′33″.

Plane coordinates: (C), x=332,613.59 feet; y=792,130.04 feet; the grid azimuth to the azimuth mark=212°54′31″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Section (Maricopa County, J. Bowie, Jr., 1936).—About 8½ miles north by west of the railroad station at Mobile and 7¾ miles southeast of the Rainbow Valley store, on the low brush-covered flat lying west of the Estrella Mountains and north of the Southern Pacific Railroad, 46 feet east of the center of the section road along the line between ranges 1 E. and 1 W. Station and reference marks are standard bronze disks welded to tops of 3-foot shanks, set in concrete. Reference mark No. 1 is about 100 feet east of the center of the section road and 21.702 meters (71.20 feet) from station in azimuth 323°09′. Reference mark No. 2 is 25 feet east of the center of the section road, 13.043 meters (42.79 feet) from station in azimuth 30°06′. *T. 3 S., R. 1 W., sec. 12, southeast corner* is 27.952 meters (91.71 feet) from station in azimuth 24°44′53″. The azimuth mark, a standard bronze disk, note 11a, is 25 feet north of the center of the dim section line road between sections 12 and 13, T. 3 S., R. 1 W., about 300 yards south of an abandoned shack, 100 feet west of a dim trail leading north, and 0.35 mile from station in azimuth 87°59′42″.

Plane coordinates: (C), x=381,078.24 feet; y=791,193.58 feet; the grid azimuth to the azimuth mark=88°12′27″.*

Enid (Pinal County, J. Bowie, Jr., 1936).—On a lone low hill lying about one-half mile north of the maintenance station of Enid on the Southern Pacific Railroad, and about 10 miles west-northwest of the small village of Maricopa, also on the railroad. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 11.975 meters (39.29 feet) from station in azimuth 286°20′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 10.128 meters (33.23 feet) from station in azimuth 181°04′. The azimuth mark is a U. S. Geological Survey bench mark, on the west side of the railroad station at Enid, 10 yards north of a pair of block signals, and 6 feet west of a board fence. The mark is a standard U. S. Geological Survey disk set in the top of an iron pipe projecting about 12 inches above the ground and is about 0.6 mile from station in azimuth 346°04′36″.

Plane coordinates: (C), x=412,976.79 feet; y=757,036.98 feet; the grid azimuth to the azimuth mark=346°13′54″.*

Estrella (Maricopa County, J. Bowie, Jr., 1936).—On the highest point in the main mountain range lying about 3½ miles northwest of the village of Estrella on the Southern Pacific Railroad, about 15 miles east-northeast of Gila Bend and about 45 miles west-northwest of Casa Grande. The station is on the highest part of the south end of a hogback, and the station mark, note 4, projects about 3 inches above the ground. Reference mark No. 1, a standard bronze reference disk, note 12c, is 2,570 meters (8.43 feet) from station in azimuth 278°52′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 4.544 meters (14.91 feet) from station in azimuth 141°10′. The azimuth mark, a standard bronze disk, note 12a, is on the southeast slope of a small hill on the west side of the wash that extends from the mountain, 66 feet southeast of a giant cactus with 12-inch square blazed on it, set flush with the ground and about 1 mile from station in azimuth 304°13′38″.

Plane coordinates: (C), x=328,582.04 feet; y=739,754.97 feet; the grid azimuth to the azimuth mark=304°31′56″.*

Big Horn (Maricopa County, J. Bowie, Jr., 1936).—Station is on the highest peak in a range or group of mountains about 3 miles north of Bighorn service station which is 37 miles west of Casa Grande on State Highway No. 84. To reach from Bighorn service station, continue 4.3 miles west and go northeast across country. It is on a high rocky hogback, overlooking all the mountains in that vicinity except one about 4 miles to the northeast. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 3.200 meters (10.50 feet) from station in azimuth 220°49′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 5.025 meters (16.49 feet) from station in azimuth 15°44′. The azimuth mark is U.S. Coast and Geodetic Survey bench mark T 85, set on the north side of Highway No. 84 and about 0.3 mile east of the point where the truck route leaves the highway to go across country to the station. The azimuth mark is about 3 miles from station in azimuth 48°48′26″.

Plane coordinates: (C), x=348,227.78 feet; y=694,894.51 feet; the grid azimuth to bench mark T 85=49°04′33″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Ham (Pinal County, J. Bowie, Jr., 1936).—On the summit of the highest peak of the low, rocky range extending north from Table Mountain, at the north end of the range, 4 miles north of State Highway No. 84, 14 miles southwest of the village of Maricopa, near the southwest end of the summit, in the center of the highest point. Marked by a standard bronze disk as described in note 3. Reference mark No. 1, a standard bronze reference disk, note 12b, is at the east edge of the summit and 6.040 meters (19.82 feet) from station in azimuth 247°14′. Reference mark No. 2, a standard bronze reference disk, note 12b, is on the ridge line of the spur ridge to the southwest and 3.435 meters (11.27 feet) from station in azimuth 65°12′. The azimuth mark, a standard bronze disk, note 11a, is on road leading to base of station peak, 75 yards west of a small brown cottage, 25 yards northwest of the northwest corner of wire chicken pen, 23 feet northeast of the center of the road and 2.25 miles from station in azimuth 292°56′00″.

Plane coordinates: (C), x=420,337.99 feet; y=685,619.65 feet; the grid azimuth to the azimuth mark=293°04′28″.*

Bench (Pinal County, J. Bowie, Jr., 1936).—On a prominent rocky peak at the west base of Table Mountain. It is about 5 miles south of State Highway No. 84, about 3 miles west of the summit of Table Mountain, and about 1 mile north of a prominent black lava mountain that is a few feet lower. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 12.194 meters (40.01 feet) from station in azimuth 120°13′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 7.717 meters (25.32 feet) from station in azimuth 151°40′. The azimuth mark, a standard bronze disk, note 12c, is on the southwest side of the hill, on the first small gravel ridge southwest of the base of the hill and about 150 yards from it, and is about one-half mile from station in azimuth 68°10′45″.

Plane coordinates: (C), x=424,100.02 feet; y=639,490.95 feet; the grid azimuth to the azimuth mark=68°18′46″.*

Lorue (Pinal County, J. Bowie, Jr., 1936).—On the low, brush-covered flat, 9½ miles west of Bitter Wells Indian Village, 31½ miles west-southwest of Casa Grande, near the ¼ corner of secs. 17 and 20, T. 9 S., R. 1 E., 31 feet north of the north boundary fence of the Papago Indian Reservation. Marked by a standard disk with 3-foot shank, set in concrete, note 1d. Reference mark No. 1, a standard bronze reference disk, note 11e, is on the reservation fence line and 13.661 meters (44.82 feet) from station in azimuth 312°09′. Reference mark No. 2, a standard bronze reference disk, note 11e, is on the reservation fence line and 11.835 meters (38.83 feet) from station in azimuth 39°14′. The azimuth mark, a standard bronze disk, note 11a, is along the track road and reservation fence line, 25 feet south of the center of the road, 4½ feet north of the fence and 0.2 mile from station in azimuth 271°36′20″. *T. 9 S., R. 1 E., secs. 17 and 20, ¼ corner* is 9.535 meters (31.28 feet) from station in azimuth 358°07′.

Plane coordinates: (C), x=388,129.61 feet; y=595,767.19 feet; the grid azimuth to the azimuth mark=271°48′06″.*

Liberty (Maricopa County, J. Bowie, Jr., 1936).—About 29.4 miles west of Phoenix on U. S. Highway No. 80, 1 mile west of the school at Liberty, in the brush-covered flats, 3.1 meters north of the east and west fence line, 40 feet north of the center line of U. S. Highway No. 80, 9.4 meters west of west gate post, and 20 meters east of a road to the south. The station and reference marks are standard disks cast on 1-inch bronze rods and project out of the ground 10 inches. Reference mark No. 1 is 1.5 meters north of the east and west fence and 14.851 meters (48.72 feet) from the station in azimuth 275°29′. Reference mark No. 2 is 9.516 meters (31.22 feet) from station in azimuth 155°33′. The azimuth mark, a standard bronze disk, note 12a, is 40 feet west of the center line of the road on the bank of the canal, and 0.2 mile from station in azimuth 10°01′47″.

Plane coordinates: (C), x=321,122.03 feet; y=865,396.02 feet; the grid azimuth to the azimuth mark=10°21′07″.*

Rain (Maricopa County, J. Bowie, Jr., 1936).—In a low flat brush-covered valley, in the northeast corner of sec. 19, T. 2 S., R. 2 W., about 9 miles, air line, south of Liberty, 5 miles west of Rainbow Valley grocery store; 0.15 mile west of section corner common to secs. 17, 18, 19 and 20. Station and ref-

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

erence marks are standard bronze disks welded to 3-foot pipes set in concrete. Reference mark No. 1 is 9.820 meters (32.22 feet) from station in azimuth 2°45′. Reference mark No. 2 is 10.055 meters (32.99 feet) from station in azimuth 81°12′. The azimuth mark, a standard bronze disk, note 11a, 30 yards north of road, is 0.15 mile from station in azimuth 97°34′55″.

Plane coordinates: (C), x=322,401.62 feet; y=817,795.40 feet; the grid azimuth to the azimuth mark=97°54′02″.*

Bow (Maricopa County, J. Bowie, Jr., 1936).—About 5 miles west and 8 miles south of Rainbow Valley grocery store, about 18 miles south-southeast of the village of Buckeye on U. S. Highway No. 80, and about on the line between sections 29 and 30, T, 3 S., R. 2 W. It is on low brush-covered flats, about 2 miles north of a range of large mountains, and about 2 miles southeast of a range of smaller, rocky peaks. Marked by a standard bronze disk set in the top of a pipe which projects about 8 inches above the top of a circular mass of concrete. Both reference marks are standard disks in pipes set similar to the station mark. Reference mark No. 1 is 8.959 meters (29.39 feet) from station in azimuth 353°17′. Reference mark No. 2 is 9.218 meters (30.24 feet) from station in azimuth 108°14′. The azimuth mark, a standard bronze disk, note 11a, is about one-fourth mile from station in azimuth 41°25′45″.

Plane coordinates: (C), x=323,577.80 feet; y=777,546.52 feet; the grid azimuth to the azimuth mark=41°44′40″.*

Pile (Maricopa County, J. Bowie, Jr., 1936).—About 5 miles northwest of the village of Mobile, 39 miles northwest of Casa Grande, on a low pile of loose rocks at the north end of the first range of mountains northwest of Mobile, in the brush-covered flats, on the north end of the pile of rocks, in a rock that projects about 6 feet above the ground. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 4.178 meters (13.71 feet), from station in azimuth 23°32′. Reference mark No. 2, a standard bronze reference disk, note 12c, is in a boulder projecting 2.5 feet above the ground and 11.872 meters (38.95 feet) from station in azimuth 133°04′. The azimuth mark, a standard bronze disk, note 12c, at the base of the mountain, about 100 yards south of the track road going to the station, in a rock projecting about 2 feet and set flush, is 0.25 mile from station in azimuth 302°04′30″.

Plane coordinates: (C), x=371,317.27 feet; y=766,093.61 feet; the grid azimuth to the azimuth mark=302°18′16″.*

Oco (Maricopa County, J. Bowie, Jr., 1936).—About 40 miles west of Casa Grande, 13 miles east-southeast of Gila Bend, on Highway No. 84 in the brush-covered flats, 57 feet south of the center line of Highway No. 84. The station and reference marks are standard disks cast on bronze 1-inch rods, projecting about 10 inches above the ground and set in concrete. Reference mark No. 1 is 9.235 meters (30.30 feet) from station in azimuth 342°30′. Reference mark No. 2 is 10.100 meters (33.14 feet) from station in azimuth 91°08′. The horizontal distance between the reference marks is 15.712 meters (51.55 feet). The azimuth mark, a standard bronze disk, note 11a, projecting 4 inches above the ground, 60 feet north of the center line of the highway, 150 feet northwest of sign "Big Horn Filling Station 6½ miles," 66 feet southeast of a saguaro marked with a 12 inch square blaze, is 0.4 mile from station in azimuth 297°56′53″.

Plane coordinates: (C), x=320,860.79 feet; y=690,192.02 feet; the grid azimuth to the azimuth mark=298°15′54″.*

Vekol (Maricopa County, J. Bowie, Jr., 1936).—About 29 miles west of Casa Grande, 2.8 miles east of Bella Loma store, near the middle of the flat desert on the northwest side of Table Mountain, 0.1 mile east of the bridge over Vekol wash, and 48 feet north of State Highway No. 84. Station and reference marks are standard bronze disks welded to 3-foot pipes set in concrete. Reference mark No. 1 is 9.625 meters (31.58 feet) from station in azimuth 251°04′. Reference mark No. 2 is 9.097 meters (29.85 feet) from station in azimuth 339°57′. The azimuth mark, a standard bronze disk, note 11a, is 30 yards south of center line of highway and 0.3 mile from station in azimuth 282°49′42″.

Plane coordinates: (C), x=397,997.63 feet; y=670,089.02 feet; the grid azimuth to the azimuth mark=283°00′31″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Mobile (Maricopa County, J. Bowie, Jr., 1936).—About 31 miles west-northwest of Casa Grande, on the highest point of the first range of hills due south of the village of Mobile and 5 miles south of the village. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.598 meters (18.37 feet) from station in azimuth 172°56′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 6.730 meters (22.08 feet) from station in azimuth 323°25′. The azimuth mark, a standard bronze disk, note 11a, is 0.3 mile from station in azimuth 109°02′05″.

Plane coordinates: (C), x=392,338.93 feet; y=721,063.28 feet; the grid azimuth to the azimuth mark=109°13′33″.*

Ocapos (Maricopa County, J. Bowie, Jr., 1936).—On the summit of a low, rocky hill lying in the pass just south of the Estrella Range, 50 miles west-northwest of Casa Grande, 12 miles east-northeast of Gila Bend, 5 miles west of the Southern Pacific Railroad station at Estrella, three-fourths mile east of the abandoned railroad camp "Ocapos," in the center of the rounded summit of the small, detached hill, on its highest point. Marked by a standard bronze disk as described in note 3. Reference mark No. 1, a standard bronze reference disk, note 12a, on the crest of the summit, is 5.515 meters (18.09 feet) from station in azimuth 334°58′. Reference mark No. 2, a standard bronze reference disk, note 12a, at the west edge of the summit, on the ridge line, is 9.352 meters (30.68 feet) from station in azimuth 154°16′. The azimuth mark, a standard bronze disk, note 11a, is on the Casa Grande Highway, 25 yards east of the grade crossing of the Southern Pacific Railroad, 23 feet north of the center of the highway, 4 feet southwest of a telephone pole, and is 0.3 mile from station in azimuth 166°40′50″.

Plane coordinates: (C), x=322,121.38 feet; y=724,725.88 feet; the grid azimuth to the azimuth mark=166°59′47″.*

G. L. O. Station No. 20 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 36, T. 8 S., R. 1 E., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches, set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1934. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 13.973 meters (45.84 feet) north (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 11.777 meters (38.64 feet) west (magnetic).

Plane coordinates: (C), x=411,937.91 feet; y=611,492.05 feet.

T. 3 S., R. 1 W., sec. 12, southeast corner (Pima County, J. Bowie, Jr., 1936).—See description of *Section*.

Plane coordinates:[1] (C), x=381,039 feet; y=791,110 feet.

T. 9 S., R. 1 E., secs. 17 and 20, ¼ corner (Pima County, J. Bowie, Jr., 1936).—See description of *Lorue*.

Plane coordinates:[1] (C), x=388,130 feet; y=595,736 feet.

McEuen (Pima County, J. Bowie, Jr., 1936).—About 14 miles west of Silverbell, 17 miles east-northeast of Santa Rosa and 3 miles south of the McEuen ranch house, on the brush-covered flats, on the south edge of sec. 32, T. 10 S., R. 6 E., and 25.2 feet north of an east and west fence. The station and underground marks are bronze disks set in concrete as described in notes 1a and 7a. The reference marks are standard disks mounted on bronze rods projecting about 4 inches above the ground. Reference mark No. 1, 1½ feet north of the east and west fence, is 9.844 meters (32.30 feet) from station in azimuth 317°25′. Reference mark No. 2, 1½ feet north of the east and west fence, is 10.096 meters (33.12 feet) from station in azimuth 44°41′. The horizontal distance between the reference marks is 13.753 meters (45.14 feet). The azimuth mark, a standard bronze disk, note 11a, is 1½ feet north of the east and west fence, 2 feet north of a General Land Office pipe stamped "$\frac{S32}{S5}$ ¾" and 225 yards from station in azimuth 87°47′23″.

Plane coordinates: (C), x=546,162.58 feet; y=516,373.02 feet; the grid azimuth to the azimuth mark=87°42′34″.*

Volcanic (Pinal County, J. Bowie, Jr., 1936).—About 15 miles south and 7 miles west of Eloy, and 11 miles northwest of Silverbell, in sec. 30, T. 10, S., R. 7 E., on the top of a hill about 400 feet high consisting of decomposed

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

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granite, the third and largest of three hills just north of a large mountain. There is a cone-shaped hill with two smaller hills about 1 mile north of the station. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 14.620 meters (47.97 feet) from station in azimuth 357°05′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 17.062 meters (55.98 feet) from station in azimuth 50°51′. The azimuth mark is a General Land Office pipe with bronze cap stamped "T. 10 S., R. 6 and 7 E., 1915," 120 yards southeast of a white building and 1.0 mile from station in azimuth 153°23′42″.

Plane coordinates: (C), x=573,474.58 feet; y=557,182.82 feet; the grid azimuth to the azimuth mark=153°16′01″.*

Rotten (Pinal County, J. Bowie, Jr., 1936).—About 4 miles west-northwest of Sasco, 9 miles north-northeast of Silverbell, in T. 10 S., R. 8 E., on the summit of the westerly and highest one of a group of three similar hills of about the same elevation lying south of Picacho Peak and State Route No. 84, on the central and highest peak of the hill, on a small rocky knoll, in the center of the rounded summit. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is near the east edge of the summit, in top of a flat rock ledge and 5.875 meters (19.27 feet) from station in azimuth 282°57′. Reference mark No. 2, a standard bronze reference disk, note 12a, is on high, rocky point, in sharp rock outcrop, 2.870 meters (9.42 feet) from station in azimuth 50°32′. The azimuth mark, a standard Coast and Geodetic Survey bench mark disk stamped "W 91 1935", set in top of a concrete post, is on road leading to foot of station peak, about 400 yards east-southeast of a ranch house, 40 yards south-southwest of the center of the road, 20 feet northeast of a cattle trail leading southwest across flat, and 1.3 miles from station in azimuth 124°44′58″.

Plane coordinates: (C), x=631,244.99 feet; y=567,162.33 feet; the grid azimuth to bench mark W 91=124°31′13″.*

Toltec (Pinal County, J. Bowie, Jr., 1936).—About 13 miles south-southeast of Casa Grande and 7 miles south-southwest of Toltec Railroad Station on the Southern Pacific Railroad, on the desert flat lying north of the Silver Reef Mountain Range and south of State Highway No. 84, in the southeast corner of sec. 24, T. 8 S., R. 6 E., on the open plain 25 yards northwest by north of a gate in a drift fence, 35 feet southwest of the fence, and 15 feet north of the center of the track road leading across the plain. Marked by a standard disk welded to top of 3-foot iron pipe, set in concrete, note 1d. Reference mark No. 1, a standard bronze reference disk, welded to iron pipe set in concrete, note 11e, is 7 feet southwest of the drift fence and 14.288 meters (46.88 feet) from station in azimuth 216°02′. Reference mark No. 2, a standard bronze reference disk, note 11e, is 15 feet southwest of the center of the road and 21.190 meters (69.52 feet) from station in azimuth 104°47′. The azimuth mark, a standard bronze disk, note 11a, is along the track road, 25 feet south-southwest of the center of the road and 0.25 mile from station in azimuth 154°48′00″.

Plane coordinates: (C), x=575,520.90 feet; y=620,149.51 feet; the grid azimuth to the azimuth mark=154°40′03″.*

Jack (Pinal County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, in sec. 6, T. 9 S., R. 5 E., about 4 miles north of Jack Rabbit store, on the Santa Rosa Road, about 14½ miles south and 8 miles west of Casa Grande, and about 2½ miles west, air line, of the Casa Grande-Santa Rosa Highway, on the highest of a group of mountains known as Silver Reef Mountains, on a twin peak mountain, the peak to the southwest of the station being a little higher than the peak on which the station is located. The west side of the mountain is a sheer cliff for about 500 feet. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 3.110 meters (10.20 feet) from station in azimuth 253°18′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 3.173 meters (10.41 feet) from station in azimuth 11°01′. The azimuth mark, a standard bronze disk, note 12a, is west of the station on a rocky hill, 100 yards west of a wash that extends northwest in the lowlands west of the station, 75 yards west of the road to the station and a giant saguaro with a triangular blaze, and 0.7 mile from station in azimuth 130°14′28″.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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Plane coordinates: (C), x=508,475.72 feet; y=606,446.51 feet; the grid azimuth to the azimuth mark=130°13′35″.*

Chui (Pinal County, J. Bowie, Jr., 1936).—On the top of a small volcanic rock hill about 50 feet in height; about 8 miles south and 1½ miles west of Casa Grande; at the north edge of the Indian village of Chui Chuschui, and about 0.3 mile west of the Casa Grande-Santa Rosa Road; in sec. 1, T. 8 S., R. 5 E., just northeast of an Indian cemetery. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 8.513 meters (27.93 feet) from station in azimuth 3°40′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 7.902 meters (25.93 feet) from station in azimuth 92°43′. The azimuth mark is U. S. Coast and Geodetic Survey level bench mark G 84, 0.5 mile south of wooden bridge, 35 feet west of highway, and 0.8 mile from station in azimuth 346°51′12″.

Plane coordinates: (C), x=540,313.16 feet; y=640,262.65 feet; the grid azimuth to bench mark G 84=346°46′57″.*

Bur (Pinal County, J. Bowie, Jr., 1936).—On top of a low rocky hill which is the smallest and most northerly of a group of low hills about 8 miles east of Table Top Mountain. It is near the north side of sec. 6, T. 8 S., R. 4 W., and about 125 yards south of the Papago Indian Reservation line. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 11.781 meters (38.65 feet) from station in azimuth 188°16′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 8.810 meters (28.90 feet) from station in azimuth 24°30′. The azimuth mark, a General Land Office iron pipe section corner marker, is about 0.2 mile east of a wire gate, and is set in the wire boundary fence. The mark is stamped "T. 7 S., R. 4 E., sections 31–32, P. I. R.", and is about 0.5 mile from station in azimuth 264°29′51″.

Plane coordinates: (C), x=477,464.65 feet; y=642,722.14 feet; the grid azimuth to the General Land Office mark=264°32′14″.*

B. M. Z 82 (Pinal County, J. Bowie, Jr., 1936).—Located about 6 miles west of Casa Grande in the southeast corner of sec. 19, T. 6 S., R. 5 E., in the brush-covered flats, 50 feet north of State Highway No. 84. There is a borrow pit about 100 yards south of the station. Marked by a standard U. S. Coast and Geodetic Survey bench mark. The reference marks are standard bronze disks cast on 1-inch bronze rods and projecting about 8 inches above the ground. Reference mark No. 1 is 10.491 meters (34.42 feet) from station in azimuth 227°41′. Reference mark No. 2 is 13.243 meters (43.45 feet) from station in azimuth 132°43′. The azimuth mark, a standard bronze disk, note 11a, is 57 feet north of the center line of Highway No. 84, projects about 4 inches above the ground, and is 0.3 mile from station in azimuth 90°16′30″.

Plane coordinates: (C), x=517,208.77 feet; y=683,689.87 feet; the grid azimuth to the azimuth mark=90°14′40″.*

Double (U. S. G. S.) (Pinal County, J. Bowie, Jr., 1936).—On the summit of two low rocky hills lying about 18 miles due west of Casa Grande, 0.4 mile northwest of State Highway No. 84, about 1½ miles northeast of Orange Valley service station, on the first hill west across the flats from Casa Grande. The station is marked by a standard U. S. Geological Survey blank disk set in bedrock at the highest point of the hill. Reference mark No. 1, a standard bronze reference disk, note 12a, is 9.481 meters (31.11 feet) from station in azimuth 335°08′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 3.958 meters (12.99 feet) from station in azimuth 101°47′. The azimuth mark, U. S. Coast and Geodetic Survey bench mark F 83, 1935, is 21 paces north of the center line of Highway No. 84, 23 paces southeast of a tree, and one-half mile from station in azimuth 295°43′20″.

Plane coordinates: (C), x=452,826.58 feet; y=680,914.61 feet; the grid azimuth to bench mark F 83=295°48′20″.*

Bon (Pinal County, J. Bowie, Jr., 1936).—About 12 miles northwest of Casa Grande along the Maricopa Highway and the Southern Pacific Railroad, 0.3 mile southeast of the railroad maintenance station Bon, 100 yards south of the railroad, 87 feet south of the center of the highway, and 50 feet south of a guyed telephone pole. Station mark, a standard bronze disk welded to top of a 3-foot shank, is set in concrete and projects about 12 inches. Reference mark No. 1, a standard bronze reference disk welded to top of a 3-foot shank,

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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set in concrete and projecting about 12 inches, is 30 feet south of the center of the highway, 3½ feet west of the guyed pole and 14.958 meters (49.07 feet) from station in azimuth 196°40′. Reference mark No. 2, a standard bronze reference disk, welded to the top of a 3-foot shank and projecting about 12 inches, is about 45 feet south of the center of the highway and 14.408 meters (47.27 feet) from station in azimuth 263°50′. The azimuth mark, a standard bronze disk, note 11a, is 35 feet north of the center of the highway, 4 feet south of the railroad right-of-way fence, 3 feet west of telephone pole No. 150 and about 0.2 mile from station in azimuth 294°26′47″.

Plane coordinates: (C), x=503,216.84 feet; y=715,928.47 feet; the grid azimuth to the azimuth mark=294°26′27″.*

Duty (Maricopa County, J. Bowie, Jr., 1936).—On low open flats, 2 miles south and 1.0 mile west of Maricopa Railroad Station, in the northeast corner of sec. 5, T. 5 S., R. 3 E., just south of township line. The station and reference marks are standard bronze disks welded to 3-foot pipes set in concrete. Reference mark No. 1 is 18.450 meters (60.53 feet) from station in azimuth 244°13′. Reference mark No. 2 is 15.610 meters (51.21 feet) from station in azimuth 116°34′. The azimuth mark, a standard bronze disk, note 11a, is about 0.25 mile from station in azimuth 265°48′44″.

Plane coordinates: (C), x=454,074.40 feet; y=738,001.75 feet; the grid azimuth to the azimuth mark=265°53′38″.*

Tooth (Pinal County, J. Bowie, Jr., 1936).—About 21½ miles, air line, due south of Casa Grande, and about 1.75 miles east of wire fence on the Papago Indian Reservation line, on the highest point of a low flat-topped black lava hill which lies at the south end of the Sawtooth Mountains, in sec. 8, T. 10 S., R. 6 E. The station is in a large mass of large black boulders on the northeast end and highest point of the hill. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 3.947 meters (12.95 feet) from station in azimuth 295°04′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 4.072 meters (13.36 feet) from station in azimuth 17°49′. The azimuth mark, a standard bronze disk, note 11a, is about 20 yards north of the north base of the first hill to the west of the station, on the north side of a dim track road, about 1½ miles east of the reservation line fence and 0.4 mile from station in azimuth 147°37′24″.

Plane coordinates: (C), x=547,565.61 feet; y=570,395.28 feet; the grid azimuth to the azimuth mark=147°32′25″.*

Slate (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation about 22½ miles east of Santa Rosa Indian Village, 8 miles west-southwest of Silver Bell mining camp, about 5 miles west of the east boundary of the reservation, in T. 12 S., R. 7 E., on the rounded summit of the most westerly one of a group of low hills lying southwest of the Silver Bell range, at the west end of the summit, about 50 feet west of the center of the summit, in a large, rectangular boulder. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 3.109 meters (10.20 feet) from station in azimuth 260°02′. Reference mark No. 2, a standard azimuth disk, note 12c, is in a large boulder at west edge of summit, 3.926 meters (12.88 feet) from station in azimuth 168°49′. The azimuth mark, a standard reference disk, note 11a, is on the road leading past the foot of the hill on which station is located, at point where dim tracks leave road east to base of hill, 12 feet west of the center of the road, and 0.3 mile from station in azimuth 132°34′33″.

Plane coordinates: (C), x=585,681.94 feet; y=497,860.84 feet; the grid azimuth to the azimuth mark=132°25′38″.*

Heath (Maricopa County, J. Bowie, Jr., 1936).—On the flat desert plain, about 2¾ miles east-northeast of the village of Litchfield, on the west bank of the Agua Fria River bed (dry), about one-half mile north of the graded county road from Litchfield, one-fourth mile north of a house with a corrugated iron roof, 60 yards north of a lone grave with headboard marked "Heath," 50 feet west of the west edge of the raised embankment at the west edge of the river bed. Marked by a standard disk, welded to top of a 3-foot shank, set in concrete, note 1d. Reference mark No. 1, a standard bronze reference disk, note 11e, is 10.712 meters (35.14 feet) from station in azimuth 349°09′. Ref-

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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erence mark No. 2, a standard bronze reference disk, note 11e, is 9.349 meters (30.67 feet) from station in azimuth 97°17′. The azimuth mark, a standard bronze disk, note 11a, is approximately one-fourth mile north of the graded road east from Litchfield, 60 yards east of the house with the corrugated iron roof, 25 feet north of dead snag, 20 feet east of center of the road leading to station and 0.3 mile from station in azimuth 12°58′41″.

Plane coordinates: (C), x=377,325.82 feet; y=909,975.15 feet; the grid azimuth to the azimuth mark=13°12′00″.*

Pok (Maricopa County, J. Bowie, Jr., 1936).—On the desert plains, 8 miles west and one-half mile north of Litchfield. It is on the highest point of a small gravel ridge, 0.5 mile north and 1.0 mile west of the point where the main road running straight west from the Goodyear flag pole in Litchfield intersects the main north-south canal of the Maricopa County Municipal Water Conservation District No. 1; and about 0.1 mile southwest of a well-traveled desert road. Station and reference marks are standard disks welded to 3-foot pipes set in concrete. Reference mark No. 1 is 9.100 meters (29.86 feet) from station in azimuth 197°49′. Reference mark No. 2, is 8.833 meters (28.98 feet) from station in azimuth 94°02′. The azimuth mark, a standard bronze disk, note 11a, is 25 feet south of center line of desert road leading to station and 0.15 mile from station in azimuth 295°00′05″.

Plane coordinates: (C), x=325,284.48 feet; y=909,915.67 feet; the grid azimuth to the azimuth mark=295°19′04″.*

Alhambra (Maricopa County, J. Bowie, Jr., 1936).—In the village of Alhambra, about 4 miles northwest of the main business district of Phoenix, 0.2 mile north of the point where a dirt street (north-south) intersects U. S. Highway No. 89 at Shady Lane Auto Court. The station is on the right-of-way of the dirt street, 8.9 meters east of its center line, 228 feet south of the center line of the T intersection of the north-south street with an east-west street, and 1.5 meters west of the east right-of-way fence. Marked by a standard bronze disk, note 6b, with the top of the concrete flush with the surface of the ground and the station mark projecting about 10 inches above the concrete. Reference mark No. 1 is 9.5 meters east of the center line of the road, 0.7 meter west of the right-of-way fence line, and about 3 meters south of an old driveway into the cultivated field. It is marked in a manner similar to the station mark, and is 12.004 meters (39.38 feet) from station in azimuth 356°42′. Reference mark No. 2 is 8.0 meters west of the center line of the road, and 1 meter east of the right-of-way fence line. It is marked in a manner similar to the station mark, and is 16.861 meters (55.32 feet) from station in azimuth 90°15′. The azimuth mark, a standard bronze disk, note 11a, is about one-half mile from station in azimuth 95°12′39″, about 20 yards southeast of a small yellow railroad house, about 15 yards northeast of railroad tracks, about 25 yards southwest of the center line of paved Highway No. 89, about 15 yards west of the center line of the north-south road, and about 4 yards south of the center line of an east-west road.

Plane coordinates: (C), x=435,224.47 feet; y=907,412.80 feet; the grid azimuth to the azimuth mark=95°19′41″.*

Jokake (Maricopa County, J. Bowie, Jr., 1936).—About 10 miles northeast of the courthouse in Phoenix, 0.3 mile west of the Jokake Inn, 1 mile southeast of the summit of Camel Back Mountain, 30 feet north of the center line of east and west road, and 71.7 feet northwest of the northwest corner of booster pumphouse No. 2 which is on the south side of the road. The station mark is a standard disk cast on a 1-inch bronze rod and projecting about 10 inches above the ground. Reference mark No. 1, a standard disk cast on a 1-inch bronze rod and projecting about 10 inches above the ground, is 11.596 meters (38.04 feet) from station in azimuth 85°23′. Reference mark No. 2, a standard disk cast on a 1-inch bronze rod and projecting about 10 inches above the ground, is 9.859 meters (32.35 feet) from station in azimuth 175°37′. The azimuth mark, a standard bronze disk, note 11a, is in the southwest angle of the intersecting roads, 3 feet northeast of the northeast corner of booster pumphouse No. 1, and 0.3 mile from station in azimuth 87°16′33″.

Plane coordinates: (C), x=488,195.93 feet; y=910,106.43 feet; the grid azimuth to the azimuth mark=87°17′50″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

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Falfa (Maricopa County, J. Bowie, Jr., 1936).—On the east side of State Highway No. 87, 4.6 miles south of Mesa. Station marks are bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, is cemented in culvert bulkhead at cross roads and is 29.405 meters (96.47 feet) from station in azimuth 0°02′. Reference mark No. 2, a standard bronze reference disk, is cemented in concrete highway opposite the station and is 11.980 meters (39.30 feet) from station in azimuth 90°16′. The azimuth mark is along the west side of Highway No. 87 near the west right-of-way boundary fence and about 0.3 mile from station in azimuth 177°41′14″.

Plane coordinates: (C), x=523,109.13 feet; y=854,851.78 feet; the grid azimuth to the azimuth mark=177°38′44″.*

Canarr (Maricopa County, J. Bowie, Jr., 1936).—At the intersection of Highland or Eastern Canal with the Southern Pacific Railroad, 7.1 meters northwest of the northwest bank of the canal, 2.1 meters southeast of a wire fence at a point where it makes a jog, 16.5 meters southwest of a concrete water gate, and 32.8 meters southwest of the southwest rail of the railroad tracks. There is a road between the station and the canal. (The canal runs approximately northeast and southwest, and the railroad runs approximately northwest and southeast.) The station and reference marks are standard disks in the top of pipes which are set in concrete. The concrete is a circular mass, the top of which is about 3 inches below the ground surface. The disk projects about 8 inches above the ground surface and about 11 inches above the top of the concrete. Reference mark No. 1 is 40 paces southwest of the southwest rail of the railroad tracks, 5 paces southwest of a wire fence, about 1 meter southeast of the southeast bank of the concrete canal and 17.269 meters (56.66 feet) from station in azimuth 313°12′. Reference mark No. 2 is about 51 meters southwest of the southwest rail (mentioned above), 13.8 meters northwest of the northwest bank of the canal, 6 inches east of a wire fence line and 19.059 meters (62.53 feet) from station in azimuth 59°22′. The azimuth mark, a standard bronze disk, note 11a, is about one-fourth mile southwest of the railroad, on the northwest side of the canal about halfway between the road and the right-of-way fence and 0.2 mile from station in azimuth 38°19′03″.

Plane coordinates: (C), x=551,640.47 feet; y=846,403.84 feet; the grid azimuth to the azimuth mark=38°13′29″.*

San (Maricopa County, J. Bowie, Jr., 1936).—About 8 miles east and 4 miles south of Chandler, at a desert cross roads and section corner 13–14–23–24, T. 2 S., R. 6 E., 1 mile east and 1 mile west of graded roads, about 18 feet west of a lone southeast fence corner. Station and reference marks are standard bronze disks welded to 3-foot pipes set in concrete. Reference mark No. 1 is 13.908 meters (45.63 feet) from station in azimuth 265°05′. Reference mark No. 2 is 13.380 meters (43.90 feet) from station in azimuth 94°23′. The azimuth mark, a standard bronze disk, note 11a, is just north of desert road, 3 feet south of fence line and 0.25 mile from station in azimuth 88°48′43″.

Plane coordinates: (C), x=565,409.46 feet; y=818,041.92 feet; the grid azimuth to the azimuth mark=88°41′41″.*

Governor Hunt's Tomb, center (Maricopa County, J. Bowie, Jr., 1936).—Plane coordinates:[1] (C), x=491,762 feet; y=891,900 feet.

Treadway (Pinal County, J. Bowie, Jr., 1936).—About 15 miles south of Florence and 5 miles west of U. S. Highway No. 80, on the south end and highest point of a north-south rocky ridge or hill that is simply a large pile of granite boulders, some of them quite large, which lies about 3 miles southeast of a higher ridge that runs out to the north from Newman Peak. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 2.297 meters (7.54 feet) from station in azimuth 302°40′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 2.661 meters (8.73 feet) from station in azimuth 125°12′. The azimuth mark, a standard bronze disk, note 11a, is on the west side of a north-south track road and one-half mile from station in azimuth 264°52′38″.

Plane coordinates: (C), x=685,385.57 feet; y=664,729.72 feet; the grid azimuth to the azimuth mark=264°33′00″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

Smoke (Pinal County, J. Bowie, Jr., 1936).—About 17½ miles southeast of Florence, and about 4 miles east of U. S. Highway No. 80, along a well-traveled track road leading east from the highway, on a cactus and brush covered plain, about 60 yards east of a wash along the road to the west, 23.5 feet south of the center of the track road, and 12 feet east-northeast of a stubby saguaro, opposite the head of a wash to the north. Marked by a standard bronze disk as described in note 1d. Reference mark No. 1, a standard bronze reference disk, note 11e, is 14.757 meters (48.42 feet) from station in azimuth 351°45′. Reference mark No. 2, a standard bronze reference disk, note 11e, is 25 feet south of the center of the track road and 14.501 meters (47.58 feet) from station in azimuth 70°39′. The azimuth mark, a standard bronze disk, note 11a, is about 60 yards east of curve where road crosses a shallow wash, 10 feet south of the center of the road and 0.3 mile from station in azimuth 96°36′15″.

Plane coordinates: (C), x=727,996.07 feet; y=676,686.40 feet; the grid azimuth to the azimuth mark=96°12′05″.*

North Hill (Pinal County, J. Bowie, Jr., 1936).—About 30 miles north and 10 miles west of Tucson, 25 miles south of Florence, on the most northern of a group of hills lying about 1 mile west of U. S. Highway No. 80, a hill to the south being higher. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12a, is 11.230 meters (36.84 feet) from station in azimuth 312°31′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 19.482 meters (63.92 feet) from station in azimuth 102°55′. The azimuth mark, a standard U. S. Coast and Geodetic Survey bench mark stamped "T 59 1934", about 50 feet east of the centerline of U. S. Highway No. 80, is 0.7 mile from station in azimuth 211°11′03″.

Plane coordinates: (C), x=737,203.55 feet; y=636,519.60 feet; the grid azimuth to bench mark T 59=210°46′00″.*

Clemens (Pinal County, J. Bowie, Jr., 1936).—No description available. Standard reference marks were set. No. 1 is 11.951 meters (39.21 feet) from station in azimuth 22°32′47″. No. 2 is 13.144 meters (43.12 feet) from station in azimuth 97°22′25″. The azimuth mark is 0.2 mile from the station in azimuth 91°55′05″.

Plane coordinates: (C), x=688,933.05 feet; y=629,123.97 feet.

Box "O" (Pinal County, J. Bowie, Jr., 1936).—About 18 miles east-southeast of Florence, on the range of the Box O ranch, on a brushy plain lying about 5 miles southeast of the Florence-Winkelman Road and 3 miles northeast of the Florence-Barkeville Road, on a slight rise of ground, about 150 yards south of the south bank of Donnelly wash, 50 yards north of the dim track road leading east across the flat and 70 feet south of a clump of piñon trees. Station and reference marks are standard bronze disks with 3-foot shanks set in a mass of concrete. Reference mark No. 1 is in range with a prominent double peak on the horizon and 10.912 meters (35.80 feet) from station in azimuth 321°13′. Reference mark No. 2 is 16.332 meters (53.58 feet) from station in azimuth 78°19′. The azimuth mark is along the track road leading past the station, about 100 yards south of the south edge of Donnelly wash, on a slight rise of ground, 35 feet north of the center of the track road, a short distance west of the point where the road enters a wide, shallow swale, and is about 0.3 mile from station in azimuth 126°20′36″.

Plane coordinates: (C), x=777,932.95 feet; y=695,534.83 feet; the grid azimuth to the azimuth mark=125°51′05″.*

Picket Post (Pinal County, J. Bowie, Jr., 1936).—On the highest point and on the south edge of Picket Post Mountain, a prominent peak consisting of vertical cliffs that tower above the local mountains, about 20 miles northeast of Florence, about 10 miles east of Florence Junction, and about 6 feet northwest of a large rock cairn. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 4.250 meters (13.94 feet) from station in azimuth 242°52′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 10.310 meters (33.83 feet) from station in azimuth 114°08′. The azimuth mark, a standard bronze disk, note 12c, on the northeast point of the flat top and approximately at the same elevation as the station, is 0.3 mile from station in azimuth 221°34′02″.

Plane coordinates: (C), x=732,178.32 feet; y=821,711.65 feet; the grid azimuth to the azimuth mark=221°09′02″.*

B. M. 3761 (U. S. G. S.) (Pinal County, J. Bowie, Jr., 1936).—About 6.8 miles north and west on the Superior-Ray Highway from the post office in Ray, at

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

the pass over the summit of an east and west ridge, this being the highest point on the road between Ray and Superior, and 30 feet west of the center line of the road. The mark is a standard U. S. Geological Survey bench mark stamped "3761" set in bedrock, flush with the ground. The southeast corner of the southeast leg of a steel transmission tower is 1.722 meters (5.65 feet) from station in azimuth 43°53′; and the northeast corner of the northeast leg of the tower is 2.980 meters (9.78 feet) from station in azimuth 106°43′.

Plane coordinates: (C), x=762,964.74 feet; y=802,502.89 feet.

Klein (Pinal County, J. Bowie, Jr., 1936).—About 16½ miles northwest of Florence and 10 miles west of Florence Junction on the brushy desert plain lying along the west side of U. S. Highway No. 80, about 1 mile north of ranch house locally known as the old Kleinman place, 100 yards south-southwest of a small dry charco, 15 feet northwest of a dim cattle trail. Marked by a standard bronze disk as described in note 1d. Reference mark No. 1, a standard bronze reference disk, note 11e, is 13.970 meters (45.83 feet) from station in azimuth 183°09′. Reference mark No. 2, a standard bronze reference disk, note 11e, is 17.110 meters (56.14 feet) from station in azimuth 289°40′. The azimuth mark, a standard bronze disk, note 11a, is along dim tracks leading to station, in range with a large, two-toned dome peak about 20 miles east, 36 feet north of a shallow wash and one-fourth mile from station in azimuth 289°58′59″.

Plane coordinates: (C), x=622,552.64 feet; y=816,179.63 feet; the grid azimuth to the azimuth mark=289°45′48″.*

Magma (Pinal County, J. Bowie, Jr., 1936).—About 200 yards northwest of the Southern Pacific depot known as Magma (now abandoned), on a slight rise of ground, 18.3 meters southwest of the southwest rail of the railroad tracks, 173 feet south of the extended center line of the road which runs on a tangent for 2 miles west from the railroad to the old Florence-Phoenix Highway, 6.5 meters northeast of the center line of an old road that parallels the railroad, 35.6 meters south of a switch post, 22.3 meters northwest of a square telephone pole. The station and reference marks are standard bronze disks set in pipes embedded in circular masses of concrete. Reference mark No. 1 is 12.2 meters southwest of the southwest rail of the railroad, 10.2 meters northwest of a square telephone pole, 12.5 meters northeast of the center line of the road that parallels the railroad tracks, and 12.173 meters (39.94 feet) from station in azimuth 292°16′. Reference mark No. 2 is 5.6 meters southwest of the center line of the road that parallels the tracks, about 60 yards south of the extended center line of the road mentioned above and 11.980 meters (39.30 feet) from station in azimuth 44°41′. The azimuth mark, a standard bronze disk, note 11a, is 200 yards southeast of the railroad depot, 29 paces southwest of the railroad tracks, 21 paces southwest of a telephone line, 4 paces northeast of the extended line of a corral fence which is about 125 yards to the northwest and about 0.3 mile from station in azimuth 322°25′20″.

Plane coordinates: (C), x=627,157.90 feet; y=776,573.87 feet; the grid azimuth to the azimuth mark=322°11′42″.*

Pasture (Pinal County, J. Bowie, Jr., 1936).—About 10 miles north of Florence on U. S. Highway No. 80, 6.6 miles south of Florence Junction, which is the junction of Highways Nos. 70, 80, and 60; 40 feet west of the center line of the highway, 12 feet off the fence line, 0.6 mile north of a sign "Florence 10 miles," on a ridge which is the highest point on the highway between Florence Junction and Florence. The station and reference marks are standard disks cast on 1-inch bronze rods and projecting about 6 inches above the ground. Reference mark No. 1 is 27.124 meters (88.99 feet) from station in azimuth 276°47′. Reference mark No. 2 is 27.934 meters (91.65 feet) from station in azimuth 14°15′. The azimuth mark is a standard U. S. Coast and Geodetic Survey bench mark stamped "M 108 1934," on the right-of-way fence line on the west side of the highway and 0.5 mile from the station in azimuth 187°08′26″.

Plane coordinates: (C), x=672,362.71 feet; y=788,671.45 feet; the grid azimuth to bench mark M 108=186°49′57″.*

Palo (Pinal County, J. Bowie, Jr., 1936).—About 9.0 miles northeast of Florence, on the highest point of a low lava knoll, which is covered with paloverde trees, and about 1.0 mile, air line, east of U. S. Highway No. 80. Marked by a standard bronze disk as described in note 2. Reference mark

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

No. 1, a standard bronze reference disk, note 12a, is 7.850 meters (25.75 feet) from station in azimuth 138°40′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 12.570 meters (41.24 feet) from station in azimuth 272°04′. Triangulation station *Pasture* used as azimuth mark.

Plane coordinates: (C), x=675,508.90 feet; y=777,412.45 feet; the grid azimuth to station *Pasture*=164°23′15″.5.

Lore (Pinal County, J. Bowie, Jr., 1936).—About 15 miles north of Florence on U. S. Highway No. 80, 0.7 mile south of the junctions of U. S. Highways Nos. 80, 60, 70 and 89, 56 feet east of the center line of U. S. Highway No. 80, and 100 feet south of a metal yellow sign painted "Curve." Marked by a standard disk cast in a 1-inch bronze rod and projecting 6 inches above the ground. Reference mark No. 1, a standard bronze reference disk cast in a 1-inch bronze rod projecting 6 inches above the ground is 14.690 meters (48.20 feet) from station in azimuth 276°28′. Reference mark No. 2, a standard bronze reference disk cast in a 1-inch bronze rod projecting 6 inches above the ground is 17.134 meters (56.21 feet) from station in azimuth 7°27′. The azimuth mark, a standard bronze disk, note 11a, is 135 feet east of the center line of U. S. Highway No. 80 and 315 yards from station in azimuth 197°52′23″.

Plane coordinates: (C), x=676,169.38 feet; y=818,628.78 feet; the grid azimuth to the azimuth mark=197°33′26″.*

Tortilla (Pinal County, J. Bowie, Jr., 1956).—About 22½ miles east of Florence, about 6½ miles south-southwest of Kelvin near the center of sec. 3, T. 5 S., R. 13 W., 1½ miles east of the Florence-Winkelman Highway and 0.3 mile east of fence line on the Redondo lease, on one of the many peaks of the Tortilla Range on the last high ridge east before dropping down into Ripsey wash. It is on the highest point of the more southerly one of two hills of equal height. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is on the same ridge as the station, near the center of a small ridge which juts out to the southwest from the highest point and 33.071 meters (108.50 feet) from station in azimuth 70°55′. Reference mark No. 2, a standard bronze reference disk, note 12a, is on the south slope of the first hill north of the station site and 58.019 meters (190.35 feet) from station in azimuth 154°45′. The azimuth mark, a standard bronze disk, note 12a, is on the first hill to the southwest, on the north end of the highest point of the hill, on a ledge which projects about 2 feet, and 0.6 mile from station in azimuth 73°12′48″.

Plane coordinates: (C), x=779,171.97 feet; y=737,121.95 feet; the grid azimuth to the azimuth mark=72°43′01″.*

Kel (Pinal County, J. Bowie, Jr., 1936).—About 3 miles east-southeast of the town of Kelvin, 0.1 mile north of the Kelvin-Winkelman Highway, on the north end and highest part of a north and south ridge crossed by the highway. The station is on a boulder projecting about 18 inches above the ground. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, is 7.447 meters (24.43 feet) from station in azimuth 349°38′. Reference mark No. 2, a standard bronze reference disk, note 12c, is 7.733 meters (25.37 feet) from station in azimuth 92°02′. Station *Kelvin* may be used as an azimuth mark.

Plane coordinates: (C), x=805,496.62 feet; y=764,267.99 feet; the grid azimuth to station *Kelvin*=357°13′11″.8.**

Ray (Pinal County, J. Bowie, Jr., 1936).—About 24½ miles northeast of Florence, 1½ miles northwest of the small mining town of Ray, about one-fourth mile north of the Ray-Superior Highway, at the east end of one of the long, sloping ridges radiating from the peak of Teapot Mountain, 200 yards northwest of a small but prominent hill lying on the north side of the highway, 27 yards northeast of a lone saguaro cactus in the longitudinal center of the ridge, 30 feet north of the ridge line, near the north edge of the ridge summit, in range with the south edge of Teapot Peak and the twin black water tanks on north side of the highway, in top of a slanting, sharp-edge boulder which projects about 6 inches above the ground. Marked by a standard bronze disk as described in note 4. Reference mark No. 1, a standard bronze reference disk, note 12c, near the south edge of the ridge, in top of boulder flush with the ground, is 10.932 meters (35.87 feet) from station in azimuth 324°05′. Refer-

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

**This azimuth has been computed by the first formula (p. 67), using both terms.

ence mark No. 2, a standard bronze reference disk, note 12c, on the crest of ridge in flat-topped boulder, is 11.032 meters (36.19 feet) from station in azimuth 53°47′. The azimuth mark, a standard bronze disk, note 11a, 35 yards north of the center of the Ray-Superior Highway, 23 feet northwest of the north side of the easterly one of two small black water tanks, 25 feet west of the northwest corner of a corrugated iron shed, is 0.25 mile from station in azimuth 296°05′47″.

Plane coordinates: (C), x=777,767.63 feet; y=796,076.40 feet; the grid azimuth to the azimuth mark=295°35′58″.*

Molenitus (Pima County, J. Bowie, Jr., 1936).—About 14 miles south and 2 miles east of Pisinemo, 2 miles northeast of Molenitus Hot Wells, on the west end and highest point of a lone lava butte which is plainly visible from Molenitus Hot Wells. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 4.621 meters (15.16 feet) from station in azimuth 203°18′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.133 meters (13.56 feet) from station in azimuth 82°02′. The azimuth mark, a standard bronze disk, note 11a, is at the junction of two track roads, 4 feet east of a sign "U. S. Customs R" and 0.4 mile from station in azimuth 354°47′12″.

Plane coordinates: (C), x=387,344.85 feet; y=299,303.52 feet; the grid azimuth to the azimuth mark=354°58′40″.*

Boundary monument No. 155 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—On the United States-Mexico boundary line, about 6 miles, air line, south of the Indian village of Molenitus and about 30 miles, air line, southwest of Sells. The boundary mark is an iron shaft, 12 inches square at the base, about 10 inches square at the top, pointed at the extreme top, and about 7 feet high. The shaft is painted a silver color, and the base is of concrete. The monument stands 19.3 meters south of the boundary fence line. Reference mark No. 1, a standard bronze reference disk, note 11a, projecting about 8 inches, is 20.828 meters (68.33 feet) from station in azimuth 220°29′. Reference mark No. 2, a standard bronze reference disk, note 11a, projecting about 8 inches, is 24.919 meters (81.76 feet) from station in azimuth 161°30′. The azimuth mark, a standard bronze disk, note 11a, is 19 paces north of the boundary fence line and 0.3 mile from station in azimuth 114°17′14″.

Plane coordinates: (C), x=374,624.06 feet; y=264,635.22 feet; the grid azimuth to the azimuth mark=114°29′58″.*

Tecolate (Pima County, J. Bowie, Jr., 1936).—About 17 miles southwest of Sells, in the Indian village of Tecolate, on top of the embankment at the northwest corner of the main village charco. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 23.790 meters (78.05 feet) from station in azimuth 63°12′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 26.174 meters (85.87 feet) from station in azimuth 168°15′. The azimuth mark, a standard bronze disk, note 11a, is 12 feet north of the center line of track road that goes west from charco and is 0.3 mile from station in azimuth 85°33′26″.

Plane coordinates: (C), x=442,130.77 feet; y=278,452.27 feet; the grid azimuth to the azimuth mark=85°39′19″.*

Stone tank (Pima County, J. Bowie, Jr., 1936).—On the Papago Indian Reservation, about 12 miles south-southwest of the Indian village of Pisinemo. From Pisinemo, go about 5½ miles southward to Indian village of Santa Cruz. About 100 yards northwest of mission take plain track road southward 2.1 miles, take right fork 0.4 mile, then middle fork of three for 1.6 miles to cleared field on left of road. Continue on main road 0.5 mile along fence line to a point 50 yards south of the southwest fence corner, then take right fork and go west 0.9 mile to windmill with stone reservoir tank and station. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 12.860 meters (42.19 feet) from station in azimuth 270°27′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 13.430 meters (44.06 feet) from station in azimuth 31°47′. The azimuth mark, a standard bronze disk, note 11a, is on south side of road leading to station and 0.3 mile from station in azimuth 300°22′31″.

Plane coordinates: (C), x=355,524.03 feet; y=329,848.77 feet; the grid azimuth to the azimuth mark=300°37′16″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Boundary monument No. 158 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, J. Bowie, Jr., 1936).—On the United States-Mexico boundary, 22½ miles south-southwest of Pisinemo, 12 miles southwest of the Indian village of Molenitus, on the flat desert plain lying south of the south end of the Mesquite Mountains and west of the north end of the Lesna Mountain Range, about 2 miles west of the abandoned Indian village of Comote and 75 feet south of the center of the track road along the north side of the boundary fence. The station is the center of the top of a standard cast-iron boundary marker about 7 feet high, painted aluminum and having the raised numerals "158" fixed to its east side. Reference and azimuth marks are bronze disks set in concrete as described in note 11a. Reference mark No. 1 is on the north side of the boundary fence, at south edge of the track road and is in azimuth 236°32′ from the station. Reference mark No. 2 is on the north side of the boundary fence, at south edge of the track road and is in azimuth 163°27′ from the station. The azimuth mark is on the north side of the road, 35 feet north of the boundary fence, 25 feet west of a shallow wash and about 0.2 mile from station in azimuth 286°01′14″.

Plane coordinates: (C), x=331,507.29 feet; y=280,474.30 feet; the grid azimuth to the azimuth mark=286°18′22″.*

G. L. O. Station No. 1 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 24, T. 19 S., R. 2 W., marked by a 3-inch iron post with a brass cap set in a concrete block 10 by 16 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range and date 1936–1925. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 21.12 meters (69.3 feet) south (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 12.515 meters (41.06 feet) N. 86°21′ E. (magnetic). A large cottonwood tree about one-fourth mile from station bears N. 27½° E. (magnetic).

Plane coordinates: (C), x=343,532.42 feet; y=276,052.60 feet.

Windmill at stone tank (Pima County, J. Bowie, Jr., 1936).—Plane coordinates: (C), x=355,727.64 feet; y=329,769.69 feet.

Pisinemo, stone windmill, center of top of tower (Pima County, J. Bowie, Jr., 1936).—Plane coordinates:[1] (C), x=376,349 feet; y=378,012 feet.

G. L. O. Station No. 2 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 33, T. 17 S., R. 1 W., marked by a 2-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1935. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 171.497 meters (562.65 feet) west (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 140.254 meters (460.15 feet) N. 45° W. (magnetic).

Plane coordinates: (C), x=359,638.01 feet; y=326,055.34 feet.

G. L. O. Station No. 3 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 36, T. 16 S., R. 1 W., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1918. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 124.323 meters (407.88 feet) east (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 129.855 meters (426.03 feet) S. 45° E. (magnetic).

Plane coordinates: (C), x=375,662.06 feet; y=357,633.84 feet.

G. L. O. Station No. 4 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 36, T. 15 S., R. 3 W., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1918. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 189.85 meters (622.9 feet) S. 30° E. (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 146.874 meters (481.87 feet) S. 30° W. (magnetic).

Plane coordinates: (C), x=312,400.79 feet; y=389,638.49 feet.

G. L. O. Station No. 5, reference mark No. 1 (Pima County, J. Bowie, Jr., 1936).—See description of *G. L. O. station No. 5.*

Plane coordinates: (C), x=312,688.43 feet; y=438,318.68 feet.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

G. L. O. Station No. 5 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 13, T. 14 S., R. 3 W., marked by a 2-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1918. *G. L. O. Station No. 5, reference mark No. 1*, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 350.958 meters (1,151.43 feet) from station in azimuth 180°00′08″.0. Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 12.05 meters (39.5 feet) N. 80° W. (magnetic).

Plane coordinates: (C), x=312,681.95 feet; y=437,167.34 feet.

G. L. O. Station No. 8, reference mark No. 1 (Maricopa County, J. Bowie, Jr., 1936).—See description of *G. L. O. station No. 8.*

Plane coordinates: (C), x=310,818.80 feet; y=581,012.82 feet.

G. L. O. Station No. 8 (Maricopa County, J. Bowie, Jr., 1936).—The south ¼ corner of sec. 35, T. 9 S., R. 3 W., marked by a 1-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 28 inches in ground. The cap is stamped with the ¼ section, and date 1936–1934. *G. L. O. Station No. 8, reference mark No. 1*, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 623.426 meters (2,045.36 feet) from station in azimuth 238°31′. Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 100.307 meters (329.09 feet) west (magnetic).

Plane coordinates:[1] (C), x=309,068 feet; y=579,955 feet.

G. L. O. Station No. 9 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 36, T. 13 S., R. 2 W., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 12 by 36 inches set 34 inches in ground. The cap is stamped with the section, township, range, and date 1936–1924. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 359.07 meters (1,178.0 feet) N. 72°37′ E. (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 16.645 meters (54.61 feet) S. 63¼° W. (magnetic).

Plane coordinates: (C), x=344,413.47 feet; y=452,853.64 feet.

G. L. O. Station No. 10 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 24, T. 14 S., R. 1 W., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1918. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 543.763 meters (1,796.68 feet) south (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 13.045 meters (42.80 feet) N. 84½° W. (magnetic).

Plane coordinates: (C), x=375,934.13 feet; y=431,554.28 feet.

G. L. O. Station No. 11 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 25, T. 12 S., R. 2 W., marked by a 2-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1924. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 257.97 meters (846.4 feet) N. 2°15′ W. (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 16.495 meters (54.12 feet) N. 73°54′ W. (magnetic).

Plane coordinates: (C), x=344,613.81 feet; y=489,787.60 feet.

G. L. O. Station No. 14 (Pinal County, J. Bowie, Jr., 1936).—About 6.8 miles southwest of Casa Grande on the Casa Grande-Santa Rosa Highway. Marked by a 1-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1928. A 1-inch iron post with brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground is 25.60 meters (84.0 feet) N. 45° W. Another 1-inch iron post with brass cap set in a similar manner is 18.106 meters (59.40 feet) west. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 18.106 meters (59.40 feet) north. The four above-described marks form a square, and the southeast corner of sec. 24, T. 7 S., R. 5 E., lies at the intersection of the diagonals, in the center line of the Casa Grande-Santa Rosa Highway.

Plane coordinates: (C), x=543,934.72 feet; y=651,866.78 feet.

G. L. O. Station No. 17 (Pima and Pinal Counties, J. Bowie, Jr., 1936).—The southeast corner of sec. 36, T. 10 S., R. 5 E. marked by a 3-inch iron post with

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

a brass cap set in a concrete block 9 by 15 by 36 inches set 34 inches in ground. The cap is stamped with the section, township, range, and date 1936–1915. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 320.544 meters (1,051.65 feet) west (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 16.04 meters (52.6 feet) N. 7° W. (magnetic).

Plane coordinates: (C), x=538,446.76 feet; y=548,022.76 feet.

G. L. O. Station No. 18 (Pima County, J. Bowie, Jr., 1936).—The southeast corner of sec. 36, T. 11 S., R. 7 E., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 34 inches in ground. The cap is stamped with the section, township, range, and date 1936–1916. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 12.265 meters (40.24 feet) west (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 28 inches in ground, is 15.335 meters (50.31 feet) north (magnetic).

Plane coordinates: (C), x=600,847.31 feet; y=517,511.99 feet.

G. L. O. Station No. 23 (Maricopa County, J. Bowie, Jr., 1936).—The southeast corner of sec. 25, T. 10 S., R. 1 W., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1914. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 104.180 meters (341.80 feet) S. 40° E. (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 13.730 meters (45.05 feet) N. 54° E. (magnetic).

Plane coordinates: (C), x=380,096.79 feet; y=553,520.34 feet.

G. L. O. Station No. 13 (Pinal County, J. Bowie, Jr., 1936; 1938).—The southeast corner of sec. 36, T. 9 S., R. 3 E., marked by a 3-inch iron post with a brass cap set in a concrete block 9 by 15 by 36 inches set 32 inches in ground. The cap is stamped with the section, township, range, and date 1936–1914. Reference mark No. 1, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 146.975 meters (482.20 feet) east (magnetic). Reference mark No. 2, a brass cap set in concrete block 7 by 12 by 30 inches set 26 inches in ground, is 16.745 meters (54.94 feet) S. 7°11′ W. (magnetic).

Plane coordinates:[1] (C), x=475,126 feet; y=579,690 feet.

SOUTHERN ARIZONA AREA

(Not divided into principal and supplementary points)

Big Mountain (Pinal County, G. D. Cowie, 1920).—Plane coordinates: (C), x=658,933.84 feet; y=625,533.33 feet.

Sawtooth (Pima County, G. D. Cowie, 1920).—Plane coordinates: (C), x=574,743.14 feet; y=545,060.90 feet.

Casa Grande Mountain (Pinal County, G. D. Cowie, 1920).—The highest summit of Casa Grande Mountain that is just south of the town of Casa Grande.

Plane coordinates:[1] (C), x=563,806 feet; y=659,821 feet.

Picacho Peak (Pinal County, G. D. Cowie, 1919).—The most conspicuous and tall spire on the mountain about 15 miles north of Silverbell.

Plane coordinates: (C), x=659,088.30 feet; y=595,132.53 feet.

Picacho Mountain (Pinal County, G. D. Cowie, 1919).—The highest point of Picacho Mountain just north of Silverbell.

Plane coordinates:[1] (C), x=658,946 feet; y=625,540 feet.

Helmet Peak (Mineral Hill) (Pima County, G. D. Cowie, 1920).—Plane coordinates: (C), x=759,327.28 feet; y=352,636.06 feet.

Tortilla (Pinal County, G. D. Cowie, 1919).—A flag on the highest point of the north end of the Tortilla Range and 3 miles southwest of McGuire's ranch. To reach from Tucson, go to a point just north of the Tortilla Range and take road to McGuire's ranch. Go through the east gate and follow the road south to a point just west of the old prospect holes and ruins of adobe hut. Station is just east of these prospect holes.

Plane coordinates: (C), x=768,666.88 feet; y=577,000.91 feet.

Black Hills (Pima County, G. D. Cowie, 1920).—Plane coordinates: (C), x=765,786.37 feet; y=396,259.58 feet.

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

Coyote Mountain (Pima County, G. D. Cowie, 1930).—Plane coordinates:[1] (C), x=619,172 feet; y=365,287 feet.

Lone Cone (Pima County, G. D. Cowie, 1920).—Plane coordinates: (C), x=632,868.63 feet; y=385,507.86 feet.

Rillito (Pima County, G. D. Cowie, 1920).—Plane coordinates:[1] (C), x=737,892 feet; y=509,950 feet.

Granite Peak (Pima County, G. D. Cowie, 1920).—Plane coordinates: (C), x=631,865.83 feet; y=527,542.57 feet.

Twin Buttes (Pima County, G. D. Cowie, 1920).—Plane coordinates:[1] (C), x=770,623 feet; y=332,674 feet.

South Comobabi (Pima County, G. D. Cowie, 1919; 1934).—On the highest point of the northern end of Comobabi Mountains. Reached from Tucson by following the Ajo road to the abandoned Indian village on the south side of the saddle between the north and south Comobabi Mountains. Take the south road to the abandoned houses and follow to the base of the mountains. Reference mark, 7 paces distant is in azimuth 100° magnetic. Station reported lost in 1934.

Plane coordinates: (C), x=534,258.02 feet; y=377,263.35 feet.

Waterman Peak (Pima County, G. D. Cowie, 1920).—Plane coordinates:[1] (C), x=637,095 feet; y=491,076 feet.

Santa Rosa (Pima County, G. D. Cowie, 1919).—The highest point of Santa Rosa Mountains, just south and east from the Santa Rosa Indian Village.

Plane coordinates: (C), x=512,651.46 feet; y=490,150.82 feet.

Highest peak south of Wasson (Pima County, G. D. Cowie, 1920).—Plane coordinates:[1] (C), x=750,906 feet; y=440,694 feet.

Mount Devine (North Comobabi) (Pima County, G. D. Cowie, 1919; 1934; 1937).—On the highest point of North Comobabi Mountain called Mount Devine. Reached from Tucson by following the Ajo Road to the west side of the pass and then taking the dim road that leads to an Indian cabin. Follow trail 3 miles to the peak. Station mark is a bronze disk. Reference mark is 28 paces in azimuth 59° magnetic.

Plane coordinates: (C), x=534,906.45 feet; y=411,640.81 feet.

Childs (Pima County, G. D. Cowie, 1920).—On a flat-top butte about 3 miles, air line, southeast from Tom Childs' ranch. Take the main traveled road from Childs' ranch to a point a little south of west from the mountain. Turn left and head in a south and west direction to within one-fourth mile of the base of the mountain. Marked by a standard bronze disk as described in note 1. Reference mark is 28 paces 316° magnetic.

Plane coordinates: (C), x=253,234.94 feet; y=478,284.12 feet.

Dome (Maricopa County, G. D. Cowie, 1920).—On a flat-top butte 30 miles by road northeast of Ajo and 8 miles east of a section house known as the Half-way House. This mountain is known locally as Flat Top, and is best reached by taking the Gila Bend wagon road from Ajo 20 miles to the Half-way House and heading across the country east. Marked by a standard bronze disk as described in note 1. Reference mark is 27 paces, 316° magnetic.

Plane coordinates: (C), x=246,063.40 feet; y=595,846.47 feet.

Bates (Pima County, G. D. Cowie, 1920).—About 1½ miles north from Bateswell on the highest peak. From Bateswell, go west one-half mile to a gate and follow the trail north to the base of the hill. Marked by a standard bronze disk as described in note 1. Reference mark is 28 paces, 347° magnetic.

Plane coordinates: (C), x=174,776.60 feet; y=435,097.96 feet.

Window (Pima County, G. D. Cowie, 1920; 1934).—On the highest point of Window Mountain, 55 miles by road east of Ajo and 20 miles north of Covered Wells, on a dome about 200 meters north of the natural bridge in the mountain. This tunnel or natural bridge may be seen for miles from the west or southwest. Marked by a standard bronze disk as described in note 1. Reference mark, a standard bronze reference disk, note 11a, is 15 paces, 270° magnetic.

Plane coordinates:[1] (C), x=398,087 feet; y=489,193 feet.

Boundary monument No. 160 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, G. D. Cowie, 1920).—See description of *Boundary monument No. 160 eccentric.*

Plane coordinates: (C), x=307,167 feet; y=289,415 feet.

Boundary monument No. 160 eccentric (Pima County, Ariz., Sonora, Mexico, G. D. Cowie, 1920).—Near Menager's ranch and about 1 mile east of the saddle on the mountain. Marked by a standard bronze disk as described in note 2a. Refer-

[1] No check on this position.

For notes in regard to marking of stations, see page 63.

ence mark, a standard bronze reference disk, note 12c, is 4.57 meters (15.0 feet) from station in azimuth 245°47′.

Plane coordinates: (C), x=307,170 feet; y=289,425 feet.

Mesquite (Pima County, G. D. Cowie, 1920).—On the highest point of Mesquite Mountain, 53 miles southeast of Ajo and 4 miles, air line, east of the Indian village of Cochive. Marked by a standard bronze disk as described in note 1. Reference mark is 25 paces, 15° magnetic.

Plane coordinates: (C), x=336,095 feet; y=325,181 feet.

Boundary monument No. 162 (I. B. C.) (Pima County, Ariz., Sonora, Mexico, G. D. Cowie, 1920).—See description of *Boundary monument No. 162 eccentric.*

Plane coordinates: (C), x=284,729 feet; y=297,667 feet.

Boundary monument No. 162, eccentric (Pima County, G. D. Cowie, 1920).—On a ridge to the south and west of a small outcropping dome on top of the ridge. About 3 miles west along the valley toward Menager's ranch. Marked by a standard bronze disk as described in note 2a. Reference mark, a standard bronze reference disk, note 12c, is 9.73 meters (31.9 feet) from station in azimuth 249°33′.

Plane coordinates: (C), x=284,742 feet; y=297,693 feet.

Montezuma Head (Pima County, G. D. Cowie, 1920).—Plane coordinates: (C), x=264,143.94 feet; y=402,075.06 feet.

Cimarron Mountains, south peak (Pima County, G. D. Cowie, 1920).—Plane coordinates:[1] (C), x=352,891 feet; y=523,348 feet.

Cimarron Mountains, north peak (Pima County, G. D. Cowie, 1920).—Plane coordinates: (C), x=353,149 feet; y=525,407 feet.

Sawtooth, Maricopa Range (Maricopa County, G. D. Cowie, 1920).—Plane coordinates:[1] (C), x=358,268 feet; y=610,301 feet.

Dome, south of Sierra del Ajo (Pima County, G. D. Cowie, 1920).—Plane coordinates: (C), x=269,267.70 feet; y=352,838.74 feet.

Spire, north of Sierra del Ajo (Pima County, G. D. Cowie, 1920).—Plane coordinates: (C), x=255,836.28 feet; y=406,319.54 feet.

Dome, north of Mesquite (Pima County, G. D. Cowie, 1920).—Plane coordinates:[1] (C), x=333,551 feet; y=350,959 feet.

Menager's store, north gable (Pima County, G. D. Cowie, 1920).—Plane coordinates:[1] (C), x=303,149 feet; y=297,941 feet.

Wasson (U. S. G. S.) (Pima County, G. D. Cowie, 1920).—See description of *Wasson.*

Plane coordinates:[1] (C), x=738,055.53 feet; y=463,952.40 feet.

Black Mountain (U. S. G. S.) (Pinal County, G. D. Cowie, 1920).—See description of *Black Mountain.*

Plane coordinates:[1] (C), x=793,195.77 feet; y=648,387.02 feet.

QUEEN CREEK AREA

Principal points

Roadside (Pinal County, F. G. Johnson, 1938).—About 21 miles east of Mesa, 4 miles southeast of Apache Junction, and about 8 miles west of the Superstition Mountains, one-fourth mile northeast of U. S. Highway No. 60 (also Nos. 70, 80, and 89), on top of the north end of a small steep butte. Station marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 3.171 meters (10.40 feet) from station in azimuth 323°05′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 3.850 meters (12.63 feet) from station in azimuth 66°47′. Azimuth mark (Coast and Geodetic Survey bench mark A 107, 1935) is 30 feet southwest of U. S. Highway No. 60 and is set in a concrete post 1 foot square projecting 4 inches above the ground, 0.8 mile from station in azimuth 153°07′51″.

Plane coordinates: (C), x=632,430.57 feet; y=866,287.52 feet; the grid azimuth to bench mark A 107=152°53′32″.*

Queen (Maricopa County, F. G. Johnson, 1938).—About 3.5 miles south of U. S. Highway No. 60 and 2.3 miles northwest of Desert Wells. Go east on U. S. Highway No. 60 from the Buck Horn Shell station to a graded dirt road and turn right or south and go 2.5 miles to a cross road, turn left through a gate and go 0.3 mile to a corner of the field, then go south about 100 yards to a telephone line and follow the telephone line 1.1 miles to a gate in the fence line,

[1] No check on this position.

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

turn right and follow the road south 0.5 mile to a gate and then go east 1 mile to the fence corner. Station is 4.2 feet north of a fence and 5.2 feet west of another fence. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 10.876 meters (35.68 feet) from station in azimuth 87°16′. Reference mark No. 2 *B. M. 1407 PHNX (U. S. G. S.)* (welded in top of a 2½-inch iron pipe) is 28.370 meters (93.08 feet) from station in azimuth 144°33′52″. Azimuth mark, a standard bronze disk, note 11a, is 12 feet east of a telephone pole and 0.3 mile from station in azimuth 325°53′25″.

Plane coordinates: (C), x=583,265.12 feet; y=860,325.69 feet; the grid azimuth to the azimuth mark=325°44′25″.*

Tower (Maricopa County, F. G. Johnson, 1938).—About 5 miles east and 4 miles south of Chandler on the south bank of irrigation ditch and in the southwest quarter of sec. 16, T. 2 S., R. 6 E. Marked by standard bronze disks as described in notes 1a and 7a. Reference mark No. 1, a standard bronze reference disk, note 11a, is 18.584 meters (60.97 feet) from station in azimuth 248°25′. Reference mark No. 2, a standard bronze reference disk, note 11a, is 18.725 meters (61.44 feet) from station in azimuth 89°23′. Azimuth mark, a standard bronze disk set in concrete abutment of an irrigation ditch, is 5 feet south of a power pole, 33 feet west of the road, 24 feet east of a pump house and one-fourth mile west and 0.7 mile north of the station. The azimuth mark is 0.8 mile from station in azimuth 163°40′32″.

Plane coordinates: (C), x=550,558.51 feet; y=817,906.84 feet; the grid azimuth to the azimuth mark=163°35′06″.*

Weeks (Maricopa County, F. G. Johnson, 1938).—About 6 miles, air line, north-northeast of Apache Junction and 0.6 mile southwest of Cottonwood Springs. On a rough, rocky high point on the west end of the first ridge west of Cottonwood Springs. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 2.972 meters (9.76 feet) from station in azimuth 274°45′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.294 meters (14.08 feet) from station in azimuth 24°04′. The azimuth mark, a standard bronze disk, note 12c, set in a large boulder 3 feet high, 4 feet long, and 2½ feet thick, is about 30 yards north of the draw that goes toward the first saddle on the way to the station, and is approximately 0.35 mile distant in azimuth 284°17′52″.

Plane coordinates: (C), x=624,319.52 feet; y=908,096.02 feet; the grid azimuth to the azimuth mark=284°04′21″.*

Dromedary (Pinal County, F. G. Johnson, 1938).—About 4½ miles east of Florence Junction, 9 miles west and 3 miles south of Superior, on the highest point of a low, rocky hill known as Dromedary Peak. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 5.545 meters (18.19 feet) from station in azimuth 351°49′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 7.635 meters (25.05 feet) from station in azimuth 81°12′. The azimuth mark, Coast and Geodetic Survey bench mark N 107, is on the north side of U. S. Highway No. 60, 4.1 miles east of Florence Junction, 150 feet north of the center line of the road, and is 1 mile from station in azimuth 133°01′41″.

Plane coordinates: (C), x=702,835.86 feet; y=820,281.48 feet; the grid azimuth to bench mark N 107=132°39′51″.*

Fraser (Pinal County, F. G. Johnson, 1938).—About 9 miles north and 5½ miles east of Florence Junction and 8 miles west and 6 miles north of Superior. On the highest point of the divide between Mill Site Creek on the east and Fraser Creek on the west. Marked by a standard bronze disk as described in note 2. Reference mark No. 1, a standard bronze reference disk, note 12a, is 3.657 meters (12.00 feet) from station in azimuth 88°49′. Reference mark No. 2, a standard bronze reference disk, note 12a, is 4.403 meters (13.46 feet) from station in azimuth 192°48′. Azimuth mark, a standard bronze disk, note 12a, is about 100 feet northeast of the end of truck travel on western slope of the hill and is 2½ miles from station in aximuth 55°40′30″.

Plane coordinates: (C), x=706,549.19 feet; y=866,092.07 feet; the grid azimuth to the azimuth mark=55°18′10″.*

*This azimuth has been computed by the first formula (p. 67), neglecting the second term.

For notes in regard to marking of stations, see page 63.

Supplementary points

Phoenix-Tucson airway beacon 0 (Maricopa County, F. G. Johnson, 1938).—Plane coordinates: (C), x=481,011.23 feet; y=861,054.94 feet.

Phoenix-Tucson airway beacon 2 (Pinal County, F. G. Johnson, 1938).—Plane coordinates: (C), x=533,833.98 feet; y=796,124.58 feet.

Phoenix-Tucson airway beacon 3A (Pinal County, F. G. Johnson, 1938).—Plane coordinates: (C), x=556,393.92 feet; y=743,746.45 feet.

Phoenix-Tucson airway beacon 3B (Pinal County, F. G. Johnson, 1938).—Plane coordinates: (C), x=574,364.48 feet; y=728,749.85 feet.

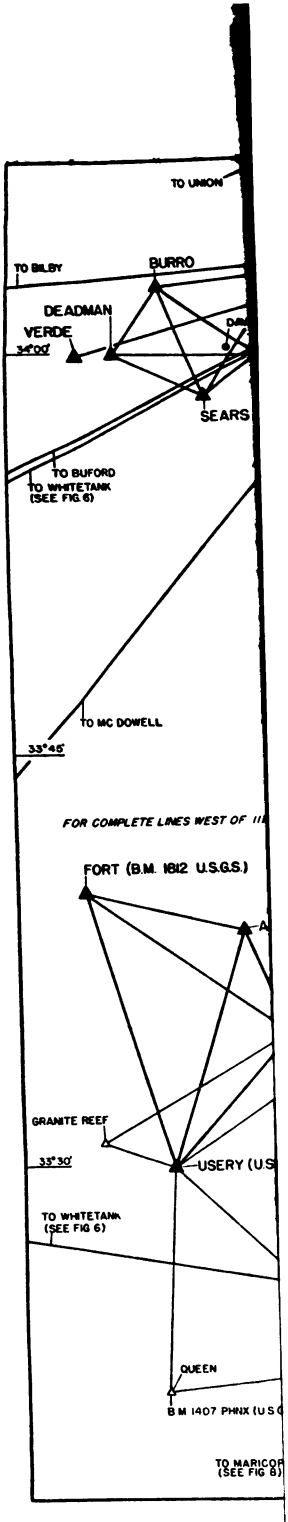
Phoenix-Tucson airway beacon 5 (Pinal County, F. G. Johnson, 1938).—Plane coordinates: (C), x=607,320.32 feet; y=662,515.83 feet.

B. M. 1407 PHNX (U. S. G. S.) (Maricopa County, F. G. Johnson, 1938).—See description of *Queen*.

Plane coordinates:[1] (C), x=583,210.98 feet; y=860,401.35 feet.

[1] No check on this position.

(A



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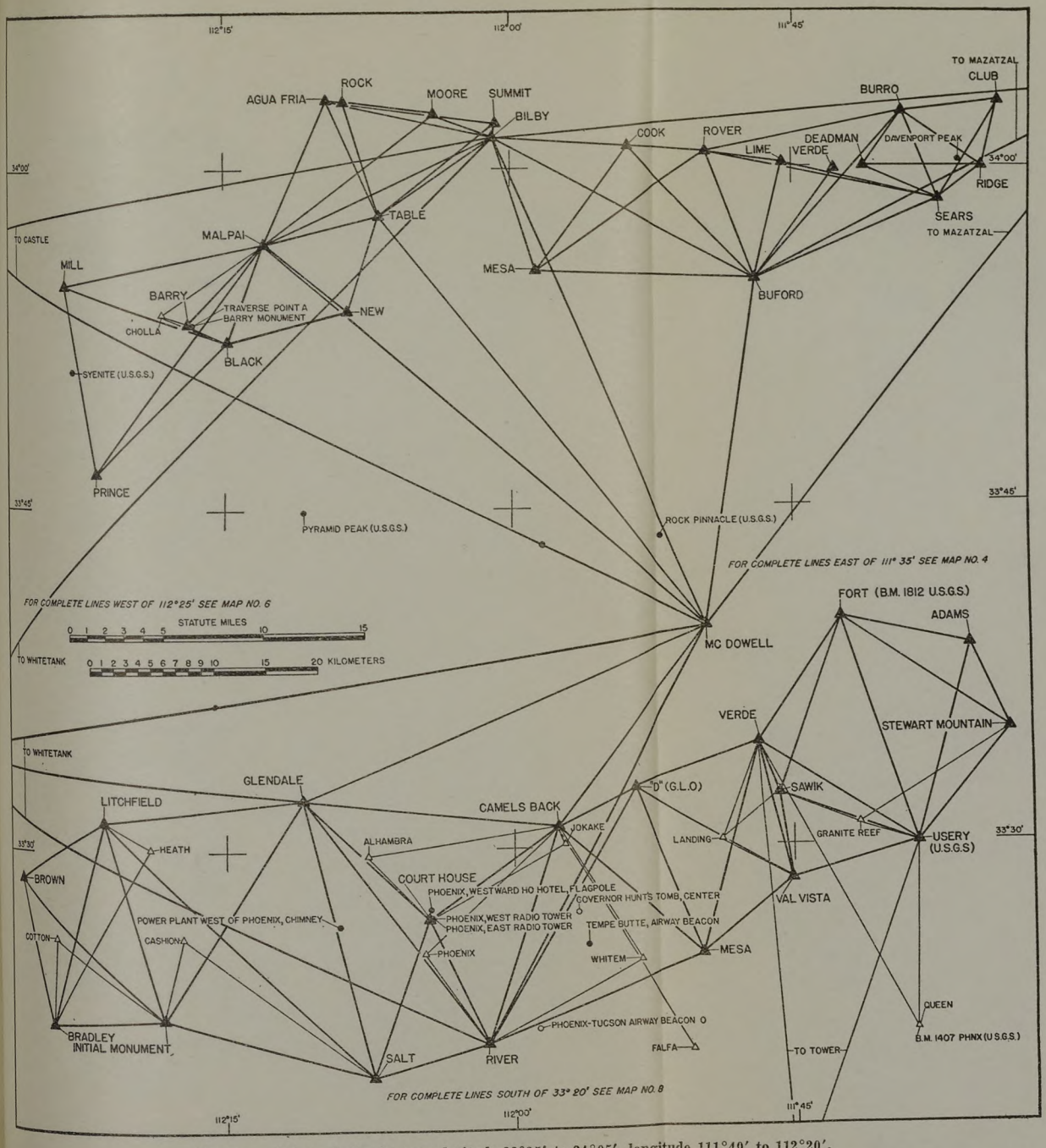

Figure 5.—Triangulation in area, latitude 33°25′ to 34°05′, longitude 111°40′ to 112°20′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

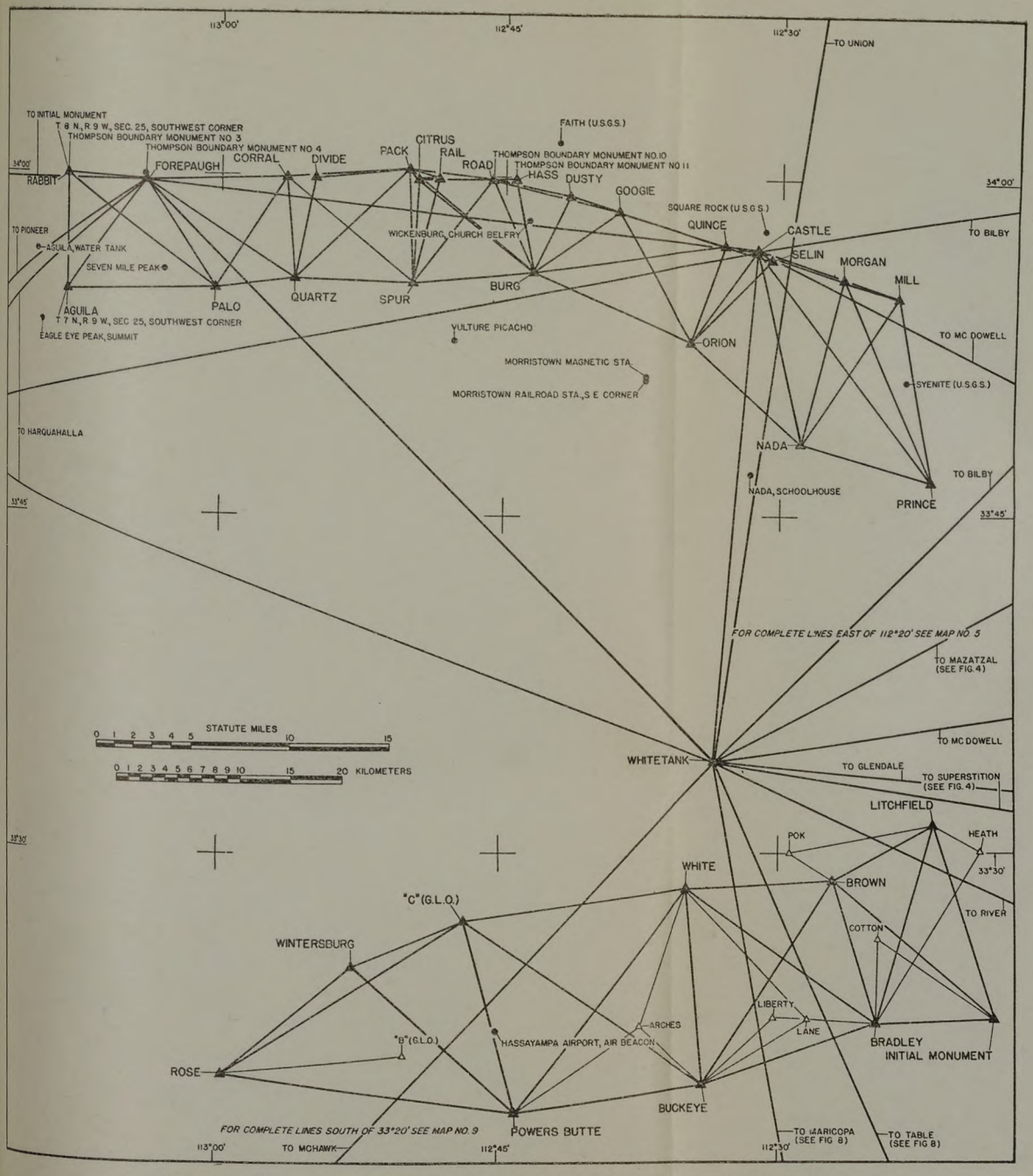

Figure 6.—Triangulation in area, latitude 33°25′ to 34°05′, longitude 112°20′ to 113°10′.

(Solid black triangles for station symbols indicate first order stations and the open triangles indicate second or lower order.)

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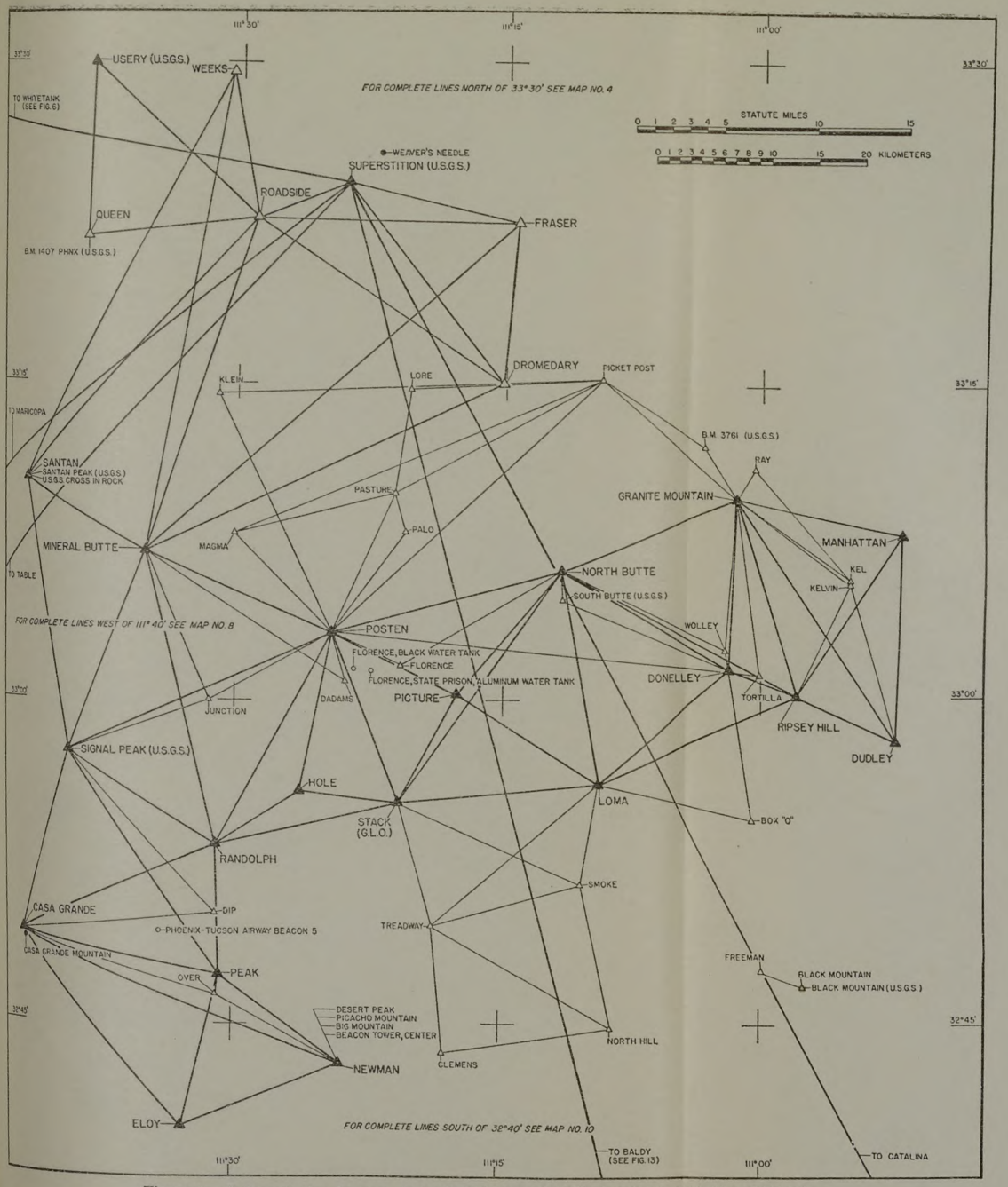

Figure 7.—Triangulation in area, latitude 32°45′ to 33°25′, longitude 110°50′ to 111°40′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

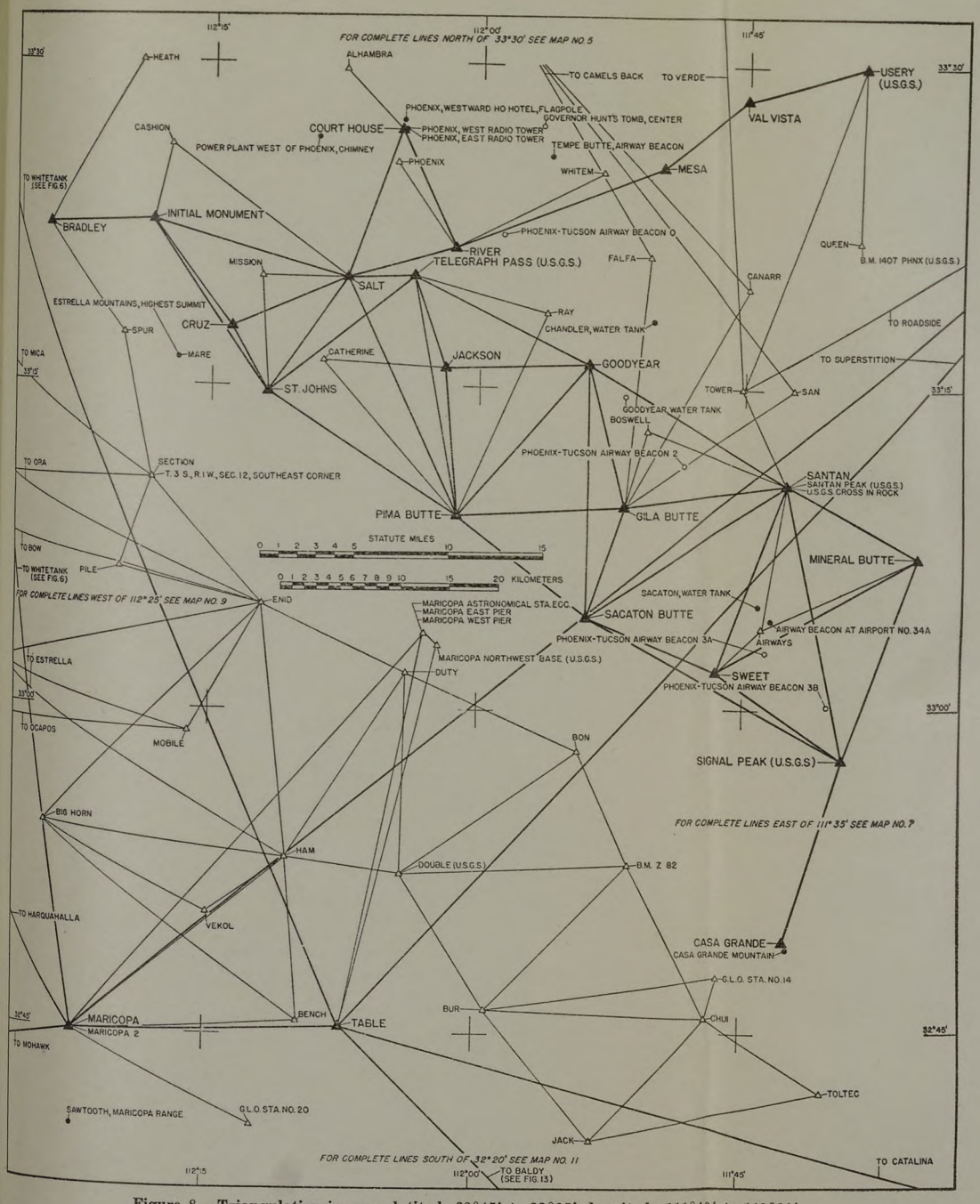

Figure 8.—Triangulation in area, latitude 32°45′ to 33°25′, longitude 111°40′ to 112°20′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

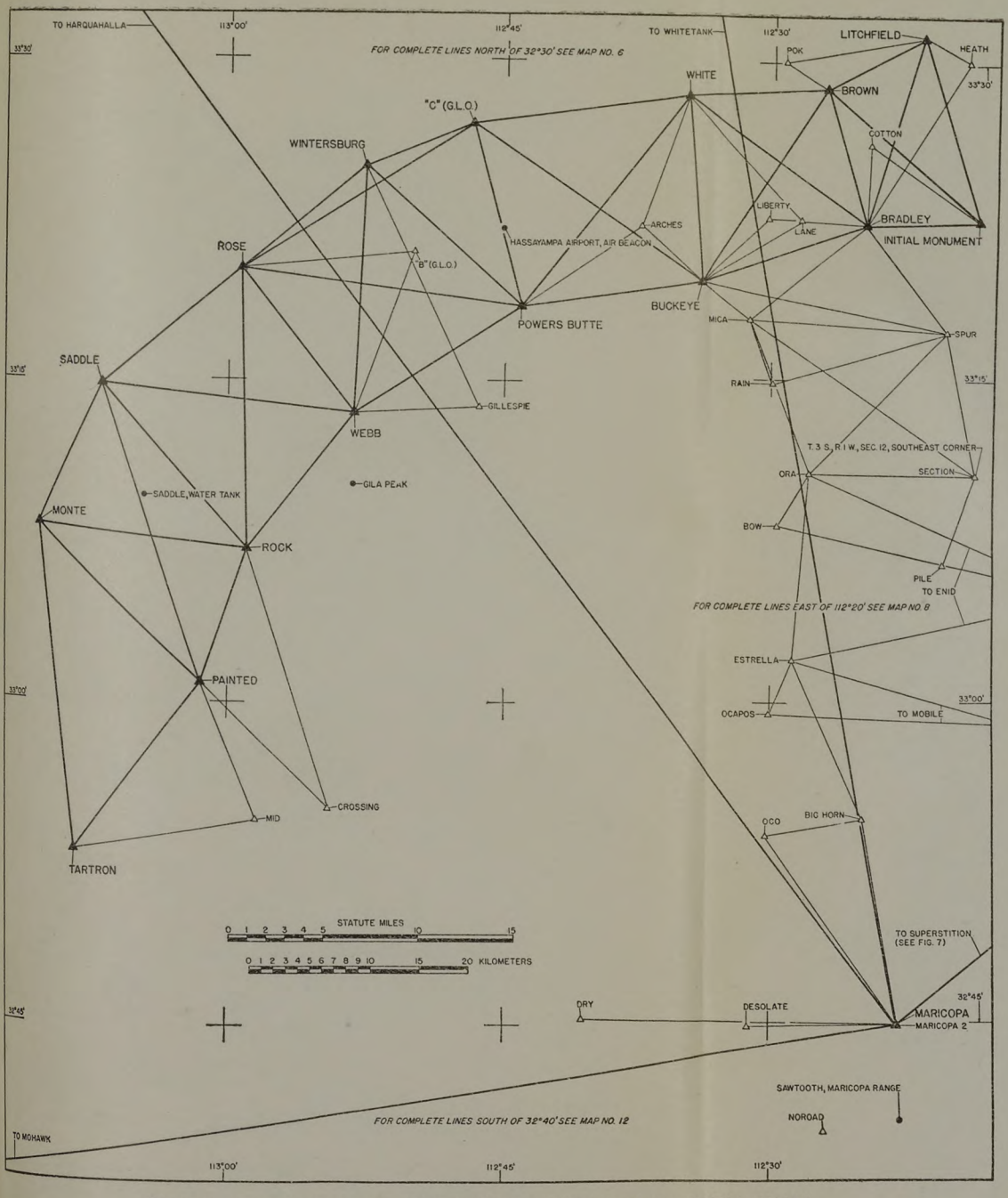

Figure 9.—Triangulation in area, latitude 32°45′ to 33°25′, longitude 112°20′ to 113°10′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

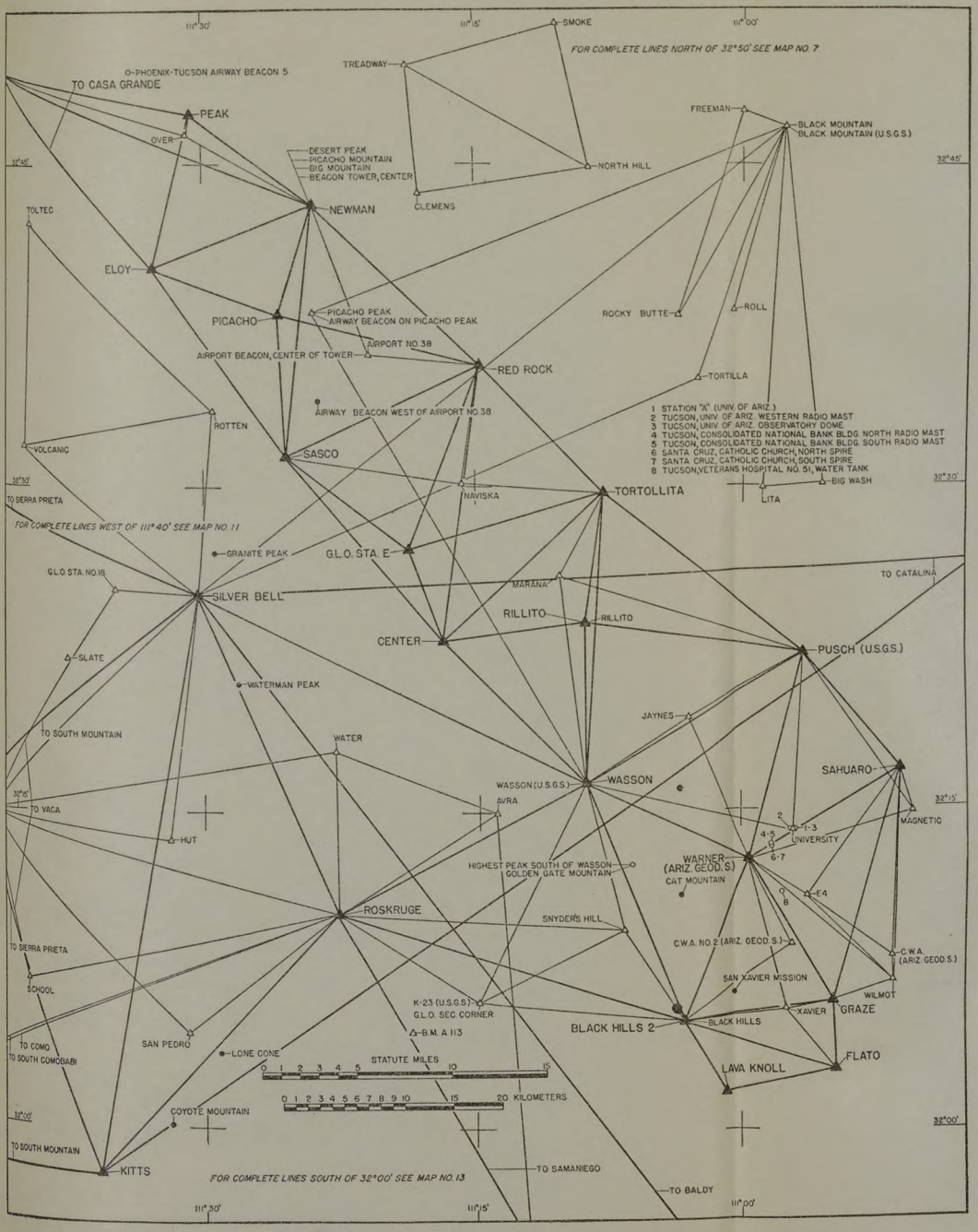

Figure 10.—Triangulation in area, latitude 32°05′ to 32°45′, longitude 110°50′ to 111°40′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

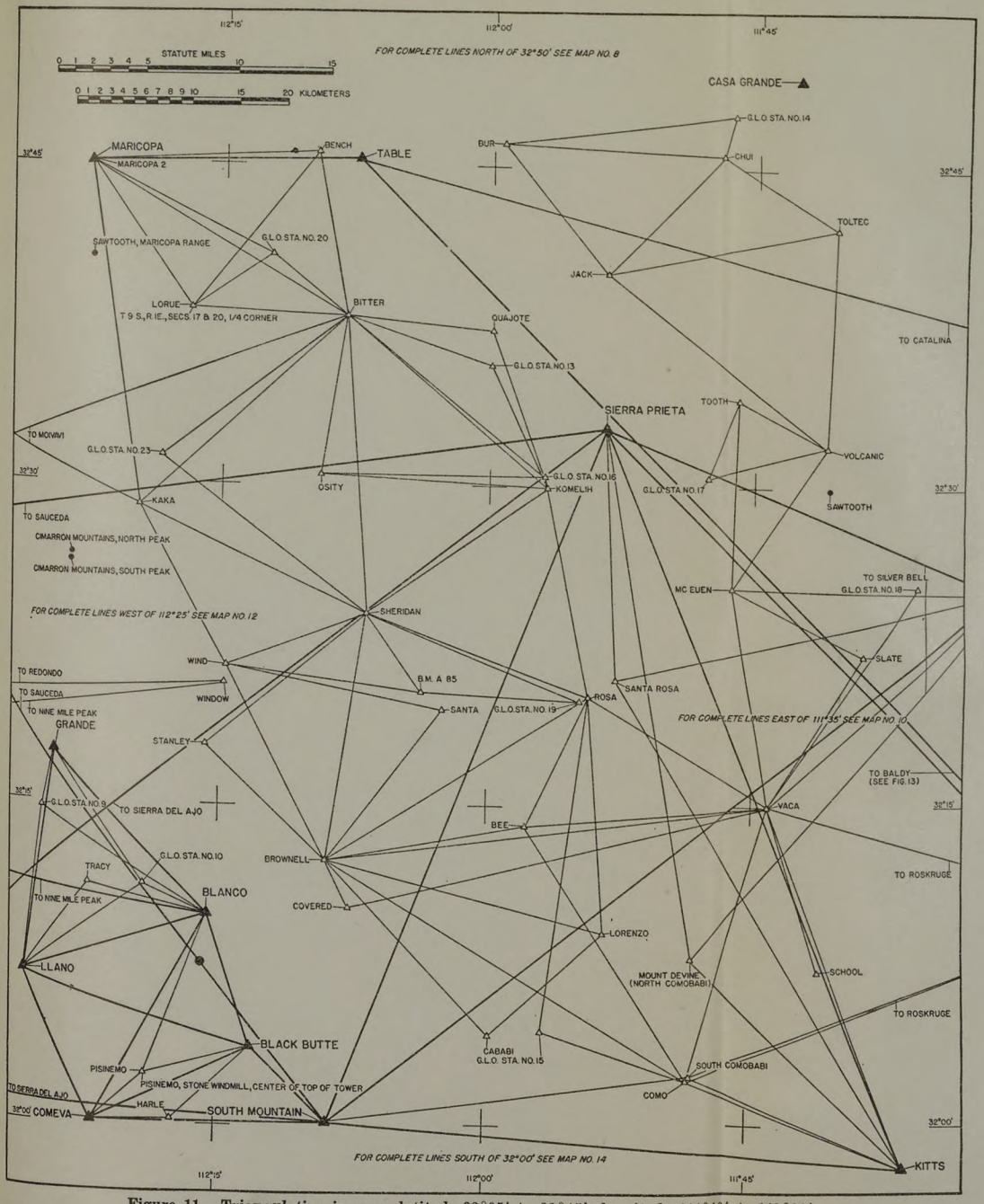

Figure 11.—Triangulation in area, latitude 32°05′ to 32°45′, longitude 111°40′ to 112°20′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

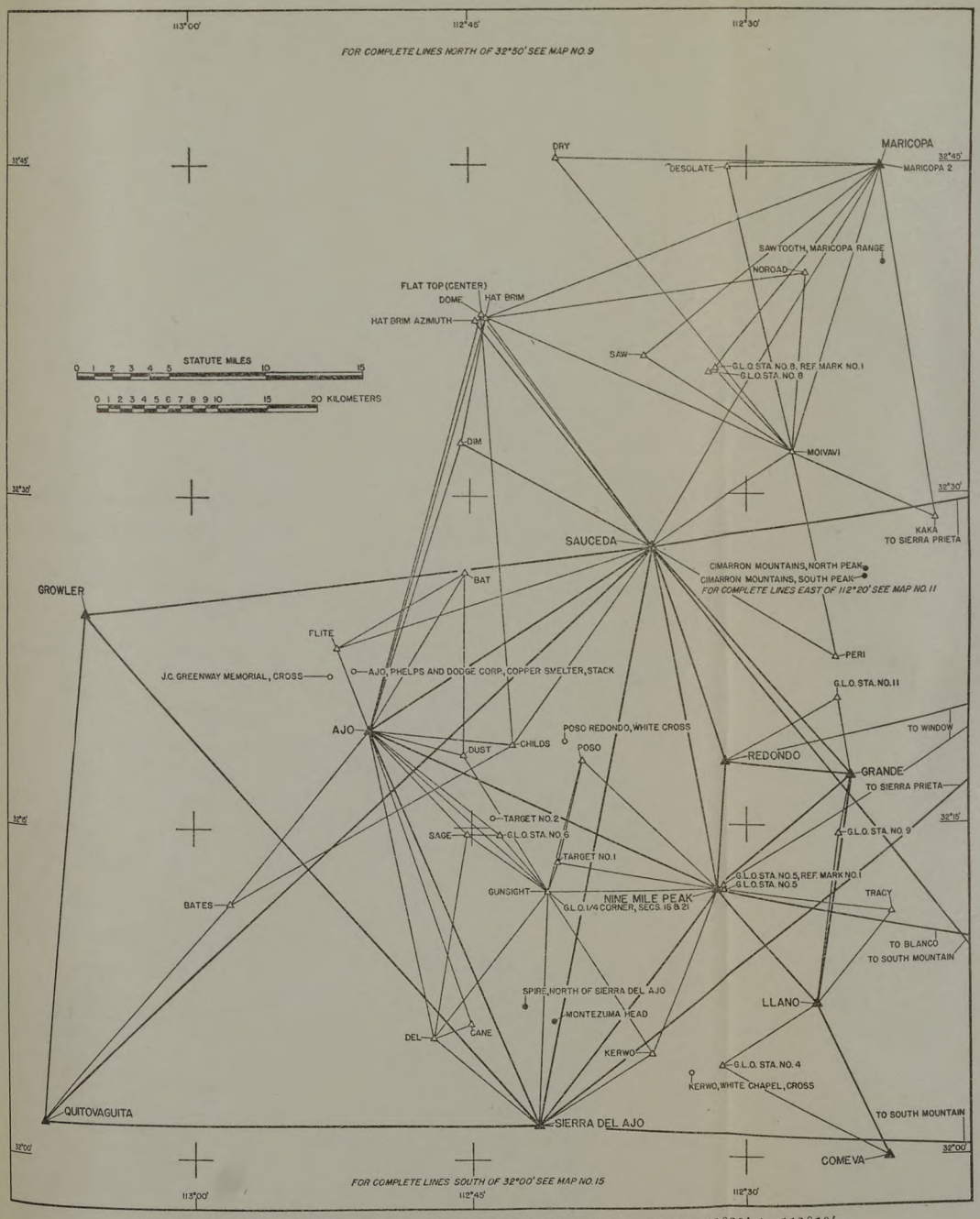

Figure 12.—Triagulation in area, latitude 32°05′ to 32°45′, longtitude 112°20′ to 113°10′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

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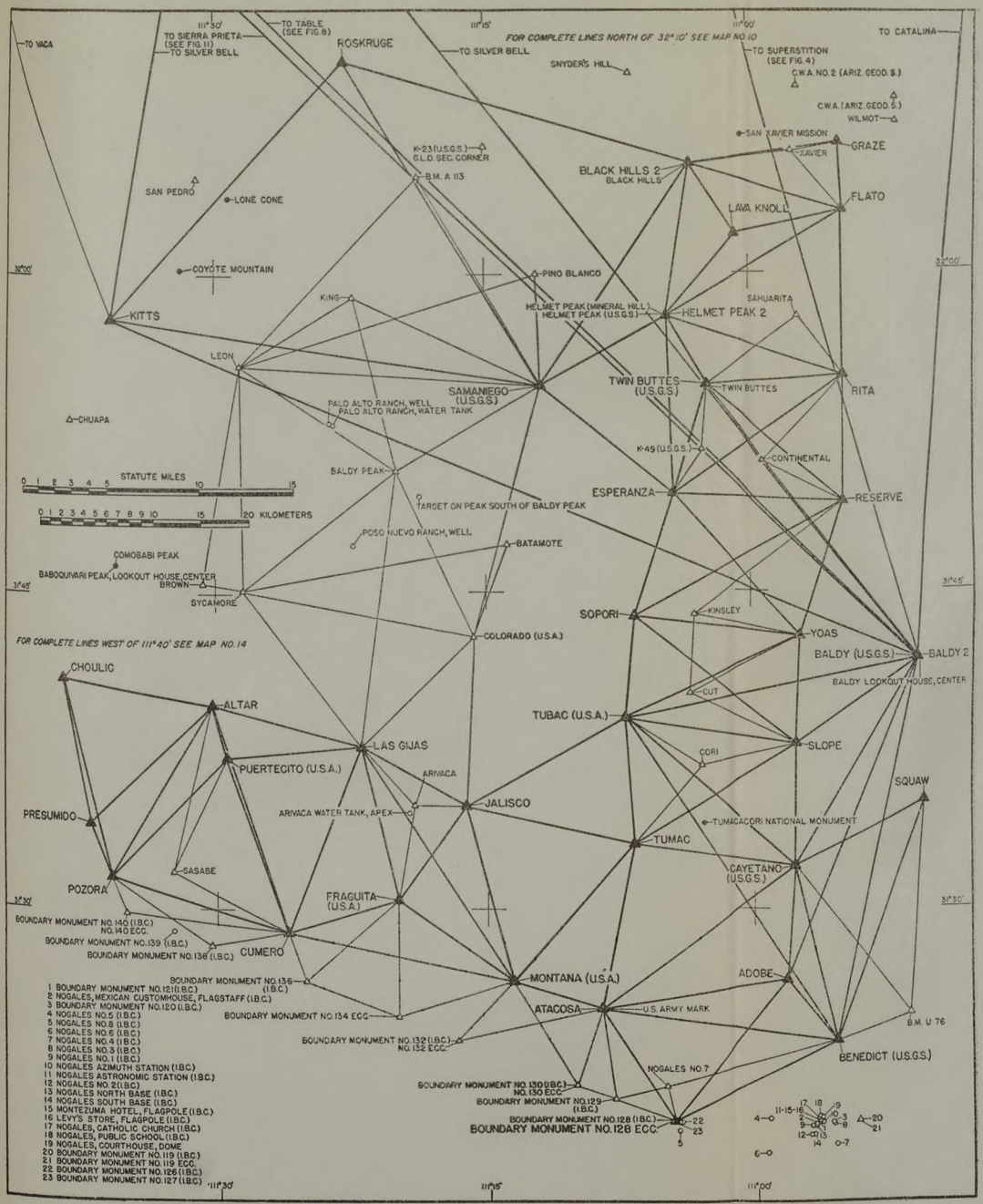

Figure 13.—Triangulation in area, latitude 31°20′ to 32°05′, longitude 110°50′ to 111°40′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

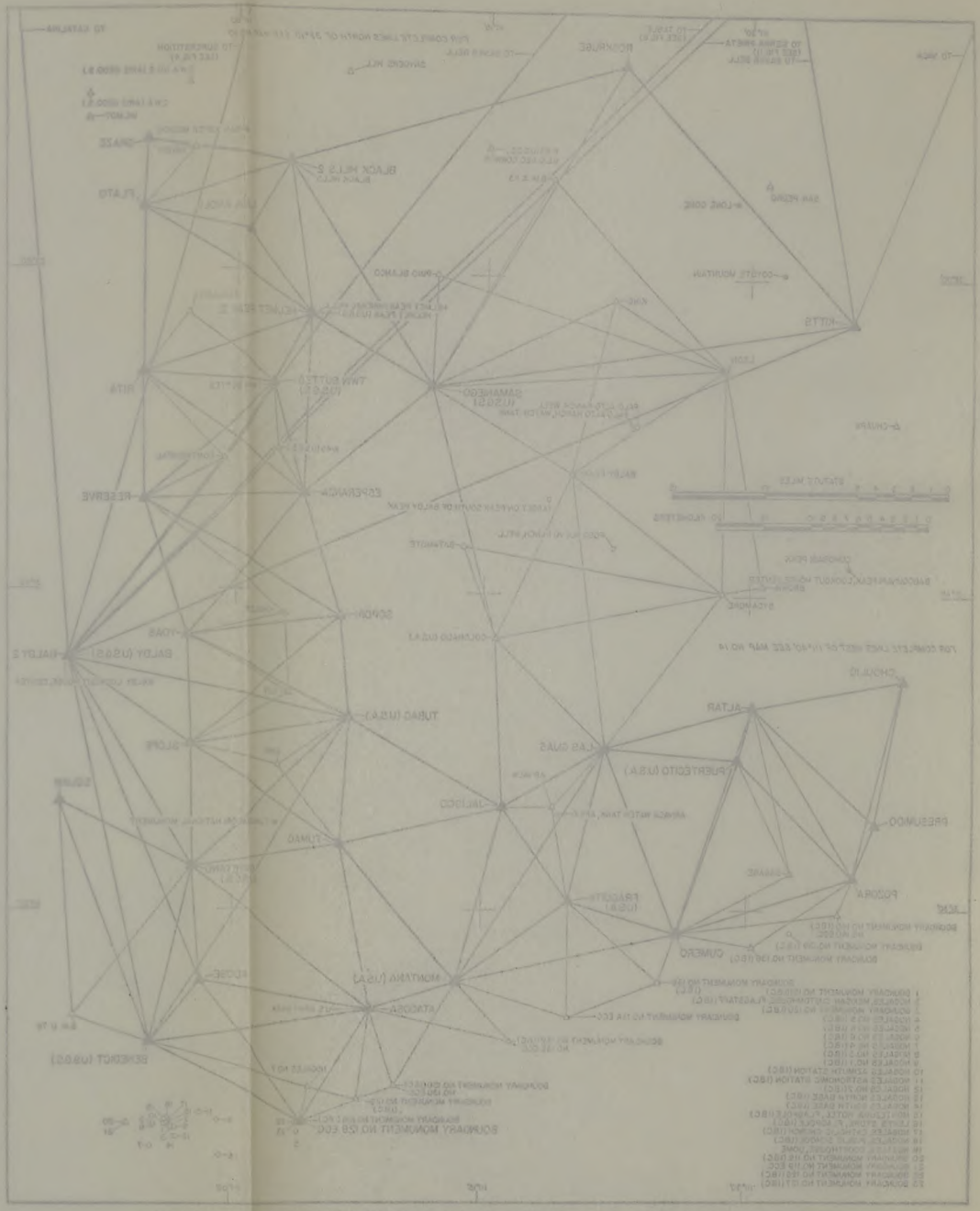

Figure 13.—Triangulation in area, latitude 31°20′ to 32°05′, longitude 110°10′ to 111°40′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

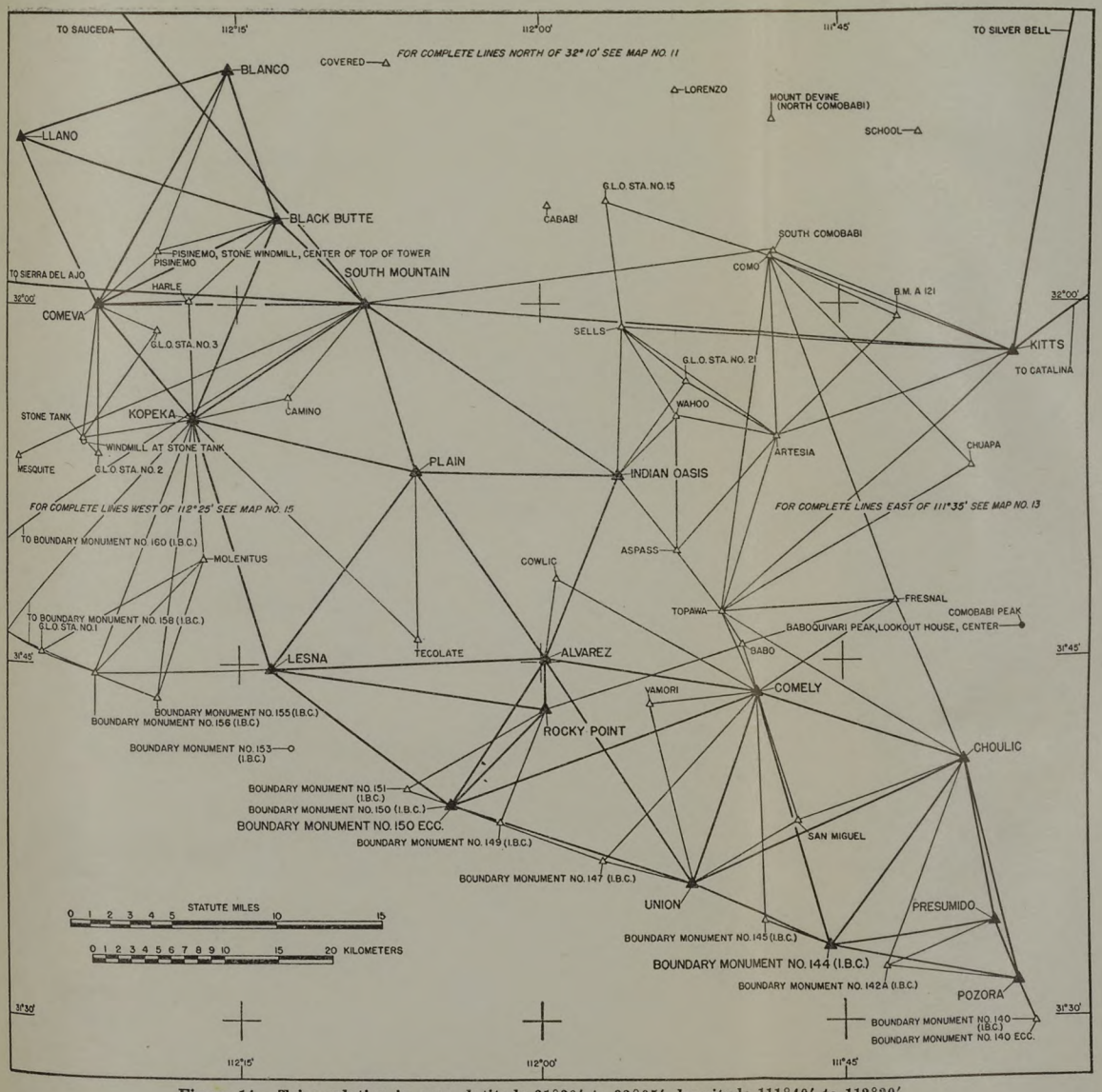

Figure 14.—Triangulation in area, latitude 31°30′ to 32°05′, longitude 111°40′ to 112°20′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

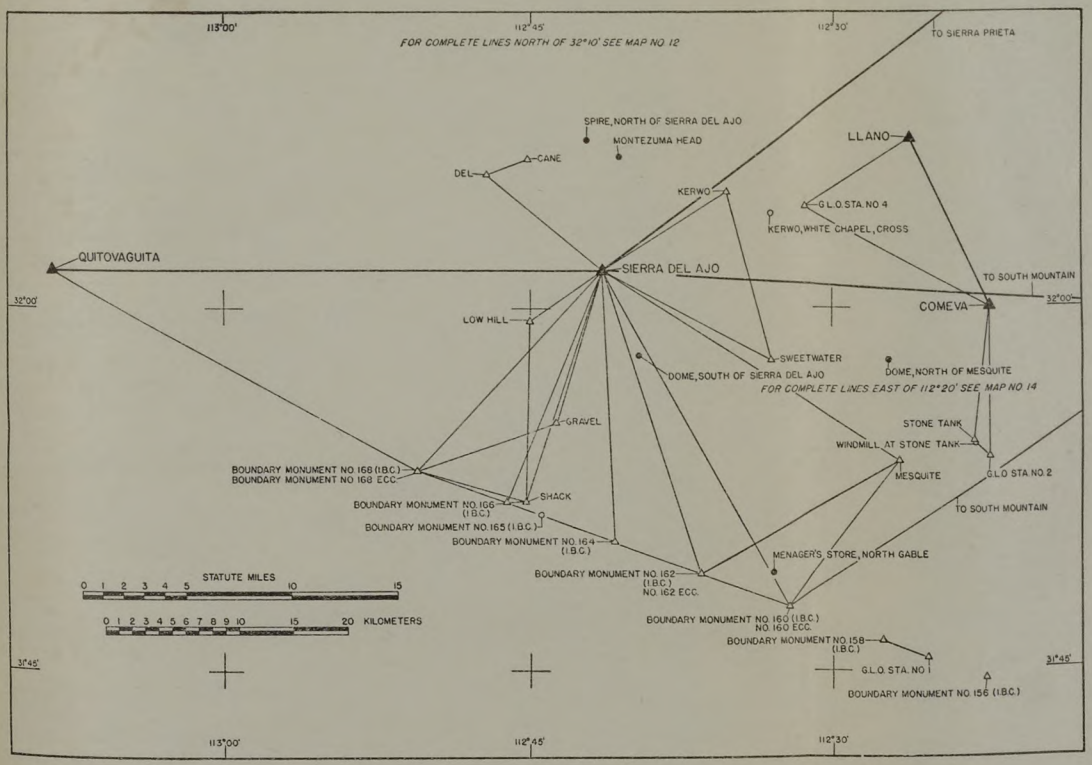

Figure 15.—Triangulation in area, latitude 31°45′ to 32°05′, longitude 112°20′ to 113°10′.

(Solid black triangles for station symbols indicate first-order stations and the open triangles indicate second or lower order.)

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