DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
O. H. TITTMANN
SUPERINTENDENT

GEODESY

TRIANGULATION ON THE COAST OF TEXAS, FROM SABINE PASS TO CORPUS CHRISTI BAY

BY

CHARLES A. MOURHESS
Computer, United States Coast and Geodetic Survey

SPECIAL PUBLICATION No. 17

WASHINGTON
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GENERAL STATEMENT.

The purpose of this publication is to present to the engineering public as complete a record as possible of the triangulation on the coast of Texas, from Sabine Pass to Corpus Christi Bay. The arrangement is such as to give all the available data in the best form for general use.

The triangulation presents no unusual features, is not of a primary degree of accuracy, and consequently offers no material for discussion. It has nevertheless a very great practical value, since it gives the engineer and geographer the positions of a large number of points determined trigonometrically and all correlated to one geodetic datum known as the United States Standard Datum.[1]

THE TRIANGULATION.

The observations involved in this triangulation were begun in Galveston Bay in 1850, and the latest work was finished in 1912. Undoubtedly many of the old stations have been lost, and many more still exist that can not be recovered, because of the changes in the topography and the destruction of the surface and reference marks, leaving only the underground marks. The underground mark can be recovered by digging at exactly the proper place, but without the guidance of the surface marks or the topography this may be impossible. Then the point may be found by locating a second point in the vicinity of the old one and determining its position from more distant triangulation. From this new position and the position of the old point, the distance and direction to the old point from the new may be determined. Then by digging at the position indicated it is very probable that the old underground mark will be found.

During the years 1911 and 1912 officers of this Survey visited the localities of most of the stations included in this publication, recovered the old marks where possible, and carried new triangulation through such portions as was necessary to control any topographic or hydrographic surveys that might be undertaken. At present there is new triangulation or old points that have recently been re-marked along all the Texas coast covered by this publication. In every case the new has been connected with at least three stations of the old triangulation.

The results of the United States Army Engineers' triangulation in Galveston Bay, San Jacinto River, Sabine Lake, and the Neches River are included in this publication. It is all well connected with the United States Coast and Geodetic Survey triangulation.

The triangulation from Corpus Christi Bay to Point Isabel was included in Appendix No. 5, Report for 1911. Since then, however, new triangulation has been established along the coast and the primary triangulation along the ninety-eighth meridian has been extended to the Rio Grande River, with a spur running to Point Isabel, thus making it necessary to readjust the coast work. The new positions for the stations between Corpus Christi Bay and Point Isabel are not available for this publication, but will appear with the results of the primary triangulation on the lower ninety-eighth meridian.

[1] After the manuscript for this publication was completed the United States Standard Datum was adopted by the Dominion of Canada and by the Republic of Mexico, and on account of its international character it will hereafter be known as the North American Datum.

ADJUSTMENT OF THE TRIANGULATION.

The primary triangulation along the ninety-eighth meridian was held fixed at Corpus Christi, and stations of the eastern oblique arc of primary triangulation were held at New Orleans. The triangulation along the coasts of Louisiana and Texas closes a loop between the above-mentioned arcs. The discrepancies of this closure were distributed through the coast triangulation. All the observed azimuths and measured lengths were held fixed. It is reasonably certain that the observed azimuths are superior to any that could be computed through the triangulation. Where spurs from the main scheme came together, forming small loop closures, they were adjusted to fit the main chain along the coast. The new triangulation with recovered stations at each end was adjusted in the same manner. The triangulation of the United States Army Engineers was adjusted at this office according to the regular methods and the positions were computed on the United States Standard Datum.[1] The accuracy of the work included in this publication is easily up to the standard of other coast triangulation in the United States. The length of any line in the main scheme is known with an accuracy greater than 1 part in 5,000.

THE UNITED STATES STANDARD DATUM.[1]

All of the positions and azimuths have been computed upon the Clarke spheroid of 1866, as expressed in meters, which has been in use in the Coast and Geodetic Survey for many years.

After a spheroid has been adopted and all the angles and lengths in a triangulation have been fully fixed, it is still necessary, before the computation of latitudes, longitudes, and azimuths can be made, to adopt a standard latitude and longitude for a specified station and a standard azimuth of a line from that station. For convenience, the adopted standard position (latitude and longitude) of a given station, together with the adopted standard azimuth of a line from that station, is called the geodetic datum.

The primary triangulation in the United States was commenced at various points, and existed at first as a number of detached portions in each of which the geodetic datum was necessarily dependent only upon the astronomic stations connected with that particular portion. As examples of such detached portions of triangulation there may be mentioned the early triangulation in New England and along the Atlantic coast, a detached portion of the transcontinental triangulation centering on St. Louis and another portion of the same triangulation in the Rocky Mountain region, and three separate portions of triangulation in California, in the latitude of San Francisco, in the vicinity of Santa Barbara Channel, and in the vicinity of San Diego. With the lapse of time these separate pieces have expanded until they have touched or overlapped.

The Transcontinental Triangulation, of which the office computation was completed in 1899, joins all of the detached portions mentioned and makes them one continuous triangulation. As soon as this took place the logical necessity existed of discarding the old geodetic data used in these various pieces and substituting one datum for the whole country, or at least for as much of the country as is covered by continuous triangulation. To do this is a very heavy piece of work, and involved much preliminary study to determine the best datum to be adopted. On March 13, 1901, the Superintendent adopted what is now known as the United States Standard Datum, and it was decided to reduce the positions to that datum as rapidly as possible. The datum adopted was that formerly in use in New England, and therefore its adoption did not affect the positions which had been used for geographic purposes in New England and along the Atlantic coast to North Carolina, nor those in the States of New York, Pennsylvania, New Jersey, and Delaware. The adopted datum does not agree, however, with that used in "The Transcontinental Triangulation" and in "The Eastern Oblique Arc of the United States," publications which deal primarily with the purely scientific problem of the determination of the figure of the earth and which were prepared for publication before the adoption of the new datum.

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As the adoption of such a standard datum is a matter of considerable importance, it is in order here to explain the desirability of this step more fully.

The main objects to be attained by the geodetic operations of the Coast and Geodetic Survey are, first, the control of the charts published by the Survey; second, the furnishing of geographic positions (latitudes and longitudes), of accurately determined elevations and of distances and azimuths, to officers connected with the Coast and Geodetic Survey and to other organizations; third, the determination of the figure of the earth. For the first and second objects it is not necessary that the reference spheroid should be accurately that which most closely fits the geoid within the area covered, nor that the adopted geodetic datum should be absolutely the best that can be derived from the astronomic observations at hand. It is simply desirable that the reference spheroid and the geodetic datum adopted shall be, if possible, such a close approximation to the truth that any correction which may hereafter be derived from the observations which are now or may hereafter become available shall not greatly exceed the probable errors of such corrections. It is, however, very desirable that one spheroid and one geodetic datum be used for the whole country. In fact, this is absolutely necessary if a geodetic survey is to perform fully the function of accurately coordinating all surveys within the area which it covers. This is the most important function of a geodetic survey. To perform this function it is also highly desirable that when a certain spheroid and geodetic datum have been adopted for a country they should be rigidly adhered to without change for all time, unless shown to be largely in error.

In striving to attain the third object, the determination of the figure of the earth, the conditions are decidedly different. This problem concerns itself primarily with astronomic observations of latitude, longitude, and azimuth, and with the geodetic positions of the points at which the astronomic observations were made, but it is not concerned with the geodetic positions of other points fixed by the triangulations. The geodetic positions (latitudes and longitudes) of comparatively few points are therefore concerned in this problem. However, in marked contrast to the statements made in preceding paragraphs, it is desirable in dealing with this problem that, with each new important accession of data, a new spheroid fitting the geoid with the greatest possible accuracy, and new values of the geodetic latitudes, longitudes, and azimuths of the highest degree of accuracy, should be derived.

The United States Standard Datum [1] was adopted with reference to positions furnished for geographic positions, but has no reference to the problem of the determination of the figure of the earth. It is adopted with reference to the engineer's problem of furnishing standard positions, and does not affect the scientist's problem of the determination of the figure of the earth.

The principles which guided in the selection of the datum to be adopted were: First, that the adopted datum should not differ widely from the ideal datum for which the sum of the station errors in latitude, longitude, and azimuth should each be zero; second, it was desirable that the adopted datum should produce minimum changes in the publications of the Survey, including its charts; and, third, it was desirable, other things being equal, to adopt that datum which allowed the maximum number of positions already in the office registers to remain unchanged, and therefore necessitated a minimum amount of new computation. These considerations led to the adoption as the United States Standard of the datum which had been in use for many years in the northeastern group of States and along the Atlantic coast as far as North Carolina.

An examination of the station errors available in 1903, on the United States Standard Datum, at 246 latitude stations, 76 longitude stations, and 152 azimuth stations scattered widely over the United States from Maine to Louisiana and to California, indicated that this datum approaches closely the ideal with which the algebraic sum of the station errors of each class would be zero.[2]

[1] After the manuscript for this publication was completed the United States Standard Datum was adopted by the Dominion of Canada and by the Republic of Mexico, and on account of its international character it will hereafter be known as the North American Datum.

[2] This is further borne out in the reduction of 765 astronomic stations in connection with the "Supplementary investigation in 1909 of the figure of the earth and isostasy," by J. F. Hayford, published by the Coast and Geodetic Survey.

The adopted United States Standard Datum,[1] upon which the positions and azimuths given in this publication depend, may be defined in terms of the position of the station Meades Ranch as follows:

	°	′	″
ϕ =	39	13	26.686
λ =	98	32	30.506
α to Waldo =	75	28	14.52

Points are then said to be upon the United States Standard Datum [1] when they are connected with the station Meades Ranch by a continuous triangulation, through which the corresponding latitudes, longitudes, and azimuths have been computed on the Clarke spheroid of 1866, as expressed in meters, starting from the above data.

The principal lists of geographic positions heretofore published upon the United States Standard Datum throughout the whole United States are contained in the following publications of the Coast and Geodetic Survey and of other organizations:

Appendix 8 of the Report for 1885, positions in Massachusetts and Rhode Island; Appendix 8 of the Report for 1888, positions in Connecticut; Appendix 8 of the Report for 1893, positions in Pennsylvania, Delaware, and Maryland; Appendix 10 of the Report for 1894, positions in Massachusetts; Appendix 6 of the Report for 1901, positions in Kansas and Nebraska; Appendix 3 of the Report for 1902, positions in Kansas, Missouri, Nebraska, and Colorado; Appendix 4 of the Report for 1903, positions in Kansas, Oklahoma, and Texas; Appendix 9 of the Report for 1904, positions in California; Appendix 5 of the Report for 1905, positions in Texas; Appendix 3 of the Report for 1907, positions in California; Appendix 5 of the Report for 1910, positions in California; Appendix 4 of the Report for 1911, positions in Nebraska, Minnesota, North Dakota, and South Dakota; Appendix 5 of the Report for 1911, positions in Texas; Appendix 6 of the Report for 1911, positions in Florida; Special Publication No. 11, positions in Texas, New Mexico, Arizona, and California; Special Publication No. 13, positions in California, Oregon, and Washington; Special Publication No. 16, positions in Florida; Appendix EEE, pages 2905–3031, Annual Report of the Chief of Engineers, 1902, positions of points on and near the Great Lakes; in publications of the Massachusetts Harbor and Land Commission; and in various bulletins of the United States Geological Survey.

TABLES OF POSITIONS.

In the tables of positions the latitude and longitude of each point are given on the United States Standard Datum,[1] also the length and azimuth of each line observed over, whether in one or both ways. This is, in a way, a duplication, as the lengths and azimuths are implicitly contained in the corresponding latitudes and longitudes, while, on the other hand, from the latitude and longitude of a single point all the remaining latitudes and longitudes may be derived by means of the given lengths and azimuths. The amount of computation involved in transforming one of these systems of coordinates into the other is so great that it is necessary to have the double system for the convenient use of the tables. Along with the latitude and longitude of each point the lengths and azimuths are given of lines from that point to other points of the triangulation. No lengths or azimuths are repeated, and for a given line the length and azimuth will generally be found opposite the position of the last mentioned of the two stations involved.

For the convenience of the draftsman a column of "seconds in meters" is given, in which is placed the length (in meters) of each small arc of a meridian or parallel corresponding to the seconds of the given latitude or longitude. To facilitate further the use of the tables, a column is given of the logarithms of the lengths. It must be remembered that it is the logarithm which is derived first in the computation, the lengths given in this table being then derived from the corresponding logarithms.

The rule followed in recent publications of this Office has been to give latitudes and longitudes to thousandths of seconds for all points the positions of which are fixed by fully

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adjusted triangulation. Points, the positions of which are given to hundredths of seconds only, are marked by footnotes as being without check or checked by verticals only. These notes mean that the object was pointed on from only two triangulation stations and that therefore an error in either pointing or in the identification of the object from either occupied station would not be detected in the computation, except that where vertical as well as horizontal observations were made on the object, a valuable check is obtained, and only a small error could pass undetected in the computation.

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 two doubtful figures are given. 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 be cast on the third figure from the right.

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

For the convenience of those who wish to convert the distances given in the table from meters into feet the following conversion table is here inserted:

Meters	Feet	Feet	Meters
1	3.280833	1	0.3048006
2	6.561667	2	0.6096012
3	9.842500	3	0.9144018
4	13.123333	4	1.2192024
5	16.404167	5	1.5240030
6	19.685000	6	1.8288037
7	22.965833	7	2.1336043
8	26.246667	8	2.4384049
9	29.527500	9	2.7432055
10	32.808333	10	3.0480061

Lake Sabine, Neches River, and Sabine Pass to East Bay.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Sabine Pass Lighthouse 1874	29 42 58.678	1806.7	74 12 14.9	254 04 10.7	Scaffold	27334.1	4.436705
	93 51 00.596	16.0	77 15 31.9	257 10 29.2	Rebecca	16840.5	4.226356
			107 40 27.5	287 32 23.8	Gum	27475.4	4.438944
			127 28 28.6	307 25 47.2	Keith	11009.2	4.041757
Pat Glennon Bayou 1874	29 46 06.204	191.0	330 36 17.7	150 37 17.7	Sabine Pass Lighthouse	6626.6	3.821291
	93 53 01.606	43.1	10 47 04.5	190 46 53.3	Sabine Pass northeast base	3239.7	3.510511
			99 32 25.8	279 30 44.3	Keith	5563.6	3.745353
Texas (U. S. E.) 1909	29 40 29.724	915.2	153 53 39.5	333 52 55.0	Sabine Pass southwest base	5489.2	3.739508
	93 52 44.738	1203.0	211 23 42.5	31 24 34.1	Sabine Pass Lighthouse	5373.3	3.730239
Louisiana (U. S. E.) 1909	29 42 19.028	585.9	56 53 41.0	236 52 05.9	Texas (U. S. E.)	6159.6	3.789552
	93 49 32.851	883.1	117 22 21.5	297 21 38.0	Sabine Pass Lighthouse	2655.8	3.424195
Sabine Pass southwest base 1874	29 43 09.807	301.9	63 57 03.6	243 55 18.9	Johnson 2	6320.5	3.800750
	93 54 14.605	392.6	150 58 10.8	330 57 05.7	Keith	7265.4	3.861258
			273 44 47.8	93 46 24.0	Sabine Pass Lighthouse	5225.8	3.718151
Sabine Pass northeast base 1874	29 44 22.841	703.2	303 52 33.9	123 53 45.1	Sabine Pass Lighthouse	4647.9	3.667254
	93 53 24.165	649.4	31 05 09.9	211 04 44.9	Sabine Pass southwest base	2625.68	3.419242
Mud Bayou 1874	29 45 15.885	489.1	242 47 20.2	62 48 15.9	Pat Glennon Bayou	3389.1	3.530086
	93 54 53.800	1445.6	304 08 06.4	124 08 50.9	Sabine Pass northeast base	2910.0	3.463898
			344 49 00.0	164 49 19.5	Sabine Pass southwest base	4022.3	3.604471

Lake Sabine, Neches River, and Sabine Pass to East Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Niggerville	29 44 24.282	747.6	89 01 47.2	269 00 59.1	Sabine Pass northeast base	2603.9	3.415622
1874	93 51 47.279	1270.5					
			107 36 08.2	287 34 35.6	Mud Bayou	5257.6	3.720790
			147 32 01.3	327 31 24.4	Pat Glennon Bayou	3719.7	3.570506
Texas Point	29 42 25.652	789.8	105 59 29.6	285 58 02.0	Sabine Pass southwest base	4938.6	3.693600
1874	93 51 17.972	483.1					
			136 46 52.8	316 45 50.2	Sabine Pass northeast base	4952.0	3.694780
			167 49 58.7	347 49 44.2	Niggerville	3736.6	3.572475
Louisiana Point	29 42 15.710	483.7	97 51 35.2	277 50 54.3	Texas Point	2240.1	3.350268
1874	93 49 55.420	1489.7	124 55 03.9	304 53 20.4	Sabine Pass northeast base	6840.9	3.835115
			142 47 36.4	322 46 40.9	Niggerville	4970.9	3.696437
Gulf Bayou	29 40 33.589	1034.2	142 08 47.5	322 07 38.5	Sabino Pass southwest base	6092.6	3.784802
1874	93 51 55.504	1492.5					
			161 20 58.8	341 20 14.9	Sabine Pass northeast base	7450.1	3.872164
			196 17 54.7	16 18 13.3	Texas Point	3595.0	3.555692
Keith (U. S. E.)	29 46 33.889	1043.4	278 23 49.3	98 25 35.8	Pat Glennon Bayou	5827.2	3.765459
1909	93 56 36.193	972.2	328 47 51.4	148 49 01.7	Sabine Pass southwest base	7345.6	3.866030
Garrison (U. S. E.) (La.)	29 48 33.814	1041.1	11 29 28.6	191 29 11.5	Pat Glennon Bayou	4637.9	3.666320
1909	93 52 27.213	730.8	61 06 36.7	241 04 33.0	Keith (U. S. E.)	7638.8	3.883025
Docks (U. S. E.)	29 49 48.296	1487.0	286 01 08.3	106 03 36.0	Garrison (U. S. E.)	8300.2	3.919091
1909	93 57 24.306	652.6	314 05 16.7	134 07 27.2	Pat Glennon Bayou	9825.3	3.992347
			347 48 57.2	167 49 21.1	Keith (U. S. E)	6123.7	3.787016
Port Arthur (U. S. E.)	29 53 51.212	1576.9	342 19 27.5	162 20 25.2	Garrison (U. S. E.)	10256.6	4.011005
1909	93 54 23.184	622.0	33 01 59.9	213 00 29.7	Docks (U. S. E.)	8920.4	3.950384
Johnson Bayou (U. S. E.) (La.)	29 51 08.367	257.6	60 31 04.2	240 28 28.4	Garrison (U. S. E.)	9662.8	3.985102
1909	93 47 13.974	375.1	113 33 15.3	293 29 41.5	Port Arthur (U. S. E.)	12562.3	4.099068
Pine (U. S. E.) (La.)	29 55 41.572	1280.0	15 15 24.1	195 14 41.5	Johnson Bayou (U. S. E.)	8719.3	3.940480
1910	93 45 48.495	1300.7					
			76 12 32.9	256 08 16.2	Port Arthur (U. S. E.)	14218.9	4.152866
Neches (U. S. E.)	29 58 02.590	79.7	294 19 22.1	114 22 20.7	Pine (U. S. E.)	10532.1	4.022515
1910	93 51 46.314	1241.8	28 32 17.2	208 30 58.9	Port Arthur (U. S. E.)	8809.7	3.944963
Sabine (U. S. E.)	29 59 20.130	619.8	336 03 21.3	156 04 16.9	Pine (U. S. E.)	7362.9	3.867046
1909	93 47 39.904	1069.6	70 08 44.5	250 06 41.4	Neches (U. S. E.)	7024.0	3.846585
Spur (U. S. E.)	29 56 44.505	1370.4	253 56 14.8	73 58 50.5	Neches (U. S. E.)	8701.1	3.939576
1909	93 56 58.180	1560.2	322 03 53.0	142 05 10.3	Port Arthur (U. S. E.)	6764.3	3.830223
Grigsby (U. S. E.)	29 59 28.772	885.9	289 15 13.7	109 17 35.1	Neches (U. S. E.)	8039.4	3.905225
1911	93 56 29.397	788.0	8 40 36.3	188 40 21.9	Spur (U. S. E.)	5116.5	3.708973
Smith (U. S. E.)	30 00 25.549	786.7	295 10 28.4	115 11 37.8	Grigsby (U. S. E.)	4108.4	3.613670
1911	93 58 48.110	1289.3	336 34 47.8	156 35 42.7	Spur (U. S. E.)	7416.8	3.870219
Nederland (U. S. E.)	29 58 44.280	1363.4	193 41 56.3	13 42 10.5	Smith (U. S. E.)	3209.5	3.506440
1911	93 59 16.471	441.6	252 58 48.4	73 00 11.9	Grigsby (U. S. E.)	4683.5	3.670567
			314 50 10.7	134 51 19.8	Spur (U. S. E.)	5229.7	3.718478
Sun (U. S. E.)	29 59 32.898	1013.0	237 34 39.6	57 35 27.2	Smith (U. S. E.)	3024.3	3.480621
1911	94 00 23.364	626.3	309 51 07.9	129 51 41.3	Nederland (U. S. E.)	2335.9	3.368454
Floyd (U. S. E.) [1]	30 01 57.35	1765.9	323 35 07	143 35 46	Smith (U. S. E.)	3512.4	3.545603
1911	94 00 05.91	158.3	6 00 15	186 00 06	Sun (U. S. E.)	4472.4	3.650545
McFadden (U. S. E.) [1]	30 01 13.79	424.6	247 28 48	67 29 48	Floyd (U. S. E.)	3503.3	3.544480
1911	94 02 06.69	179.3	318 16 43	138 17 35	Sun (U. S. E.)	4161.7	3.619272
Cut Off (U. S. E.) [1]	30 03 29.91	921.0	313 36 49	133 37 45	Floyd (U. S. E.)	4131.2	3.616080
1911	94 01 57.54	1541.3	3 20 51	183 20 46	McFadden (U. S. E.)	4198.6	3.623103
Spindle Top (U. S. E.) [1]	30 02 11.20	344.9	227 38 10	47 39 00	Cut Off (U. S. E.)	3597.4	3.555993
1911	94 03 36.78	985.4	306 12 37	126 13 22	McFadden (U. S. E.)	2991.8	3.475929
Beaumont (U. S. E.) [1]	30 04 33.23	1023.2	296 00 17	116 01 32	Cut Off (U. S. E.)	4444.9	3.647865
1911	94 04 26.68	714.6	342 59 56	163 00 21	Spindle Top (U. S. E.)	4573.1	3.660212
Keith	29 46 36.109	1111.8	36 23 53.9	216 21 32.2	Rebecca	12943.4	4.112047
1882	93 56 25.857	694.6	51 07 22.5	231 01 59.0	Scaffold	22548.3	4.353114
			95 20 18.9	275 14 56.3	Gum	17518.6	4.243500
Gulf Bayou 2	29 40 33.856	1042.4	92 51 14.2	272 46 39.7	Rebecca	14918.4	4.173721
1882	93 51 57.351	1542.1	102 13 05.7	282 10 13.0	Johnson 2	9585.5	3.981614
			147 06 59.8	327 04 46.6	Keith	13284.6	4.123347
			198 53 09.3	18 53 37.4	Sabine Pass Lighthouse	4712.9	3.673284

[1] No check on this position.

Lake Sabine, Neches River, and Sabine Pass to East Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Johnson 2	29 41 39.615	1219.7	76 51 55.7	256 50 13.8	Rebecca	5678.9	3.754268
1882	93 57 45.825	1232.0	193 14 27.1	13 15 06.8	Keith	9378.6	3.972136
			257 22 29.5	77 25 50.3	Sabine Pass Lighthouse	11161.7	4.047730
Fort	29 41 26.955	829.9	77 54 01.1	257 52 43.6	Rebecca	4299.6	3.633425
1882	93 58 35.155	945.2	200 02 41.7	20 03 45.8	Keith	10133.2	4.005747
			278 39 48.3	98 43 05.3	Gulf Bayou 2	10819.9	4.034225
			71 45 40.3	251 41 21.2	Scaffold	14820.4	4.170867
Rebecca	29 40 57.658	1775.3	69 14 35.0	249 11 33.4	Scaffold	10555.8	4.023491
1882	94 01 11.514	309.6	108 55 34.3	288 48 56.4	Big Hill	22806.5	4.358059
Gum	29 47 28.603	880.7	320 53 39.1	140 56 39.5	Rebecca	15506.7	4.190519
1882	94 07 15.291	410.7	0 18 49.9	180 18 48.3	Scaffold	15782.8	4.198184
Scaffold	29 38 56.014	1724.6	66 03 23.3	246 00 12.9	Cross	11341.3	4.054664
1882	94 07 18.505	497.8	133 32 00.6	313 28 24.7	Big Hill	16156.1	4.208337
			69 56 35.4	249 48 45.3	Highland 2	27276.2	4.435784
Fence	29 40 03.484	107.3	66 22 00.4	246 20 33.1	Scaffold	5179.5	3.714291
1882	94 04 22.081	593.8	89 38 51.1	269 37 11.1	Salt	5437.2	3.735372
			251 57 22.2	71 58 56.5	Rebecca	5388.8	3.731494
Salt	29 40 02.355	72.5	260 48 49.9	80 52 04.3	Rebecca	10697.2	4.029271
1882	94 07 44.268	1190.5	341 15 40.1	161 15 52.8	Scaffold	2156.9	3.333834
			55 30 22.5	235 27 24.7	Cross	11735.4	4.069497
Big Hill	29 44 57.233	1762.2	355 02 40.3	175 03 05.4	Cross	15788.3	4.198335
1882	94 14 34.417	924.8	34 07 11.9	214 02 56.7	Highland 2	24758.8	4.393729
Cross	29 36 26.369	811.9	72 38 52.0	252 34 12.3	Highland 2	15979.5	4.203562
1882	94 13 43.731	1176.7	92 24 48.0	272 21 52.0	Pierce	9592.6	3.981937
Trueman	29 37 36.085	1111.0	66 39 28.5	246 37 57.1	Cross	5414.7	3.733574
1882	94 10 38.966	1048.2	110 10 05.2	290 08 06.0	Gap	6903.6	3.839077
			226 12 11.2	46 13 37.6	Salt	6508.5	3.813484
			245 27 15.8	65 28 54.9	Scaffold	5927.3	3.772854
Gap	29 38 53.330	1642.0	269 34 14.9	89 37 53.2	Scaffold	11872.2	4.074531
1882	94 14 39.903	1073.4	341 31 46.1	161 32 13.9	Cross	4770.5	3.678564
			55 55 45.2	235 51 33.2	Highland 2	16587.5	4.219781
Wolcott 2	29 34 31.299	963.6	80 12 27.5	260 10 16.8	Highland 2	7237.7	3.859600
1882	94 18 45.380	1221.5	91 25 01.6	271 21 55.1	Northwest Bend	10175.0	4.007533
			159 34 49.3	339 34 22.4	Pierce	4207.2	3.623994
			199 16 58.1	19 19 02.3	Big Hill	20419.8	4.310052
			246 24 04.0	66 26 33.0	Cross	8857.3	3.947299
Flat	29 31 07.364	226.7	209 40 06.8	29 41 01.5	East Bay Bayou	6030.5	3.780355
1882	94 27 53.912	1451.9	236 31 18.3	56 33 38.1	Highland 2	9151.8	3.961507
			246 48 42.1	66 49 59.7	Sand	4610.6	3.663761
Lad	29 35 33.342	1026.6	246 31 28.1	66 32 37.1	Cross	4100.1	3.612795
1882	94 16 03.500	94.2	66 20 10.1	246 18 50.2	Wolcott 2	4757.1	3.677345
			74 43 35.0	254 40 04.4	Highland 2	11910.6	4.075932
			200 03 33.6	20 04 14.9	Gap	6555.4	3.816601
Gilbert	29 35 28.681	883.0	66 13 48.3	246 12 33.0	Wolcott	4486.9	3.651942
1873	94 16 11.765	316.6	75 07 02.7	255 03 36.2	Highland 2	11658.5	4.066641
			111 14 35.7	291 12 52.9	Pierce	6009.4	3.778833
Wolcott	29 34 29.919	921.2	67 27 53.7	247 25 40.0	Hampshire	7897.4	3.897485
1872	94 18 44.324	1193.1	80 34 35.2	260 32 23.9	Highland 2	7258.7	3.860856
			159 25 16.4	339 24 49.0	Pierce	4257.0	3.629101
Pierce	29 36 39.355	1211.7	47 35 02.9	227 33 19.0	Highland 2	7671.6	3.884886
1873	94 19 39.936	1074.5	67 00 42.0	246 58 02.3	Northwest Bend	9454.3	3.975631
County Line	29 33 35.332	1087.8	98 48 55.2	278 47 57.2	Highland 2	3199.9	3.505137
1882	94 21 12.867	346.4	203 48 41 3	23 49 27.2	Pierce	6193.4	3.791927
			246 31 36.1	66 32 48.8	Wolcott 2	4327.8	3.636271
Highland 2	29 33 51.245	1577.8	87 12 25.7	267 09 42.8	Oyster Bayou	8900.5	3.949415
1872	94 23 10.336	278.2	115 57 53.6	295 56 57.9	Northwest Bend	3381.9	3.529165
Hampshire	29 32 51.539	1586.8	99 06 41.5	279 04 01.1	Oyster Bayou	8869.3	3.947888
1873	94 23 15.259	410.9	138 46 30.2	318 45 36.9	Northwest Bend	4412.7	3.644707
			184 07 24.0	4 07 26.5	Highland 2	1843.1	3.265540
Midway 2	29 31 15.986	492.2	156 24 43.4	336 24 08.7	Oyster Bayou	4739.2	3.675708
1872	94 27 30.126	811.3	212 15 27.1	32 16 39.5	Northwest Bend	7404.0	3.869466
			246 46 40.8	66 48 46.4	Hampshire	7466.7	3.873129
Rollover 2	29 30 10.708	329.7	204 19 46.3	24 20 38.9	Oyster Bayou	6972.5	3.843389
1873	94 30 27.283	734.9	247 08 42.8	67 10 10.1	Midway 2	5177.3	3.714102
Rollover	29 30 13.135	404.4	66 41 39.4	246 38 26.5	Shaw	11498.8	4.060654
1849	94 30 28.540	768.7	145 49 01.8	325 47 18.3	Robinsons Bayou	10057.5	4.002490
Robinsons Bayou	29 34 43.317	1333.7	20 51 15.3	200 49 45.6	Shaw	13774.3	4.139068
1860	94 33 58.486	1574.0	69 45 49.1	249 42 51.1	Stevenson	10352.5	4.015045

Lake Sabine, Neches River, and Sabine Pass to East Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Shaw	29 27 45.213	1392.1	62 32 40.7	242 30 32.5	Parrs Grove	7924.6	3.898975
1860	94 37 00.465	12.5	152 36 16.1	332 34 48.1	Stevenson	10462.2	4.019625
Northwest Bend	29 34 39.322	1210.7	32 19 23.3	212 18 10.8	Midway	7402.7	3.869389
1861	94 25 03.305	88.9	71 51 44.6	251 49 57.4	Oyster Bayou	6154.6	3.789201
East Bay Bayou	29 33 57.539	1771.6	25 18 30.5	205 17 47.6	Midway	5497.2	3.740143
1861	94 26 03.021	81.3	81 32 54.7	261 31 37.0	Oyster Bayou	4287.8	3.632239
			231 19 23.9	51 19 53.4	Northwest Bend	2058.8	3.313609
			272 22 32.0	92 23 57.2	Highland 2	4652.4	3.667680
Sand	29 32 06.303	194.0	159 55 18.0	339 54 55.1	East Bay Bayou	3646.6	3.561885
1882	94 25 16.514	444.7	184 18 55.2	4 19 01.7	Northwest Bend	4724.7	3.674378
			226 25 31.9	46 26 34.1	Highland 2	4688.2	3.671010
Midway	29 31 16.123	496.4	68 00 56.2	247 59 28.4	Rollover	5177.8	3.714142
1860	94 27 30.284	815.5	156 26 19.8	336 25 45.1	Oyster Bayou	4733.6	3.675195
Oyster Bayou	29 33 37.045	1140.6	24 51 17.1	204 50 23.9	Rollover	6918.7	3.840022
1860	94 28 40.574	1092.2	103 26 00.2	283 23 23.3	Robinsons Bayou	8797.2	3.944346
Supplementary points.							
Broussard's house, cupola	29 41 54.195	1668.6	72 24 36.9	252 24 10.8	Johnson 2	1485.1	3.171767
1882	93 56 53.166	1429.5	184 49 50.3	4 50 03.9	Keith	8711.1	3.940073
			258 08 37.5	78 11 32.2	Sabine Pass Lighthouse	9683.0	3.986010
			287 15 22.9	107 17 49.5	Gulf Bayou 2	8329.0	3.920593
Mortar [1]	29 40 31.20	960.6	177 08 25	357 08 21	Sabine Pass southwest base	4889.7	3.689284
1874	93 54 05.53	148.7	268 47 03	88 48 08	Gulf Bayou	3497.0	3.543699
Sabine Pass Methodist Church, spire [1]	29 43 52.45	1615.0	292 31 15	112 32 28	Sabine Pass Lighthouse	4321.1	3.635590
1906	93 53 29.10	782.2	59 21 42	239 19 34	Johnson 2	8021.6	3.904261
Sabine Pass Baptist Church, spire	29 44 03.208	98.8	35 01 33.0	215 01 11.7	Sabine Pass southwest base	2007.8	3.302713
1906	93 53 31.731	852.7	135 11 30.4	315 10 03.9	Keitb	6637.1	3.821977
			192 03 44.4	12 03 59.3	Pat Glennon Bayou	3872.6	3.588001
North	29 44 09.64	296.8	20 42 16	200 42 12	Sahine Pass Methodist Church, spire	566.0	2.75278
1911	93 53 21.65	581.8					
West	29 44 08.93	275.0	261 57 28	81 57 31	North	157.10	2.19618
1911	93 53 27.44	737.4	5 00 54	185 00 53	Sahine Pass Methodist Church, spire	509.4	2.70704
South	29 44 02.29	70.5	40 37 56	220 37 51	Sahine Pass Methodist Church, spire	399.3	2.60130
1911	93 53 19.42	521.9	94 47 29	274 47 23	Sahine Pass Baptist Church, spire	332.2	2.52136
			165 10 15	345 10 14	North	234.165	2.36952
Sabine longitude station	29 44 09.69	298.3	359 59 45	179 59 45	North	1.68	0.2253
1911	93 53 21.65	581.8					
Sabine Pass Jetty Light (U. S. E.)	29 40 03.756	115.6	99 10 54.4	279 09 23.2	Texas (U. S. E.)	5017.6	3.700496
1909	93 49 40.526	1089.8	158 13 09.5	338 12 29.8	Sahine Pass Lighthouse	5800.1	3.763433
			182 50 09.4	2 50 13.2	Louisiana (U. S. E.)	4170.1	3.620145
Sun pumping station, stack	29 43 19.396	597.2	61 05 28.7	241 03 46.2	Johnson 2	6352.4	3.802937
1906	93 54 18.980	510.1	276 48 30.5	96 50 08.8	Sabine Pass Lighthouse	5370.1	3.729981
Sabine Bank Lighthouse	29 28 20.212	622.3	129 03 35.9	308 54 47.4	Rebecca	37068.4	4.569004
1906	93 43 21.000	565.8	136 39 32.7	316 32 25.7	Johnson 2	33875.5	4.529886
			147 26 38.6	327 21 13.6	Sun pumping station	32863.1	4.516708
			155 27 29.5	335 23 42.5	Sahine Pass Lighthouse	29741.0	4.473356
Sabine Pass East Jetty Beacon.	29 39 15.119	465.5	113 41 25.4	293 39 49.0	Texas (U. S. E.)	5720.1	3.757405
1909	93 49 29.936	805.1	179 12 25.7	359 12 24.3	Louisiana (U. S. E.)	5663.1	3.753051
Entrance Range Front Beacon	29 41 21.214	653.2	211 17 46.0	31 18 05.9	Louisiana (U. S. E.)	2083.3	3.318747
1909	93 50 13.109	352.4	339 49 36.5	159 49 52.6	Sahine Pass Jetty Light (U. S. E.)	2540.7	3.404954
			68 45 41.6	248 44 26.4	Texas (U. S. E.)	4374.3	3.640907
Entrance Range Rear Beacon	29 41 53.554	1648.9	239 09 10.0	59 09 34.2	Louisiana (U. S. E.)	1529.8	3.184643
1909	93 50 21.711	583.6	341 51 38.6	161 51 59.0	Sahine Pass Jetty Light (U. S. E.)	3557.4	3.551129
			56 08 24.3	236 07 13.5	Texas (U. S. E.)	4631.4	3.665708
Mud Flat [1]	29 41 15.80	486.5	168 15 34	348 15 26	Texas Point	2196.6	3.341744
1874	93 51 01.34	36.0	223 51 07	43 51 40	Louisiana Point	2558.0	3.407895

[1] No check on this position.

Lake Sabine, Neches River, and Sabine Pass to East Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Sabine Pass Life-Saving Station, flagstaff 1909	29 42 21.59 93 51 11.38	664.8 305.9	271 41 58 330 04 08	91 42 47 150 04 53	Louisiana (U. S. E.) Sabine Pass Jetty Light (U. S. E.)	2649.8 4896.7	3.423217 3.689903
Windsor Hotel, flagstaff[1] 1909	29 43 11.22 93 52 19.84	345.5 533.3	323 24 49 7 40 09	143 26 08 187 39 57	Sabine Pass Jetty Light (U. S. E.) Texas (U. S. E.)	7187.6 5017.4	3.856581 3.700483
Inner Range Front Beacon 1909	29 44 00.848 93 52 21.295	26.1 572.3	304 41 24.5 5 32 19.4 62 42 40.8 164 19 38.7	124 42 48.0 185 32 07.8 242 41 44.6 344 19 18.5	Louisiana (U. S. E.) Texas (U. S. E.) Sabine Pass southwest base. Pat Glennon Bayou	5506.9 6531.0 3426.9 4008.8	3.740904 3.814978 3.534897 3.603019
Inner Range Rear Beacon 1909	29 44 27.490 93 52 42.311	846.4 1136.9	307 49 34.4 0 30 38.0 46 02 48.7 170 19 18.5	127 51 08.5 180 30 37.0 226 02 02.9 350 19 08.9	Louisiana (U. S. E.) Texas (U. S. E.) Sabine Pass southwest base. Pat Glennon Bayou	6447.8 7321.1 3445.7 3083.3	3.809409 3.864576 3.537283 3.489015
Sabine Pass Channel Beacon 1909	29 44 22.956 93 53 05.629	706.8 151.3	355 31 37.3 39 27 38.6 181 56 49.3	175 31 47.9 219 27 04.4 1 56 51.3	Texas (U. S. E.) Sabine Pass southwest base Pat Glennon Bayou	7203.1 2917.0 3180.8	3.857520 3.464935 3.502543
Elevator "A," chimney 1912	29 50 18.790 93 57 24.029	578.5 645.1	264 37 56.6 292 03 22.2 349 29 14.9	84 43 00.2 112 05 49.8 169 29 38.7	Johnson Bayou (U. S. E.) Garrison (U. S. E.) Keith (U. S. E.)	16447.1 8599.9 7042.9	4.216090 3.934491 3.847751
Water tower, docks 1912	29 50 36.050 93 57 20.437	1110.0 548.6	266 27 37.2 295 31 50.2 350 56 35.7	86 32 39.0 115 34 16.0 170 56 57.7	Johnson Bayou (U. S. E.) Garrison (U. S. E.) Keith (U. S. E.)	16309.7 8726.1 7550.3	4.212447 3.940821 3.877962
Kansas City Southern R. R. station, tower 1912	29 52 02.620 93 56 17.915	80.7 480.8	276 29 23.6 316 03 16.6 2 46 37.5	96 33 54.4 136 05 11.4 182 46 28.4	Johnson Bayou (U. S. E.) Garrison (U. S. E.) Keith (U. S. E.)	14694.6 8927.1 10133.6	4.167157 3.950708 4.005765
Water tower, Port Arthur 1909	29 51 56.360 93 56 06.523	1735.4 175.1	218 05 39.1 275 51 56.0 335 15 33.5 4 35 21.1 27 54 25.5	38 06 30.6 95 56 21.3 155 17 05.4 184 35 06.3 207 53 46.8	Port Arthur (U. S. E.) Johnson Bayou (U. S. E.) Pat Glennon Bayou Keith (U. S. E.) Docks (U. S. E.)	4494.0 14369.9 11869.8 9960.9 4461.8	3.652631 4.157453 4.074445 3.998298 3.649510
Wireless mast, Port Arthur 1912	29 52 00.903 93 56 03.264	27.8 87.6	276 27 34.4 317 41 42.0 5 01 13.9	96 31 57.9 137 43 29.5 185 00 57.5	Johnson Bayou (U. S. E.) Garrison (U. S. E.) Keith (U. S. E.)	14297.9 8619.7 10107.6	4.155273 3.935490 4.004649
Plaza Hotel, flagstaff 1909	29 52 14.181 93 55 58.721	436.6 1575.9	220 37 29.8 320 03 44.3 5 29 15.1 27 05 34.6	40 38 17.4 140 05 29.5 185 28 56.4 207 04 52.0	Port Arthur (U. S. E.) Garrison (U. S. E.) Keith (U. S. E.) Docks (U. S. E.)	3936.7 8847.5 10525.9 5045.2	3.595137 3.946821 4.022260 3.702882
Wireless tower, Port Arthur 1912	29 52 45.577 93 55 35.042	1403.4 940.4	223 38 51.9 282 30 48.4 326 56 44.8	43 39 27.7 102 34 57.9 146 58 18.2	Port Arthur (U. S. E.) Johnson Bayou (U. S. E.) Garrison (U. S. E.)	2793.2 13776.9 9247.4	3.446101 4.139151 3.966020
White water tower, red tank 1912	29 53 38.966 93 54 52.489	1199.8 1408.3	290 37 01.4 337 27 01.0 12 00 57.4	110 40 49.7 157 28 13.3 192 00 05.8	Johnson Bayou (U. S. E.) Garrison (U. S. E.) Keith (U. S. E.)	13149.6 10172.8 13381.1	4.118912 4.007442 4.126493

[1] No check on this position.

East Bay, Galveston Bay, and West Bay.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Stevenson	29 32 46.879	1443.3	9 42 00.4	189 41 20.	Parrs Grove	13131.3	4.118307
1850	94 39 59.269	1595.7	76 44 00.5	256 40 58.3	Smiths Point	10228.7	4.009820
Parrs Grove	29 25 46.472	1430.8	53 58 10.0	233 55 39.9	Bolivar Point	10198.0	4.008516
1849	94 41 21.353	575.6	143 49 52.7	323 47 31.2	Smiths Point	13124.0	4.118066
Smiths Point	29 31 30.498	939.0	1 41 35.1	181 41 26.2	Bolivar Point	16601.0	4.220135
1849	94 46 08.972	241.6	49 10 40.6	229 07 05.1	Dollar Point	15603.0	4.193207
Dollar Point	29 25 59.014	1817.0	359 41 12.6	179 41 13.8	Virginia Point	12621.2	4.101100
1847	94 53 27.041	728.9	49 57 49.3	229 54 36.3	Highland Bayou	13853.7	4.141567
Bolivar Point	29 22 31.540	971.1	61 03 20.8	240 59 56.3	Virginia Point	12868.1	4.109516
1848	94 46 27.159	742.4	119 27 48.5	299 24 22.4	Dollar Point	12998.4	4.113885
Virginia Point	29 19 09.085	279.7	53 27 53.5	233 24 37.2	Black Point	13487.5	4.129933
1847	94 53 24.483	660.7	109 09 34.8	289 06 20.9	Highland Bayou	11301.9	4.053153
Highland Bayou	29 21 09.401	289.4	0 43 59.6	180 43 56.9	Black Point	11739.8	4.069660
1850	95 00 00.260	7.0	47 27 41.3	227 25 20.4	Halls Bayou	10546.1	4.023091
Black Point	29 14 48.121	1481.5	15 48 03.8	195 47 06.4	Galveston Island west base	11688.4	4.067755
1850	95 00 05.824	157.3	121 09 52.8	301 07 34.8	Halls Bayou	8905.6	3.949665
Halls Bayou	29 17 17.730	545.9	344 19 32.3	164 20 52.6	Galveston Island west base	16464.7	4.216554
1850	95 04 48.151	1299.6	49 20 38.1	229 17 22.2	Chocolate Bayou	14277.8	4.154661
Galveston Island west base	29 08 42.805	1317.9	48 08 03.9	228 03 30.6	Peninsula	20434.5	4.310365
1850	95 02 03.576	96.6	113 13 34.3	293 08 58.6	Chocolate Bayou	16624.7	4.220753
Galveston Island east base	29 12 49.123	1512.4	53 05 50.9	233 02 48.8	Galveston Island west base	12622.2	4.101134
1850	94 55 50.147	1354.5	117 58 01.5	297 55 56.6	Black Point	7816.7	3.893026
Chocolate Bayou	29 12 15.423	474.8	359 45 17.3	179 45 18.9	Peninsula	20194.0	4.305222
1850	95 11 29.121	786.6	21 06 15.1	201 04 35.7	Cottonwood	15330.9	4.185568
Mustang Bayou	29 11 44.627	1374.0	203 19 46.0	23 21 06.1	Halls Bayou	11169.5	4.048034
1850	95 07 32.027	865.3	244 51 15.3	64 54 53.1	Black Point	13310.0	4.124177
			302 13 03.0	122 15 43.1	Galveston Island west base	10493.4	4.020915
West End	29 05 18.583	572.1	173 52 52.5	353 52 29.5	Mustang Bayou	11953.4	4.077491
1850	95 06 44.865	1213.4	230 23 57.4	50 26 13.9	Galveston Island west base	9867.5	3.994209
			45 56 57.7	225 54 40.9	Peninsula	10582.4	4.024585
Rollover (U. S. E.)	29 30 10.678	328.8	225 44 11.4	45 46 22.6	East Bay Bayou	10010.8	4.000468
1900	94 30 29.350	790.5	226 40 56.7	46 43 37.5	Northwest Bend	12061.6	4.081403
			240 05 36.5	60 09 12.9	Highland 2	13633.0	4.134592
Robinson Bayou (U. S. E.)	29 34 43.211	1330.4	275 12 09.0	95 17 28.5	Highland 2	17496.4	4.242949
1900	94 33 57.634	1551.2	326 13 46.6	146 15 29.3	Rollover (U. S. E.)	10092.5	4.004000
Shaw (U. S. E.)	29 27 17.474	538.0	204 01 27.2	24 03 19.2	Robinson Bayou (U. S. E.)	15027.2	4.176878
1900	94 37 44.941	1211.1	245 31 56.3	65 35 30.7	Rollover (U. S. E.)	12890.1	4.110257
Stevenson Point (U. S. E.)	29 32 47.903	1474.9	249 08 44.2	69 11 35.2	Robinson Bayou (U. S. E.)	9983.6	3.999285
1901	94 39 44.265	1191.7	342 27 33.5	162 28 32.3	Shaw (U. S. E.)	10669.2	4.028131
Parrs Grove (U. S. E.)	29 25 40.190	1237.4	190 22 11.8	10 22 55.9	Stevenson Point (U. S. E.)	13387.7	4.126707
1900	94 41 13.772	371.3	241 57 53.2	61 59 35.9	Shaw (U. S. E.)	6375.6	3.804523
Smith Point (U. S. E.)	29 31 33.719	1038.2	257 06 03.7	77 09 06.7	Stavenson Point (U. S. E.)	10251.6	4.010792
1900	94 45 55.428	1492.6	325 05 54.3	145 08 12.9	Parrs Grove (U. S. E.)	13268.7	4.122830
Four E (U. S. E.)	29 21 46.026	1417.1	177 51 26.9	357 51 14.5	Smith Point (U. S. E.)	18107.0	4.257845
1901	94 45 30.290	816.9	223 47 39.7	43 49 45.6	Parrs Grova (U. S. E.)	9990.8	3.999601
Galveston north base (U. S. E.)	29 25 07.331	225.7	226 20 27.2	46 24 15.1	Smith Point (U. S. E.)	17242.0	4.236588
1900	94 53 38.648	1041.8	295 10 17.4	115 14 17.1	Four E (U. S. E.)	14553.9	4.162980
Galveston south base (U. S. E.)	29 19 48.807	1502.7	191 14 19.3	11 14 54.8	Galveston north base (U. S. E.)	9998.8	3.999947
1900	94 54 50.938	1374.3	256 32 25.8	76 37 00.6	Four E (U. S. E.)	15548.7	4.191694
Cathedral, north spira	29 18 13.831	425.8	103 43 35.7	283 39 58.0	Galveston south base (U. S. E.)	12349.5	4.091651
1849	94 47 26.290	709.6	141 45 20.4	321 42 17.8	Galveston north basa (U. S. E.)	16215.6	4.209934
			145 50 05.4	325 47 08.5	Dollar Point	17314.4	4.238407
			191 21 50.0	11 22 19.0	Bolivar Point	8093.2	3.908118
Edwards Point (U. S. E.)	29 29 42.537	1309.7	256 17 05.5	76 21 22.7	Smith Point (U. S. E.)	14474.9	4.160617
1901	94 54 37.630	1013.6	349 22 19.3	169 22 48.3	Galveston north baso (U. S. E.)	8621.0	3.935559

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Cedar Point (U. S. E.) 1901	29 40 10.594 94 52 37.686	326.2 1013.4	325 44 57.8 9 29 08.3	145 48 16.5 189 28 09.1	Smith Point (U. S. E.) Edwards Point (U. S. E.)	19246.7 19605.0	4.284356 4.292367
Red Bluff, Harris Co. (U. S. E.) 1901	29 36 07.279 94 58 59.060	224.1 1589.3	233 50 06.0 329 15 53.3	53 53 14.5 149 18 02.2	Cedar Point (U. S. E.) Edwards Point (U. S. E.)	12703.0 13779.1	4.103906 4.139220
Morgans Point (U. S. E.) 1901	29 40 51.414 94 59 09.570	1583.0 257.3	276 46 28.7 358 08 54.8	96 49 42.7 178 09 00.0	Cedar Point (U. S. E.) Red Bluff (U. S. E.)	10612.1 8752.9	4.025801 3.942152
Double Bayou (U. S. E.) 1900	29 40 50.885 94 41 47.458	1566.7 1276.0	21 16 15.4 85 59 10.9	201 14 12.9 265 53 49.0	Smith Point (U. S. E.) Cedar Point (U. S. E.)	18406.7 17528.0	4.264976 4.243733
Lawrence Cove (U. S. E.) 1900	29 46 18.499 94 46 57.187	569.6 1536.4	320 26 55.3 38 57 28.6	140 29 28.9 218 54 39.8	Double Bayou (U.S.E) Cedar Point (U. S. E.)	13078.4 14562.6	4.116553 4.163239
Wiggins 2 1911	29 49 23.682 94 42 10.728	729.1 288.1	357 43 50.5 53 28 33.8	177 44 02.0 233 26 11.4	Double Bayou Lawrence Cove	15801.4 9575.9	4.198696 3.981179
Anahuac 1850	29 46 42.644 94 40 35.966	1313.0 966.1	85 52 26.7 152 50 14.5	265 49 17.4 332 49 27.4	Lawrence Cove Wiggins 2	10267.5 5573.3	4.011464 3.746116
Mesquite Knoll (U. S. E.) 1900	29 39 28.552 94 55 43.620	879.1 1173.2	114 44 54.4 40 19 28.5	294 43 12.1 220 17 51.9	Morgan Point (U.S.E.) Red Bluff (U. S. E.)	6097.5 8126.8	3.785153 3.909922
Dr. Smith (U. S. E.) 1900	29 42 02.742 94 58 35.522	84.4 954.9	315 45 17.0 22 37 45.0	135 46 42.1 202 37 28.1	Mesquite Knoll (U. S. E.) Morgan Point (U.S.E.)	6625.9 2379.3	3.821242 3.376453
Jennings (U. S. E.) 1900	29 42 12.770 95 01 12.944	393.2 347.9	274 09 43.3 299 42 15.5 307 03 07.0	94 11 01.3 119 44 58.7 127 04 08.1	Dr. Smith (U. S. E.) Mesquite Knoll (U. S. E.) Morgan Point (U.S.E.)	4243.1 10196.7 4156.5	3.627682 4.008458 3.618727
Davis (U. S. E.) 1900	29 44 08.857 95 01 39.409	272.7 1059.0	326 27 49.3 348 44 35.6	146 29 03.5 168 44 48.7	Morgan Point (U.S.E.) Jennings (U. S. E.)	7292.4 3644.4	3.862873 3.561624
Santa Anna (U. S. E.) 1900	29 45 05.502 95 04 35.620	169.4 957.1	290 12 32.0 311 43 58.3 314 18 06.5	110 13 59.3 131 46 39.9 134 19 47.0	Davis (U. S. E.) Morgan Point (U.S.E.) Jennings (U. S. E.)	5046.0 11747.6 7612.8	3.702945 4.069951 3.881545
Thayer (U. S. E.) 1900	29 42 19.957 95 06 13.899	614.5 373.6	203 52 57.2 207 23 06.7 283 24 40.4	23 53 51.9 27 23 55.4 103 28 10.5	Tory Hill (U. S. E.) Santa Anna (U. S. E.) Morgan Point (U.S.E.)	7324.9 5740.8 11729.1	3.864803 3.758972 4.069263
Tory Hill (U. S. E.) 1900	29 45 57.473 95 04 23.509	1769.7 631.6	318 08 17.1 11 29 41.9	138 10 52.8 191 29 35.9	Morgan Point (U.S.E.) Santa Anna (U. S. E.)	12649.0 1633.0	4.102055 3.212973
Battlefield (U. S. E.) 1900	29 45 07.386 95 05 15.651	227.4 420.5	222 14 49.2 273 05 01.8	42 15 15.1 93 05 21.7	Tory Hill (U. S. E.) Santa Anna (U. S. E.)	2083.5 1077.1	3.318785 3.032260
Case (U. S. E.) 1900	29 19 47.980 94 46 23.438	1477.2 632.4	90 08 26.9 129 58 58.6 201 31 29.1	270 04 18.3 309 55 25.1 21 31 55.2	Galveston south base (U. S. E.) Galveston north base (U. S. E.) Four E (U. S. E.)	13692.6 15311.2 3907.0	4.136485 4.185009 3.591841
Mort (U. S. E.) 1900	29 19 44.074 94 45 27.481	1357.0 741.5	90 35 14.4 94 33 30.6 126 57 10.2 178 50 37.6	270 30 38.3 274 33 03.1 306 53 09.3 358 50 36.3	Galveston south base (U. S. E.) Case (U. S. E.) Galveston north base (U. S. E.) Four E (U. S. E.)	15203.1 1514.5 16568.5 3755.5	4.181931 3.180279 4.219283 3.574662
Fort Point Lighthouse (U. S. E.) 1900	29 20 11.126 94 46 01.098	342.5 29.6	87 17 02.0 126 29 55.5 195 52 28.6 312 33 29.9	267 12 42.4 306 26 11.0 15 52 43.7 132 33 46.4	Galveston south base (U. S. E.) Galveston north base (U. S. E.) Four E (U. S. E.) Mort (U. S. E.)	14311.4 15343.5 3037.7 1231.3	4.155681 4.185925 3.482548 3.090378
Bolivar Point Lighthouse (U. S. E.) 1900	29 21 59.437 94 46 00.986	1830.0 26.6	74 19 22.9 115 08 51.5 296 30 14.9 347 45 42.5 0 03 07.6	254 15 03.1 295 05 07.1 116 30 29.9 167 45 58.8 180 03 07.5	Galveston south base (U. S. E.) Galveston north base (U. S. E.) Four E (U. S. E.) Mort (U. S. E.) Fort Point Lighthouse (U. S. E.)	14850.8 13629.1 925.1 4264.4 3334.7	4.171749 4.134466 2.966194 3.629861 3.523059
West Bay Point 1912	29 17 51.306 94 51 04.210	1579.6 113.6	120 36 38.6 226 56 22.3 242 13 15.3	300 34 47.6 46 58 50.9 62 15 43.7	Galveston south base (U. S. E.) Bolivar Point Lighthouse (U. S. E.) Fort Point Lighthouse	7107.7 11193.3 9242.8	3.851730 4.048958 3.965803
W. B. 3 (U. S. E.) 1900	29 15 03.426 94 55 32.709	105.5 883.2	187 18 33.2 234 29 20.7	7 18 53.6 54 31 32.0	Galveston south base (U. S. E.) West Bay Point	8858.3 8902.3	3.947352 3.949503

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
W. B. 4 (U. S. E.) 1900	29 16 49.407	1521.1	226 40 00.9	46 41 47.1	Galveston south base (U. S. E.)	8051.0	3.905848
	94 58 27.988	755.7	260 55 46.9	80 59 24.0	West Bay Point	12129.1	4.083828
			304 34 32.3	124 35 58.0	W. B. 3 (U. S. E.)	5748.0	3.759514
W. B. 6 (U. S. E.) 1900	29 14 09.882	304.2	222 15 48.1	42 17 08.9	W. B. 4 (U. S. E.)	6637.7	3.822017
	95 01 13.365	360.9	259 49 00.6	79 51 47.0	W. B. 3 (U. S. E.)	9345.3	3.970595
Reef 1912	29 11 58.209	1792.1	146 44 52.3	326 44 04.3	W. B. 6 (U. S. E.)	4848.0	3.685560
	94 59 34.930	943.6	191 23 43.4	11 24 16.1	W. B. 4 (U. S. E.)	9145.7	3.961219
			228 54 20.9	48 56 19.2	W. B. 3 (U. S. E.)	8678.3	3.938437
Y (U. S. E.) 1900	29 11 52.796	1625.4	224 16 53.0	44 18 07.4	W. B. 6 (U. S. E.)	5896.3	3.770580
	95 03 45.807	1237.5	268 34 27.7	88 36 30.1	Reef	6779.5	3.831196
Snake 1912	29 09 20.773	639.5	156 21 16.6	336 20 39.6	Y (U. S. E.)	5109.5	3.708381
	95 02 29.950	809.4	193 04 49.6	13 05 27.0	W. B. 6 (U. S. E.)	9138.2	3.960861
			224 16 57.0	44 18 22.3	Reef	6771.9	3.830708
Hall (U. S. E.) 1912	29 10 22.544	694.1	238 14 19.6	58 15 40.6	Y (U. S. E.)	5280.4	3.722668
	95 06 31.998	864.6	286 11 41.4	106 13 39.3	Snake	6811.9	3.833271
Life 1912	29 07 36.870	1135.1	158 23 40.0	338 23 03.6	Hall (U. S. E.)	5486.3	3.739278
	95 05 17.239	466.0	197 24 17.7	17 25 01.7	Y (U. S. E.)	8259.5	3.916954
			234 42 41.9	54 44 03.3	Snake.	5538.9	3.743424
Mesquite 2 1912	29 08 23.780	732.1	232 22 37.3	52 24 02.9	Hall (U. S. E.)	5991.2	3.777513
	95 09 27.608	746.2	282 01 43.3	102 03 45.2	Life	6920.4	3.840130
Fence 1912	29 05 28.710	883.9	101 17 24.8	281 16 17.4	Mud Island, north base (U. S. E.)	3822.6	3.582358
	95 06 52.034	1407.2	142 02 32.2	322 01 16.5	Mesquite 2	6836.9	3.834860
			213 00 04.6	33 00 50.7	Life	4705.1	3.672567
Fort Bayou 1912	29 06 41.792	1286.7	192 29 34.5	12 29 47.0	Mesquite 2	3216.1	3.507328
	95 09 53.346	1442.4	294 38 20.5	114 39 48.7	Fence	5394.4	3.731944
			322 27 34.8	142 27 55.6	Mud Island, north base (U. S. E.)	1894.4	3.277481
			22 55 09.2	202 54 39.1	Hartrick	4312.9	3.634765
Mud Island, north base (U. S. E.) 1912	29 05 52.999	1631.7	174 21 48.6	354 21 40.3	Mesquite 2	4664.7	3.668821
	95 09 10.659	288.2	207 19 12.1	27 20 29.3	Hall (U. S. E.)	9341.3	3.970406
			243 06 45.1	63 08 38.6	Life	7075.1	3.849730
Supplementary points							
High Island Hotel (U. S. E.) 1900	29 33 22.064	679.3	62 18 24.9	242 14 59.7	Rollover (U. S. E.)	12667.4	4.102688
	94 23 32.924	886.4	98 29 38.1	278 24 29.8	Robinson Bayou (U. S. E.)	17000.4	4.230459
			105 08 14.6	285 07 00.4	East Bay Bayou	4185.5	3.621752
			214 05 14.4	34 05 25.6	Highland 2	1084.9	3.035393
Jackson (U. S. E.) 1900	29 33 23.846	734.2	33 31 08.6	213 29 56.5	Rollover (U. S. E.)	7133.0	3.853269
	94 28 03.111	83.7	104 23 13.5	284 20 18.6	Robinson Bayou (U. S. E.)	9850.8	3.993473
			263 52 13.7	83 54 38.1	Highland 2	7926.4	3.899077
Rollover Tide Gauge (U. S. E.) 1900	29 31 39.670	1221.4	138 01 38.7	318 00 05.5	Robinson Bayou (U. S. E.)	7602.6	3.880960
	94 30 48.727	1312.1	251 47 46.1	71 51 32.2	Highland 2	12989.3	4.113586
			349 12 55.5	169 13 05.1	Rollover (U. S. E.)	2789.2	3.445480
Frozen Point (U. S. E.) 1900	29 32 24.388	750.8	135 36 13.4	315 34 56.7	Robinson Bayou (U. S. E.)	5983.1	3.776925
	94 31 22.111	595.3	251 30 56.8	71 33 34.0	East Bay Bayou	9056.5	3.956962
			340 57 18.0	160 57 44.0	Rollover (U. S. E.)	4355.1	3.638997
G [1] 1882	29 29 32.391	997.3					
	94 32 08.970	241.6					
Marsh Point (U. S. E.) 1901	29 31 53.977	1661.9	100 10 44.5	280 07 54.8	Stevenson Point (U. S. E.)	9416.6	3.973893
	94 34 00.015	0.4	180 42 16.3	0 42 17.5	Robinson Bayou (U. S. E.)	5210.9	3.716916
			299 15 37.3	119 17 21.1	Rollover (U. S. E.)	6504.1	3.813187
F [1] 1882	29 28 42.535	1309.6					
	94 34 18.701	503.9					
Rip (U. S. E.) 1901	29 33 13.867	427.0	5 05 57.8	185 05 39.9	Shaw (U. S. E.)	11016.5	4.042044
	94 37 08.604	231.6	79 12 40.0	259 11 23.2	Stevenson Point (U. S. E.)	4266.3	3.630054
			241 50 04.7	61 51 39.0	Robinson Bayou (U. S. E.)	5830.3	3.765690
Cox (U. S. E.) 1901	29 30 09.331	287.3	31 57 13.9	211 56 13.4	Shaw (U. S. E.)	6235.7	3.794884
	94 35 42.475	1144.1	126 52 48.5	306 50 49.3	Stevenson Point (U. S. E.)	8138.3	3.910534
			198 30 04.4	18 30 56.0	Robinson Bayou (U. S. E.)	8892.4	3.949020
E [1 2] 1882	29 27 15.973	491.8					
	94 37 37.168	1001.7					

[1] This position was determined from an unmarked traverse.

[2] No check on this position.

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Long Grove (U. S. E.) 1900	29 32 17.009 94 42 11.209	523.7 301.8	77 33 58.9 256 28 14.9	257 32 08.3 76 29 27.3	Smitb Point (U. S. E.) Stevenson Point (U. S. E.)	6183.0 4069.1	3.791196 3.609502
			352 46 40.9	172 47 09.1	Parrs Grove (U. S. E.)	12315.2	4.090441
D [1 2] 1882	29 26 21.327 94 39 27.391	656.6 738.3					
Hannas Reef Tide Gauge (U. S. E.) 1900	29 27 11.242 94 42 25.878	346.1 697.4	202 46 11.2	22 47 30.8	Stevenson Point (U. S. E.)	11242.4	4.050860
			268 31 44.2	88 34 02.4	Sbaw (U. S. E.)	7573.1	3.879272
			325 15 53.2	145 16 28.7	Parrs Grove (U. S. E.)	3411.1	3.532890
Cren (U. S. E.) 1901	29 25 39.864 94 43 17.030	1227.3 459.1	26 31 55.0	206 30 49.6	Four E (U. S. E.)	8046.3	3.905598
			158 37 13.1	338 35 55.2	Smith Point (U. S. E.)	11700.7	4.068213
			269 49 06.8	89 50 07.4	Parrs Grove (U. S. E.)	3322.4	3.521451
S (U. S. E.) 1900	29 24 52.872 94 41 54.085	1627.9 1458.0	45 23 48.7	225 22 02.6	Four E (U. S. E.)	8190.4	3.913303
			152 13 56.6	332 11 57.8	Smitb Point (U. S. E.)	13949.9	4.144570
			216 43 04.4	36 43 24.2	Parrs Grove (U. S. E.)	1817.5	3.259477
C [1 2] 1882	29 25 14.484 94 41 22.444	445.9 605.0					
B [1] 1882	29 23 57.943 94 43 02.103	1784.0 56.7					
A [1] 1882	29 22 29.228 94 44 41.157	899.9 1110.0					
Galveston Bay Channel Light No. 1 1911	29 25 02.470 94 49 42.302	76.0 1140.4	40 46 46.0	220 44 14.6	Galveston soutb base (U. S. E.)	12749.3	4.105485
			91 21 43.7	271 19 47.7	Galveston nortb base (U. S. E.)	6373.0	3.804345
			313 20 40.0	133 22 28.6	Bolivar Point Lighthouse (U. S. E.)	8207.8	3.914228
			326 21 33.7	146 23 22.2	Fort Point Lighthouse (U. S. E.)	10772.5	4.032317
Galveston Bay Channel Light No. 2 1911	29 31 51.523 94 53 34.653	1586.4 933.1	326 07 14.2	146 10 57.2	Bolivar Point Lighthouse (U. S. E.)	21949.7	4.341429
			0 29 45.2	180 29 43.3	Galveston nortb base (U. S. E.)	12445.0	4.094996
			23 07 53.5	203 07 22.6	Edwards Point (U. S. E.)	4318.3	3.635316
Galveston Bay Channel Light No. 3 1911	29 28 07.720 94 51 15.425	237.7 415.7	34 48 31.4	214 47 21.0	Galveston nortb base (U. S. E.)	6763.5	3.830174
			118 12 02.3	298 10 22.8	Edwards Point (U. S. E.)	6180.4	3.791014
			323 11 50.5	143 14 29.3	Bolivar Point Lightbouse (U. S. E.)	14157.1	4.150973
			329 58 14.0	150 00 47.4	Fort Point Lightbouse (U. S. E.)	16945.1	4.229044
Dollar Point (U. S. E.) 1900	29 25 59.000 94 53 26.912	1816.5 725.4	11 14 53.3	191 14 47.5	Galveston nortb base (U. S. E.)	1622.0	3.210043
			121 14 15.0	301 13 25.7	Miller Point (U. S. E.)	3159.1	3.499559
			164 31 45.1	344 31 10.3	Edwards Point (U. S. E.)	7141.4	3.853781
Dollar Point Sboal Beacon 1911	29 27 27.632 94 52 02.613	850.8 70.4	30 56 10.2	210 55 23.1	Galveston north base (U. S. E.)	5035.8	3.702066
			77 38 18.9	257 36 48.2	Miller Point	5090.9	3.706793
			98 10 39.5	278 08 52.6	April Fool Point (U. S. E.)	5914.7	3.771930
Miller Point (U. S. E.) 1900	29 26 52.199 94 55 07.139	1607.1 192.4	188 37 06.3	8 37 20.8	Edwards Point (U. S. E.)	5304.4	3.724639
			323 32 24.1	143 33 07.6	Galveston nortb base (U. S. E.)	4014.2	3.603597
			358 04 46.1	178 04 54.0	Galveston soutb base (U. S. E.)	13043.0	4.115376
April Fool Point (U. S. E.) 1900	29 27 54.908 94 55 39.892	1690.6 1074.8	206 50 37.3	26 51 07.9	Edwards Point (U. S. E.)	3714.1	3.569857
			246 47 35.2	66 52 22.9	Smith Point (U. S. E.)	17124.4	4.233616
			327 38 40.2	147 39 39.8	Galveston nortb base (U. S. E.)	6107.2	3.785841
			335 25 52.8	155 26 08.9	Miller Point (U. S. E.)	2122.9	3.326931
Dickinson (U. S. E.) 1900	29 27 37.758 94 58 26.222	1162.5 706.6	238 01 40.8	58 03 33.3	Edwards Point (U. S. E.)	7258.6	3.860854
			300 50 29.0	120 52 50.3	Galveston north base (U. S. E.)	9028.9	3.955636
			338 04 59.4	158 06 46.7	Galveston south base (U. S. E.)	15561.5	4.192052

[1] This position was determined from an unmarked traverse.

[2] No check on this position.

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Dickinson Beacon No. 1 1911	29 27 24.741	761.7	130 10 54.6	310 10 34.5	April Fool Point (U. S. E.)	1439.6	3.158237
	94 54 59.074	1592.0	187 45 11.1	7 45 21.6	Edwards Point (U. S. E.)	4281.7	3.631618
			332 51 56.6	152 52 36.1	Galveston north base (U. S. E.)	4753.7	3.677029
Dickinson Beacon No. 5 1911	29 27 34.523	1062.9	200 58 44.2	20 58 48.6	April Fool Point (U. S. E.)	672.2	2.827493
	94 55 48.824	1315.6	319 14 06.5	139 14 27.0	Miller Point (U. S. E.)	1720.4	3.235639
			322 14 41.6	142 15 45.5	Galveston north base (U. S. E.)	5731.2	3.758247
North Galveston Hotel 1911	29 29 18.527	570.4	234 50 13.2	54 50 32.4	Edwards Point (U. S. E.)	1283.7	3.108466
	94 55 16.590	446.9	341 09 01.7	161 09 49.9	Galveston north base (U. S. E.)	8172.0	3.912326
			356 45 52.0	176 45 56.7	Miller Point (U. S. E.)	4512.5	3.654413
Red Fish Bar Light (U. S. E.) 1900	29 30 29.464	907.2	10 12 46.1	190 12 13.5	Galveston north base (U. S. E.)	10077.6	4.003357
	94 52 32.365	871.9	66 49 38.6	246 48 36.9	Edwards Point (U. S. E.)	3670.4	3.564710
			259 29 16.3	79 32 31.8	Smith Point (U. S. E.)	10871.5	4.036288
Rock Springs (U. S. E.) 1900	29 30 33.071	1018.2	173 22 08.1	353 21 46.2	Red Bluff (U. S. E.)	10359.4	4.015333
	94 58 14.605	393.4	206 59 44.0	27 02 27.4	Cedar Point (U. S. E.)	19959.8	4.300157
			284 53 38.7	104 55 22.7	Edwards Point (U. S. E.)	6047.8	3.781596
Flanders 1850	29 32 12.698	391.0	201 50 29.8	21 51 22.9	Red Bluff (U. S. E.)	7781.6	3.891068
	95 00 46.649	1256.1	221 46 08.8	41 50 10.3	Cedar Point (U. S. E.)	19738.7	4.295318
			294 55 22.1	114 58 23.9	Edwards Point (U. S. E.)	10961.0	4.039849
			306 49 41.6	126 50 59.4	Rock Springs (U. S. E.)	5116.0	3.708932
Morris 2 1911	29 33 59.239	1823.9	327 12 11.9	147 13 26.8	Rock Springs (U. S. E.)	7550.5	3.877976
	95 00 46.455	1250.5	0 05 29.7	180 05 29.6	Flanders	3280.3	3.515914
Seabrook Beacon No. 1 1911	29 33 03.146	96.9	35 53 54.1	215 53 33.5	Flanders	1917.4	3.282709
	95 00 04.896	131.8	147 04 04.6	327 03 44.1	Morris 2	2057.8	3.313394
			327 15 42.6	147 16 37.0	Rock Springs (U. S. E.)	5492.8	3.739790
Seabrook Beacon No. 3 1911	29 33 09.633	296.6	18 53 01.1	198 52 50.1	Flanders	1852.7	3.267803
	95 00 24.380	656.3	158 44 29.8	338 44 18.9	Morris 2	1638.8	3.214537
			324 03 03.4	144 04 07.4	Rock Springs (U. S. E.)	5953.8	3.774794
Seabrook Beacon No. 5 1911	29 33 20.601	634.3	191 11 38.1	11 11 42.4	Morris 2	1212.7	3.083748
	95 00 55.200	1486.0	320 00 48.9	140 02 08.1	Rock Springs (U. S. E.)	6731.0	3.828077
			353 42 55.6	173 42 59.8	Flanders	2103.3	3.322907
Double Bayou No. 2 Light. 1911	29 38 37.277	1147.7	125 03 09.1	304 59 14.1	Fisher (U. S. E.)	15561.7	4.192056
	94 42 58.446	1572.0	155 41 52.9	335 39 54.6	Lawrence Cove (U. S. E.)	15583.7	4.192671
			204 53 22.7	24 53 57.8	Double Bayou (U. S. E.)	4535.1	3.656588
Fisher Reef Beacon 1911	29 39 26.544	817.3	166 48 03.1	346 47 31.0	Fisher (U. S. E.)	7614.6	3.881645
	94 49 47.749	1284.2	199 51 35.8	19 53 00.3	Lawrence Cove (U. S. E.)	13487.1	4.129919
			258 35 54.4	78 39 52.1	Double Bayou (U. S. E.)	13173.9	4.119713
Fisher (U. S. E.) 1900	29 43 27.315	841.0	230 09 42.2	50 11 38.9	Lawrence Cove (U. S. E.)	8230.4	3.915419
	94 50 52.440	1409.5	25 02 44.0	205 01 51.8	Cedar Point (U. S. E.)	6685.2	3.825117
Browns Beach (U. S. E.) 1900	29 45 24.020	739.6	32 19 07.2	212 17 14.6	Cedar Point (U. S. E.)	11417.4	4.057566
	94 48 50.692	1362.0	241 10 39.4	61 11 35.6	Lawrence Cove (U. S. E.)	3480.2	3.541610
			306 26 46.4	126 30 16.2	Double Bayou (U. S. E.)	14146.6	4.150653
Barrow's house (U. S. E.) 1900	29 44 31.016	955.0	29 10 38.1	209 09 15.5	Cedar Point (U. S. E.)	9182.6	3.962964
	94 49 51.211	1376.1	234 41 48.8	54 43 15.1	Lawrence Cove (U. S. E.)	5728.3	3.758024
			297 29 50.8	117 33 50.5	Double Bayou (U. S. E.)	14663.5	4.166238
Trinity Tide Gauge[1] 1911	29 44 08.820	271.6	357 01 27.5	177 01 33.8	Double Bayou (U. S. E.)	6102.6	3.785516
	94 41 59.240	1592.0	116 31 45.9	296 29 18.0	Lawrence Cove (U. S. E.)	8945.8	3.951619
Trinity River A Light 1911	29 44 21.331	656.8	83 04 53.7	263 00 41.9	Fisher (U. S. E.)	13738.1	4.137926
	94 42 25.000	671.8	116 16 35.0	296 14 19.9	Lawrence Cove (U. S. E.)	8154.5	3.911397
			351 08 44.5	171 09 02.9	Double Bayou (U. S. E.)	6557.7	3.816752

[1] No check on thia position.

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Trinity River B Light 1911	29 45 19.600	603.5	76 51 57.8	256 47 25.0	Fisher (U. S. E.)	11906.6	4.075786
	94 41 42.695	1147.1	102 08 09.4	282 05 33.3	Lawrence Cove (U. S. E.)	8641.5	3.936587
			0 53 12.6	180 53 10.2	Doubie Bayou (U. S. E.)	8274.7	3.917753
Canal (U. S. E.) 1900	29 40 33.848	1042.2	130 27 46.0	310 27 34.3	Morgan Point (U.S.E.)	833.4	2.920847
	94 58 45.987	1236.6	292 16 43.4	112 18 13.7	Mesquite Knoll (U. S. E.)	5300.2	3.724293
			2 27 14.9	182 27 08.5	Red Bluff (U. S. E.)	8215.0	3.914610
North Jetty Light (at entrance to Cedar Bayou) 1911	29 40 40.093	1234.5	94 37 30.0	274 36 10.5	Morgan Point(U. S. E.)	4333.2	3.636811
	94 56 28.934	778.0	117 04 56.8	297 03 51.9	Hog (U. S. E.)	3958.4	3.597518
			331 02 42.5	151 03 05.0	Mesquite Knoll (U. S. E.)	2517.3	3.400931
Allen (U. S. E.)[1] 1900	29 41 14.366	442.3	81 44 02.5	261 42 33.0	Morgan Point(U.S.E.)	4908.3	3.690928
	94 56 08.919	239.8	110 42 45.1	290 41 32.5	Dr. Smith (U. S. E.)	4213.3	3.624627
Morgan Point Channel Light 1911	29 41 10.319	317.7	76 23 48.5	256 23 04.2	Morgan Point(U.S.E.)	2473.8	3.393361
	94 57 40.147	1079.4	118 24 58.9	298 24 29.2	Hog (U. S. E.)	1830.4	3.262552
			314 59 29.6	135 00 27.5	Mesquite Knoll (U. S. E.)	4431.2	3.646525
Atkinson (U. S. E.) 1900	29 40 57.198	1761.1	83 34 43.6	263 34 14.5	Morgan Point (U.S.E.)	1591.4	3.201770
	94 58 10.755	289.2	161 44 32.9	341 44 20.7	Dr. Smith (U. S. E.)	2125.1	3.327380
			304 35 20.5	124 36 33.5	Mesquite Knoll (U. S. E.)	4806.6	3.681839
Hog (U. S. E.) 1901	29 41 38.606	1188.6	310 09 28.8	130 10 56.1	Mesquite Knoll (U. S. E.)	6207.6	3.792924
	94 58 40.029	1076.2	28 39 49.0	208 39 34.4	Morgan Point (U.S.E.)	1655.9	3.219040
Houston Channel No. 2 Light 1911	29 41 22.801	702.0	236 30 11.0	56 30 24.5	Hog (U. S. E.)	881.8	2.945358
	94 59 07.381	198.5	302 41 14.6	122 42 55.8	Mesquite Knoll (U. S. E.)	6511.0	3.813649
			3 29 09.3	183 29 08.2	Morgan Point (U.S.E.)	968.2	2.985959
Spillman I (U. S. E.) 1900	29 41 46.438	1429.8	109 56 07.0	289 55 25.6	Jennings (U. S. E.)	2378.5	3.376310
	94 59 49.765	1337.8	255 52 35.6	75 53 12.4	Dr. Smith (U. S. E.)	2058.0	3.313453
			327 27 53.8	147 28 13.7	Morgan Point (U.S.E.)	2009.5	3.303086
Spillman II (U. S. E.) 1900	29 41 28.826	887.5	136 36 04.8	316 35 41.2	Jennings (U. S. E.)	1862.3	3.270043
	95 00 25.347	681.4	250 30 50.3	70 31 44.7	Dr. Smith (U. S. E.)	3131.7	3.495784
			299 28 42.0	119 29 19.5	Morgan Point (U.S.E.)	2340.4	3.369297
Tabb (U. S. E.) 1900	29 42 11.421	351.6	90 54 12.2	270 53 23.4	Jennings (U. S. E.)	2654.3	3 423949
	94 59 34.217	919.9	279 36 29.0	99 36 58.1	Dr. Smith (U. S. E.)	1600.3	3.204204
			344 56 34.7	164 56 46.9	Morgan Point (U.S.E.)	2551.1	3.406704
Duck (U. S. E.) 1900	29 42 37.650	1159.2	57 20 23.6	237 20 01.6	Jennings (U. S. E.)	1419.4	3.152100
	95 00 28.492	765.8	145 50 22.7	325 49 47.5	Davis (U. S. E.)	3394.0	3.530710
			327 01 30.5	147 02 09.6	Morgan Point (U.S.E.)	3898.8	3.590936
Midway (U. S. E.)[1] 1900	29 41 52.87	1628.0	58 47 29	238 46 32	Morgan Point (U.S.E.)	3651.2	3.562440
	94 57 13.42	360.9	331 28 25	151 29 09	Mesquite Knoll (U. S. E.)	5057.3	3.703919
Daragon (U. S. E.) 1900	29 41 09.017	277.6	176 59 02.9	356 59 04.0	Davis (U. S. E.)	5544.9	3.743894
	95 01 28.557	767.8	192 04 06.8	12 04 14.5	Jennings (U. S. E.)	2007.3	3.302616
			250 24 47.4	70 26 13.1	Dr. Smith (U. S. E.)	4937.3	3.693490
McKee (U. S. E.) 1900	29 43 10.221	314.7	134 34 14.1	314 32 37.5	Tory Hill (U. S. E.)	7339.8	3.865682
	95 01 08.880	238.7	155 33 44.9	335 33 29.7	Davis (U. S. E.)	1983.1	3.297342
			323 06 17.8	143 07 16.9	Morgan Point (U.S.E.)	5343.5	3.727824
			3 32 04.3	183 32 02.3	Jennings (U. S. E.)	1772.3	3.248530
Grassy Point (U. S. E.) 1900	29 42 35.155	1082.4	170 54 52.5	350 54 44.0	Davis (U. S. E.)	2921.7	3.465643
	95 01 22.241	597.8	311 50 12.8	131 51 18.5	Morgan Point (U.S.E.)	4787.9	3.680145
			340 04 13.5	160 04 18.2	Jennings (U. S. E.)	733.1	2.865173
Small (U. S. E.) 1900	29 41 57.251	1762.7	234 58 37.6	54 58 50.1	Jennings (U. S. E.)	832.6	2.920442
	95 01 38.310	1029.9	268 01 00.8	88 02 31.3	Dr. Smith (U. S. E.)	4916.7	3.691674
			296 52 16.4	116 53 30.1	Morgan Point (U.S.E.)	4483.3	3.651601
Strang (U. S. E.) 1900	29 42 13.855	426.6	189 05 46.3	9 05 56.8	Davis (U. S. E.)	3586.0	3.554614
	95 02 00.505	13.6	271 29 32.0	91 29 55.6	Jennings (U. S. E.)	1278.9	3.106852
			208 54 01.4	118 55 33.9	Morgan Point (U.S.E.)	5250.0	3.720156
Badger (U. S. E.) 1900	29 43 41.857	1288.7	120 43 07.2	300 41 47.2	Santa Anna (U. S. E.)	5043.4	3.702723
	95 01 54.254	1458.1	205 38 04.6	25 38 12.0	Davis (U. S. E.)	922.1	2.964782
			337 57 33.8	157 57 54.3	Jennings (U. S. E.)	2959.2	3.471169
Marsh (U. S. E.) 1900	29 43 54.495	1677.8	120 07 36.5	300 06 27.0	Santa Anna (U. S. E.)	4357.2	3.639209
	95 02 15.360	412.7	245 24 11.3	65 24 29.1	Davis (U. S. E.)	1062.5	3.026344
			331 49 16.8	151 49 47.7	Jennings (U. S. E.)	3553.1	3.550603
Thompson (U. S. E.)[1] 1900	29 42 22.82	702.6	216 46 13	36 46 58	Davis (U. S. E.)	4072.3	3.609837
	95 03 10.12	272.0	275 39 28	95 40 26	Jennings (U. S. E.)	3165.3	3.500416
Goat (U. S. E.) 1900	29 44 17.808	548.3	282 08 13.1	102 08 36.7	Davis (U. S. E.)	1310.5	3.117437
	95 02 27.085	727.9	332 37 44.9	152 38 21.6	Jennings (U. S. E.)	4335.0	3.636993
			113 02 35.3	293 01 31.5	Santa Anna (U. S. E.)	3753.0	3.574384

[1] No check on this position.

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Barnes (U. S. E.) 1900	29 43 53.762	1655.3	130 05 26.8	310 04 38.4	Santa Anna (U. S. E.)	3430.4	3.535344
	95 02 57.948	1554.4	148 53 33.3	328 52 50.9	Tory Hill (U. S. E.)	4449.1	3.648270
			257 34 34.7	77 35 13.6	Davis (U. S. E.)	2161.2	3.334697
Wooster (U. S. E.)[1] 1900	29 44 40.03	1232.5	106 54 00	286 53 12	Santa Anna (U. S. E.)	2699.1	3.431219
	95 02 59.50	1598.8	294 01 40	114 02 20	Davis (U. S. E.)	2356.6	3.372289
Upper Crack (U. S. E.) 1900	29 44 17.103	526.6	126 08 45.5	306 08 07.8	Santa Anna (U. S. E.)	2526.7	3.402561
	95 03 19.681	528.8	150 58 37.6	330 58 05.9	Tory Hill (U. S. E.)	3534.4	3.548310
			275 22 33.7	95 23 23.4	Davis (U. S. E.)	2706.5	3.432416
Crystal (U. S. E.) 1900	29 44 58.796	1810.3	99 06 09.2	279 05 45.4	Santa Anna (U. S. E.)	1305.7	3.115846
	95 03 47.636	1280.0	151 55 28.4	331 55 10.6	Tory Hill (U. S. E.)	2047.7	3.311264
			294 02 23.6	114 03 27.2	Davis (U. S. E.)	3773.2	3.576705
Peggy (U. S. E.) 1900	29 44 32.267	993.4	127 37 15.8	307 36 51.3	Santa Anna (U. S. E.)	1676.5	3.224395
	95 03 46.200	1241.5	159 05 27.4	339 05 08.9	Tory Hill (U. S. E.)	2808.5	3.448473
			281 56 11.2	101 57 14.1	Davis (U. S. E.)	3482.6	3.541901
Bluff (U. S. E.)[1] 1900	29 46 01.64	50.5	62 23 24	242 22 23	Santa Anna (U. S. E.)	3728.3	3.571506
	95 02 32.66	877.4	87 32 36	267 31 41	Tory Hill (U. S. E.)	2980.6	3.474302
Burnett (U. S. E.) 1900	29 45 39.377	1212.4	61 21 39.8	241 21 04.5	Santa Anna (U. S. E.)	2175.8	3.337622
	95 03 24.548	659.5	71 44 44.3	251 43 49.2	Battlefield (U. S. E.)	3143.3	3.497392
			109 23 02.3	289 22 33.0	Tory Hill (U. S. E.)	1679.2	3.225091
Hog Island (U. S. E.) 1900	29 46 18.619	573.2	25 49 49.8	205 49 30.2	Battlefield (U. S. E.)	2436.7	3.386799
	95 04 36.136	970.7	332 28 43.9	152 28 50.2	Tory Hill (U. S. E.)	734.1	2.865781
			359 38 50.0	179 38 50.3	Santa Anna (U. S. E.)	2251.3	3.352436
Lost (U. S. E.) 1900	29 47 10.480	322.7	323 48 11.9	143 48 42.3	Tory Hill (U. S. E.)	2785.3	3.444874
	95 05 24.737	664.4	341 04 11.9	161 04 36.3	Santa Anna (U. S. E.)	4068.0	3.609381
			356 18 50.7	176 18 55.2	Battlefield (U. S. E.)	3797.9	3.579545
Fuller (U. S. E.) 1900	29 45 33.798	1040.6	293 49 07.7	113 50 56.4	Davis (U. S. E.)	6472.0	3.811041
	95 05 19.739	530.4	306 18 43.4	126 19 05.3	Santa Anna (U. S. E.)	1471.1	3.167642
			352 18 22.7	172 18 24.7	Battlefield (U. S. E.)	820.6	2.914137
Half Moon Shoal Beacon 1911	29 23 59.314	1826.1	38 55 12.9	218 53 19.7	Galveston south base (U. S. E.)	9911.0	3.996118
	94 51 00.160	4.3	294 33 46.3	114 36 13.1	Bolivar Point Lighthouse (U. S. E.)	8871.8	3.948013
			311 02 10.5	131 04 37.2	Fort Point Lighthouse (U. S. E.)	10696.5	4.029243
Shoal Point (U. S. E.) 1900	29 23 39.422	1213.8	16 07 51.6	196 07 14.3	Galveston south base (U. S. E.)	7391.1	3.868707
	94 53 34.828	939.1	177 49 15.4	357 49 13.5	Galveston north base (U. S. E.)	2708.6	3.432738
			284 55 34.2	104 59 31.8	Four E (U. S. E.)	13525.2	4.131143
Texas City water tower 1911	29 23 39.248	1116.0	282 14 57.2	102 19 06.1	Bolivar Point Lighthouse (U. S. E.)	14009.9	4.146434
	94 54 28.600	771.2	294 43 58.6	114 48 07.3	Fort Point Lighthouse (U. S. E.)	15074.7	4.178250
			4 55 05.5	184 54 54.5	Galveston south base (U. S. E.)	7028.4	3.846856
Texas City Range rear light 1911	29 23 03.939	121.3	186 40 29.4	6 40 37.5	Galveston north base (U. S. E.)	3825.0	3.582630
	94 53 55.141	1587.0	278 47 44.1	98 51 36.7	Bolivar Point Lighthouse (U. S. E.)	12940.5	4.111952
			292 33 40.7	112 37 33.1	Fort Point Lighthouse (U. S. E.)	13849.0	4.141417
Texas City Range front light 1911	29 22 59.413	1829.2	18 58 47.0	198 58 10.3	Galveston south base (U. S. E.)	6205.7	3.792788
	94 53 36.132	974.4	179 00 48.7	359 00 47.5	Galveston north base (U. S. E.)	3939.0	3.595385
			278 31 27.5	98 35 10.8	Bolivar Point Lighthouse (U. S. E.)	12412.8	4.093869
			292 51 22.5	112 55 05.7	Fort Point Lighthouse (U. S. E.)	13322.3	4.124579
Texas City elevator tower 1911	29 22 31.374	966 0	274 30 28.8	94 34 14.1	Bolivar Point Lighthouse (U. S. E.)	12424.5	4.094277
	94 53 40.223	1084.8	289 11 27.0	109 15 12.0	Fort Point Lighthouse (U. S. E.)	13115.5	4.117784
			20 52 00.5	200 51 25.8	Galveston south base (U. S. E.)	5356.4	3.728869
Texas City Light No. 5 1912	29 22 45.488	1400.5	277 12 01.5	97 15 24.8	Bolivar Point Lighthouse (U. S. E.)	11267.8	4.051839
	94 52 55.469	1495.9	341 39 26.7	161 40 21.2	West Bay Point (U. S. E.)	9541.7	3.979627
			29 48 09.1	209 47 12.5	Galveston south base (U. S. E.)	6268.3	3.797150

[1] No check on this position.

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Texas City, warehouse water tower 1911	29 22 31.227 94 53 47.500	961.4 1281.0	18 53 42.6	198 53 11.5	Galveston south base (U. S. E.)	5285.3	3.723073
			274 24 59.1	94 28 47.9	Bolivar Point Lighthouse (U. S. E.)	12619.8	4.101051
			288 53 36.5	108 57 25.2	Fort Point Lighthouse (U. S. E.)	13299.5	4.123834
Texas Channel, No. 3a Light 1911	29 22 25.420 94 51 26.104	782.6 704.0	48 54 12.1	228 52 31.7	Galveston south base (U. S. E.)	7333.4	3.865308
			275 11 26.3	95 14 05.8	Bolivar Point Lighthouse (U. S. E.)	8804.8	3.944720
			295 13 41.2	115 16 20.5	Fort Point Lighthouse (U. S. E.)	9692.8	3.986448
Texas Channel, No. 3 Light 1911	29 22 00.559 94 49 38.675	17.2 1043.1	64 18 26.9	244 15 53.8	Galveston south base (U. S. E.)	9349.3	3.970780
			270 19 20.7	90 21 07.4	Bolivar Point Lighthouse (U. S. E.)	5871.4	3.768739
			299 50 38.4	119 52 25.0	Fort Point Lighthouse (U. S. E.)	6767.4	3.830425
Texas Channel, No. 1a Light 1911	29 21 35.192 94 48 52.942	1083.5 1428.1	71 17 21.4	251 14 25.9	Galveston south base (U. S. E.)	10197.7	4.008502
			260 50 43.8	80 52 08.1	Bolivar Point Lighthouse (U. S. E.)	4697.8	3.671893
			299 09 50.6	119 11 14.8	Fort Point Lighthouse (U. S. E.)	5309.4	3.725042
Texas City Beacon No. 4 1912	29 22 22.099 94 50 53.862	680.4 1452.6	275 01 40.7	95 04 04.4	Bolivar Point Lighthouse (U. S. E.)	7929.6	3.899253
			1 55 06.8	181 55 01.7	West Bay Point (U. S. E.)	8341.9	3.921265
			53 35 19.2	233 33 23.0	Galveston south base (U. S. E.)	7948.1	3.900262
Texas City Oil Refinery, chimney 1911	29 22 04.816 94 54 34.541	148.3 931.6	6 01 51.8	186 01 43.8	Galveston south base (U. S. E.)	4210.8	3.624363
			270 39 00.0	90 43 11.9	Bolivar Point Lighthouse (U. S. E.)	13851.9	4.141509
			284 08 54.6	104 13 06.3	Fort Point Lighthouse (U. S. E.)	14285.4	4.154892
Cut "A" Front Range Beacon 1912	29 22 08.689 94 49 51.226	267.5 1381.6	272 36 38.5	92 38 31.4	Bolivar Point Lighthouse (U. S. E.)	6216.2	3.793526
			13 57 34.0	193 56 58.2	West Bay Point (U. S. E.)	8165.3	3.911974
			61 58 35.3	241 56 08.3	Galveston south base (U. S. E.)	9160.4	3.961913
Cut "A" Rear Range Beacon 1912	29 22 16.390 94 50 08.655	504.6 233.4	274 27 04.7	94 29 06.1	Bolivar Point Lighthouse (U. S. E.)	6700.0	3.826078
			10 24 36.2	190 24 09.0	West Bay Point (U. S. E.)	8298.0	3.918971
			59 11 36.7	239 09 18.2	Galveston south base (U. S. E.)	8867.3	3.947791
Cut "B" Front Beacon, outer range 1912	29 21 57.146 94 49 14.420	1759.4 388.9	269 12 44.3	89 14 19.2	Bolivar Point Lighthouse (U. S. E.)	5217.6	3.717469
			21 22 49.4	201 21 55.6	West Bay Point (U. S. E.)	8127.9	3.909981
			66 30 02.0	246 27 17.1	Galveston south base (U. S. E.)	9900.5	3.995657
Cut "B" Rear Beacon, outer range 1912	29 21 53.376 94 48 58.571	1643.3 1579.7	267 45 23.5	87 46 50.6	Bolivar Point Lighthouse (U. S. E.)	4793.3	3.680633
			24 27 56.8	204 26 55.2	West Bay Point (U. S. E.)	8187.5	3.913153
			68 03 02.9	248 00 10.3	Galveston south base (U. S. E.)	10250.0	4.010723
Port Bolivar, Back Range[1] 1912	29 22 12.90 94 47 04.56	397.2 123.0	283 35 12	103 35 43	Bolivar Point Lighthouse (U. S. E.)	1764.1	3.246530
			70 36 25	250 32 36	Mud Island south base (U. S. E.)	13339.8	4.125150
Port Bolivar, Front Range 1912	29 21 58.394 94 47 02.421	1797.8 65.3	268 53 08.5	88 53 38.6	Bolivar Point Lighthouse (U. S. E.)	1657.3	3.219392
			333 23 27.7	153 23 57.7	Fort Point Lighthouse (U. S. E.)	3693.7	3.567462
			72 30 43.0	252 26 53.2	Galveston south base (U. S. E.)	13253.4	4.122326
Port Bolivar Roads Day Beacon 1911	29 21 06.453 94 46 35.394	198.7 954.8	79 53 42.3	259 49 39.4	Galveston south base (U. S. E.)	13580.6	4.132920
			209 38 04.2	29 38 21.1	Bolivar Point Lighthouse (U. S. E.)	1876.8	3.273419
			331 29 24.4	151 29 41.2	Fort Point Lighthouse (U. S. E.)	1938.5	3.287460

[1] No check on this position.

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
M (U. S. E.) 1900	29 20 27.258	839.2	83 43 41.6	263 40 36.8	Galveston south base (U. S. E.)	10790.0	4.033020
	94 48 13.413	361.9	134 32 08.6	314 29 29.0	Galveston north base (U. S. E.)	12299.7	4.089895
			241 07 36.8	61 08 56.8	Four E (U. S. E.)	5024.2	3.701069
Second Turn Beacon 1911	29 20 20.298	624.9	85 58 15.1	265 54 07.2	Galveston south base (U. S. E.)	13682.6	4.136169
	94 46 25.058	676.1	192 00 30.8	12 00 42.6	Bolivar Point Lighthouse (U. S. E.)	3120.6	3.494238
			293 35 56.8	113 36 08.5	Fort Point Lighthouse (U. S. E.)	705.4	2.848446
East Bank Light 1911	29 19 12.605	388.1	94 52 40.7	274 48 42.0	Galveston south base (U. S. E.)	13196.8	4.120470
	94 46 43.582	1176.0	192 36 27.3	12 36 48.2	Bolivar Point Lighthouse (U. S. E.)	5263.4	3.721269
			212 27 40.7	32 28 01.6	Fort Point Lighthouse (U. S. E.)	2135.5	3.329491
Hitchcock Reef Light 1911	29 19 36.592	1126.6	91 40 22.7	271 36 24.0	Galveston south base (U. S. E.)	13141.0	4.118628
	94 46 44.088	1189.6	194 48 22.7	14 48 43.8	Bolivar Point Lighthouse (U. S. E.)	4549.0	3.657920
			227 29 12.5	47 29 33.5	Fort Point Lighthouse (U. S. E.)	1573.4	3.196853
Galveston Channel Day Beacon 1911	29 19 58.503	1801.2	88 44 52.5	268 40 50.8	Galveston south base (U. S. E.)	13306.3	4.124055
	94 46 37.874	1021.8	194 57 37.9	14 57 56.0	Bolivar Point Light- (U. S. E.)	3854.0	3.585913
			248 36 31.0	68 36 49.0	Fort Point Lighthouse (U. S. E.)	1065.6	3.027592
Galveston, wireless mast 1912	29 18 54.146	1667.0	74 08 13.3	254 06 09.9	West Bay Point (U. S. E.)	7070.7	3.849462
	94 46 52.202	1408.6	97 27 19.1	277 23 24.6	Galveston south base (U. S. E.)	13026.6	4.114832
			193 36 40.4	13 37 05.5	Bolivar Point Lighthouse (U. S. E.)	5869.7	3.768617
Elevator A, center of south cistern (U. S. E.) 1900	29 18 47.318	1456.8	98 37 15.6	278 33 28.1	Galveston south base (U. S. E.)	12675.3	4.102958
	94 47 06.450	174.0	137 54 35.5	317 51 23.2	Galveston north base (U. S. E.)	15772.8	4.197910
			236 47 39.1	56 48 27.6	Mort (U. S. E.)	3191.3	3.503973
Medical College, flagstaff (U. S. E.) 1900	29 18 40.472	1246.0	99 08 32.7	279 04 34.6	Galveston south base (U. S. E.)	13288.8	4.123484
	94 46 44.663	1205.3	136 52 38.2	316 49 15.2	Galveston north base (U. S. E.)	16326.0	4.212880
			226 45 26.4	46 46 04.4	Mort (U. S. E.)	2858.6	3.456152
Sealy Hospital; center of dome (U. S. E.) 1900	29 18 41.231	1269.4	98 58 01.2	278 54 01.0	Galveston south base (U. S. E.)	13397.5	4.127024
	94 46 40.443	1091.4	136 31 53.2	316 28 28.1	Galveston north base (U. S. E.)	16387.1	4.214502
			225 29 29.9	45 30 05.8	Mort (U. S. E.)	2760.3	3.440958
Market, Eleventh Street, weather vane (U. S. E.) 1900	29 18 34.912	1074.9	99 58 46.7	279 54 51.2	Galveston south base (U. S. E.)	13170.7	4.119609
	94 46 50.167	1353.8	137 39 59.5	317 36 39.2	Galveston north base (U. S. E.)	16351.0	4.213544
			197 46 21.6	17 46 34.7	Case (U. S. E.)	2362.4	3.373360
Elevator "B," flagstaff (U. S. E.) 1900	29 18 23.917	736.4	103 26 53.2	283 23 34.4	Galveston south base (U. S. E.)	11260.7	4.051566
	94 48 05.016	135.4	144 05 56.9	324 03 13.3	Galveston north base (U. S. E.)	15337.7	4.185759
			239 51 04.2	59 52 21.5	Mort (U. S. E.)	4915.3	3.691549
Electric Chy. street car power house (U. S. E.) 1911	29 18 07.302	224.8	104 27 47.7	284 24 07.4	Galveston south base (U. S. E.)	12538.4	4.098241
	94 47 20.945	565.3	141 47 42.9	321 44 37.7	Galveston north base (U. S. E.)	16462.8	4.216503
			225 46 22.0	45 47 17.7	Mort (U. S. E.)	4272.1	3.630644
Ball High School, center of globe (U. S. E.) 1900	29 18 08.900	274.0	104 27 05.3	284 23 28.2	Galveston south base (U. S. E.)	12350.5	4.091684
	94 47 27.664	746.6	142 11 16.7	322 08 14.8	Galveston north base (U. S. E.)	16312.3	4.212516
			227 53 32.6	47 54 31.6	Mort (U. S. E.)	4370.7	3.640555
Galveston longitude station 1895	29 18 10.16	312.8					
	94 47 28.17	761.4					
Weather Service, tower 1912	29 18 16.168	497.8	82 15 14.6	262 13 32.7	West Bay Point (U. S. E.)	5669.1	3.753511
	94 47 36.075	973.5	103 41 27.9	283 37 54.9	Galveston south base (U. S. E.)	12075.9	4.081919
			200 27 33.6	20 28 20.2	Bolivar Point Lighthouse (U. S. E.)	7337.1	3.865527

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Tremont Hotel, flagstaff (U. S. E.) 1900	29 18 12.966 94 47 36.387	399.2 982.0	104 09 15.5	284 05 42.7	Galveston south base (U. S. E.)	12091.5	4.082479
			142 34 34.6	322 31 37.0	Galveston north base (U. S. E.)	16069.5	4.206002
			231 06 26.7	51 07 30.0	Mort (U. S. E.)	4468.5	3.650161
Customhouse, flagstaff (U. S. E.) 1900	29 18 08.839 94 47 45.454	272.1 1226.7	105 02 07.3	284 58 39.0	Galveston south base (U. S. E.)	11886.7	4.075060
			143 32 45.8	323 29 52.7	Galveston north base (U. S. E.)	16024.0	4.204771
			231 46 06.0	51 47 13.8	Mort (U. S. E.)	4739.1	3.675692
Brewery chimney (U. S. E.) 1900	29 18 03.190 94 48 19.749	98. 533.0	107 08 51.8	287 05 40.3	Galveston south base (U. S. E.)	11045.4	4.043183
			146 38 57.2	326 36 20.9	Galveston north base (U. S. E.)	15636.9	4.194151
			224 12 07.8	44 13 04.9	Case (U. S. E.)	4501.1	3.653315
St. Patricks Church, spire (U. S. E.) 1900	29 17 44.388 94 48 16.460	1366.6 444.3	147 30 52.8	327 28 14.9	Galveston north base (U. S. E.)	16171.1	4.208739
			211 03 47.8	31 05 09.2	Four E (U. S. E.)	8686.1	3.938824
			231 02 47.1	51 04 09.8	Mort (U. S. E.)	5862.7	3.768098
Cotton Mill, chimney (U. S. E.) 1900	29 17 52.182 94 48 47.552	1606.6 1283.3	110 08 09.5	290 05 11.6	Galveston south base (U. S. E.)	10442.6	4.018808
			149 38 48.9	329 36 26.2	Galveston north base (U. S. E.)	15528.8	4.191137
			227 28 34.3	47 29 45.0	Case (U. S. E.)	5275.8	3.722288
Standpipe (U. S. E.) 1900	29 17 58.100 94 48 06.127	1788.7 165.4	107 21 24.0	287 18 05.8	Galveston south base (U. S. E.)	11443.0	4.058540
			145 51 30.5	325 48 47.5	Galveston north base (U. S. E.)	15971.4	4.203344
			232 40 34.5	52 41 52.2	Mort (U. S. E.)	5382.6	3.730991
Beach Chimney, Beach Hotel (U. S. E.) 1900	29 17 20.412 94 47 20.614	628.4 556.4	110 38 04.6	290 34 24.1	Galveston south base (U. S. E.)	12982.8	4.113369
			144 40 34.4	324 37 29.1	Galveston north base (U. S. E.)	17625.0	4.246129
			198 45 12.1	18 45 40.0	Case (U. S. E.)	4798.2	3.681078
Brazos Valley Railroad, water tower 1911	29 17 51.838 94 50 02.156	1596.1 58.2	114 49 20.9	294 46 59.5	Galveston south base (U. S. E.)	8584.6	3.933719
			220 27 58.4	40 29 56.6	Bolivar Point Ligbthouse (U. S. E.)	10022.4	4.000973
			236 35 15.4	56 37 13.5	Fort Point Ligbthouse (U. S. E.)	7791.1	3.891597
Southern Pacific Elevator 1911	29 18 15.994 94 49 03.681	492.4 99.3	106 58 58.7	286 56 08.7	Galveston south base (U. S. E.)	9796.3	3.991063
			215 36 30.0	35 37 59.5	Bolivar Point Lighthouse (U. S. E.)	8462.9	3.927519
			234 15 10.1	54 16 39.5	Fort Point Ligbthouse (U. S. E.)	6069.3	3.783140
Galveston Dike, West End Light 1911	29 18 50.653 94 49 33.355	1559.5 900.0	101 49 22.9	281 46 47.4	Galveston south base (U. S. E.)	8754.2	3.942218
			224 34 23.4	44 36 07.5	Bolivar Point Lighthouse (U. S. E.)	8161.3	3.911760
			246 35 29.7	66 37 13.8	Fort Point Lighthouse (U. S. E.)	6240.0	3.795184
Middle Deer Island[1] 1850	29 16 43.122 94 55 03.911	1327.7 105.6	135 43 58.5	315 41 33.4	Highland Bayou	11452.5	4.058899
			210 50 08.4	30 50 57.1	Virginia Point	5234.1	3.718846
Spillman[1] 1850	29 17 29.892 94 57 10.976	920.3 296.2	145 57 28.3	325 56 05.4	Highland Bayou	8157.1	3.911535
			243 26 10.3	63 28 01.2	Virginia Point	6832.8	3.834601
West Bay (U. S. E.) Beacon No. 5 1912	29 15 59.204 94 55 51.101	1822.8 1379.6	343 52 15.8	163 52 24.8	W. B. 3 (U. S. E.)	1787.6	3.252277
			68 52 30.6	248 49 53.2	W. B. 6 (U. S. E.)	9329.8	3.969871
			110 03 36.6	290 02 19.9	W. B. 4 (U. S. E.)	4508.4	3.654027
West Bay (U. S. E.) Beacon No. 7 1912	29 15 44.832 94 56 11.070	1380.3 298.9	320 54 16.7	140 54 35.5	W. B. 3 (U. S. E.)	1642.5	3.215510
			70 18 57.7	250 16 30.1	W. B. 6 (U. S. E.)	8670.2	3.938027
			118 17 02.9	298 15 56.0	W. B. 4 (U. S. E.)	4197.0	3.622937
West Bay (U. S. E.) Beacon No. 8 1912	29 15 31.419 94 56 29.676	967.3 801.2	71 52 28.9	251 50 10.3	W. B. 6 (U. S. E.)	8061.1	3.906392
			126 56 31.9	306 55 34.0	W. B. 4 (U. S. E.)	3995.8	3.601608
			299 15 30.7	119 15 58.5	W. B. 3 (U. S. E.)	1763.1	3.246283
West Bay (U. S. E.) Beacon No. 9 1912	29 14 57.973 94 57 16.072	1784.9 434.0	34 07 55.6	214 06 47.6	Reef	6685.5	3.825132
			77 00 19.4	256 58 23.4	W. B. 6 (U. S. E.)	6576.6	3.817999
			150 29 54.8	330 29 19.6	W. B. 4 (U. S. E.)	3942.1	3.595729
West Bay (U. S. E.) Beacon No. 10 1912	29 14 24.157 94 58 03.004	743.7 81.1	28 55 46.6	208 55 01.7	Reef	5133.7	3.710432
			85 07 34.7	265 06 01.8	W. B. 6 (U. S. E.)	5159.4	3.712598
			171 25 26.5	351 25 14.3	W. B. 4 (U. S. E.)	4522.5	3.655380
West Bay (U. S. E.) Beacon No. 12 1912	29 13 27.368 94 59 21.972	842.6 593.4	113 31 14.1	293 30 19.7	W. B. 6 (U. S. E.)	3280.8	3.515974
			193 11 04.7	13 11 31.1	W. B. 4 (U. S. E.)	6388.8	3.805420
			7 16 02.4	187 15 56.1	Reef	2767.2	3.442043

[1] No check on this position.

East Bay, Galveston Bay, and West Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
West Bay (U. S. E.) Beacon No. 13 1912	29 12 59.406	1829.0	71 22 40.2	251 20 50.3	Y (U. S. E.)	6417.0	3.807333
	95 00 00.708	19.1	137 52 46.5	317 52 11.0	W. B. 6 (U. S. E.)	2925.5	3.466202
			199 27 54.4	19 28 39.7	W. B. 4 (U. S. E.)	7510.8	3.875685
West Bay (U. S. E.) Beacon No. 14 1912	29 12 46.870	1443.0	73 28 40.4	253 26 59.1	Y (U. S. E.)	5849.2	3.767098
	95 00 18.230	492.4	149 46 34.7	329 46 07.8	W. B. 6 (U. S. E.)	2957.9	3.470984
			201 43 37.9	21 44 31.8	W. B. 4 (U. S. E.)	8038.6	3.905182
West Bay (U. S. E.) Beacon No. 15 1912	29 12 33.501	1031.4	76 13 26.6	256 11 54.4	Y (U. S. E.)	5258.0	3.720819
	95 00 36.774	993.4	161 34 55.3	341 34 37.4	W. B. 6 (U. S. E.)	3127.6	3.495209
			203 48 26.4	23 49 29.3	W. B. 4 (U. S. E.)	8612.1	3.935110
West Bay (U. S. E.) Beacon No. 16 1912	29 12 18.190	560.0	80 13 38.8	260 12 16.9	Y (U. S. E.)	4600.7	3.662824
	95 00 57.977	1566.2	173 06 34.0	353 06 26.5	W. B. 6 (U. S. E.)	3463.8	3.539547
			285 19 40.8	105 20 21.3	Reef	2326.2	3.366656
West Bay (U. S. E.) Beacon No. 17 1912	29 12 03.319	102.2	85 21 13.8	265 20 02.0	Y (U. S. E.)	3991.1	3.601094
	95 01 18.556	501.3	182 03 36.9	2 03 39.5	W. B. 6 (U. S. E.)	3899.1	3.590962
			273 12 34.2	93 13 24.8	Reef	2803.8	3.447751
West Bay (U. S. E.) Beacon No. 18[1] 1912	29 11 49.71	1530.4	265 28 07	85 29 07	Reef	3319.2	3.521033
	95 01 37.41	1010.6	17 12 21	197 11 56	Snake	4800.0	3.681242
West Bay (U. S. E.) Beacon No. 19 1912	29 11 35.502	1093.0	12 04 54.8	192 04 38.8	Snake	4241.9	3.627558
	95 01 57.097	1542.6	193 57 12.9	13 57 34.3	W. B. 6 (U. S. E.)	4897.5	3.689978
			259 40 27.8	79 41 37.1	Reef	3903.8	3.591490
Q (U. S. E.) 1900	29 21 11.064	340.6	73 50 33.7	253 47 55.1	Galveston south base (U. S. E.)	9047.0	3.956505
	94 49 27.379	738.5	137 02 59.4	317 00 56.1	Galveston north base	9941.1	3.997435
Pelican Island North 1882	29 21 12.956	398.9	142 04 55.2	322 02 50.3	Dollar Point	11166.7	4.047925
	94 49 12.440	335.6	241 29 53.5	61 31 14.7	Bolivar Point	5072.1	3.705189
Caronkoway Island[1] 1850	29 12 22.877	704.4	167 44 29.3	347 44 11.8	Black Point	4576.1	3.660495
	94 59 29.842	806.2	262 13 53.0	82 15 40.3	Galveston Island east base	5989.1	3.777365
Caronkoway Point 1850	29 12 49.686	1529.8	217 54 01.4	37 54 52.6	Black Point	4621.5	3.664781
	95 01 50.961	1376.5	270 04 38.5	90 07 34.6	Galveston Island east base	9745.9	3.988824
			2 34 07.8	182 34 01.6	Galveston Island west base	7608.5	3.881298
Chocolate Bayou Canal Inner Beacon 1912	29 10 35.339	1088.0	9 32 32.2	189 32 05.9	Mud Island north base (U. S. E.)	8814.3	3.945189
	95 08 16.622	449.1	25 20 56.6	205 20 22.0	Mesquite 2	4481.7	3.651443
			277 55 32.9	97 56 23.9	Hall (U. S. E.)	2854.4	3.455515
Chocolate Bayou Canal Outer Beacon[1] 1912	29 10 08.83	271.8	33 55 15	213 54 35	Mesquite 2	3897.2	3.590752
	95 08 07.15	193.2	260 40 02	80 40 48	Hall (U. S. E.)	2605.7	3.415919
Brazos Canal Inner Beacon 1912	29 06 30.251	931.3	10 49 48.8	190 49 44.9	Mud Island north base (U. S. E.)	1167.7	3.067320
	95 09 02.545	68.8	169 01 50.5	349 01 38.3	Mesquite 2	3560.3	3.551487
			251 22 34.0	71 24 23.6	Life	6427.5	3.808039
Brazos Canal Outer Beacon 1912	29 06 54.428	1675.7	32 00 03.0	211 59 41.8	Mud Island north base (U. S. E.)	2230.0	3.348312
	95 08 26.957	728.8	149 12 27.1	329 11 57.6	Mesquite 2	3202.5	3.505484
			255 41 41.0	75 43 13.3	Life	5292.9	3.723694
Brazos Canal Beacon 1912	29 06 13.228	407.3	180 05 59.8	0 05 59.9	Mesquite 2	4019.3	3.604154
	95 09 27.868	753.5	211 45 34.6	31 47 00.2	Hall (U. S. E.)	9028.6	3.955622
			249 10 30.6	69 12 32.5	Life	7249.0	3.860278
			323 13 55.0	143 14 03.4	Mud Island north base (U. S. E.)	777.4	2.890659
Oil tank 1912	29 06 25.875	796.6	184 25 28.2	4 25 33.2	Mesquite 2	3640.8	3.561198
	95 09 37.999	1027.4	214 35 36.6	34 37 07.1	Hall (U. S. E.)	8852.6	3.947071
			252 45 26.1	72 47 32.9	Life	7381.1	3.868119
			323 51 12.2	143 51 25.5	Mud Island north base (U. S. E.)	1253.4	3.098089
Alligator Head 1850	29 10 26.790	824.8	8 18 56.3	188 18 32.4	West End	9589.5	3.981798
	95 05 53.582	1447.9	110 16 23.7	290 13 40.1	Chocolate Bayou	9662.7	3.985097
			187 56 47.7	7 57 19.7	Halls Bayou	12774.7	4.106350
			297 14 02.8	117 15 55.6	Galveston Island west base	6991.9	3.844597
San Luis Life Saving Station cupola 1912	29 06 47.005	1447.1	76 15 59.6	256 13 57.4	Mud Island north base (U. S. E.)	6995.1	3.844795
	95 04 59.372	1605.2	112 21 15.8	292 19 05.2	Mesquite 2	7839.7	3.894299
			159 20 06.1	339 19 21.0	Hall (U. S. E.)	7092.4	3.850795
			162 32 05.1	342 31 56.4	Life	1609.4	3.206664
Dr. Jones 1850	29 07 02.108	64.9	50 13 28.4	230 12 19.6	West End	4980.8	3.697297
	95 04 23.316	630.7	149 37 38.6	329 36 06.7	Mustang Bayou	10082.9	4.003587
			230 36 58.9	50 38 05.1	Galveston Island west base	4886.7	3.689018

[1] No check on this position.

West Bay to Matagorda Bay.

Station	Latitude and longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Bastrop	29 06 24.834	764.6	211 53 12.2	31 55 02.7	Mustang Bayou	11597.3	4.064356
1850	95 11 18.790	508.1	285 22 37.4	105 24 50.6	West End	7683.0	3.885531
			1 10 37.6	181 10 34.1	Peninsula	9402.1	3.973225
Peninsula	29 01 19.506	600.5	50 40 43.7	230 36 18.3	Jupiter	19187.3	4.283014
1850	95 11 25.927	701.6	71 04 11.8	251 01 12.0	Oyster Creek	10609.1	4.025677
Cottonwood	29 04 30.816	948.7	316 23 25.9	136 25 06.6	Peninsula	8132.6	3.910230
1853	95 14 53.212	1439.2	25 21 28.3	205 20 09.0	Oyster Creek	10330.4	4.014119
Oyster Creek	28 59 27.570	848.8	28 49 53.2	208 48 27.4	Jupiter	9954.8	3.998032
1852	95 17 36.652	992.1	56 48 25.4	236 46 46.3	Brazos	6621.2	3.820936
Rattlesnake	28 58 34.385	1058.5	50 30 07.6	230 27 34.1	Jupiter	11133.1	4.046617
1852	95 15 16.735	453.1	113 23 16.4	293 22 08.6	Oyster Creek	4126.5	3.615580
			183 19 06.4	3 19 17.8	Cottonwood	10991.8	4.041069
			230 50 56.3	50 52 48.2	Peninsula	8054.3	3.906027
Velasco	28 56 24.581	756.7	53 57 23.3	233 56 07.6	Jupiter	5247.2	3.719927
1853	95 17 57.244	1550.3	111 57 06.7	291 55 37.6	Brazos	5372.8	3.730200
			185 39 02.0	5 39 12.0	Oyster Creek	5661.1	3.752902
			227 23 30.3	47 24 48.0	Rattlesnake	5904.2	3.771160
Brazos	28 57 29.786	917.0	351 42 25.1	171 42 38.4	Jupiter	5149.5	3.711762
1852	95 21 01.278	34.6	69 37 01.5	249 34 58.6	Bryan	7338.5	3.865608
Jupiter	28 54 44.269	1362.9	57 13 28.2	237 10 50.2	Bernard	10543.4	4.022981
1852	95 20 33.860	917.3	108 25 56.7	288 23 40.6	Bryan	8033.7	3.904918
Bryan	28 56 06.697	206.2	8 32 04.3	188 31 42.2	Bernard	8341.0	3.921218
1853	95 25 15.268	413.6	63 13 54.3	243 11 17.9	McNeel	9813.3	3.991817
Bernard	28 51 38.761	1193.3	58 34 48.2	238 32 35.7	Cedar Lake	8731.2	3.941076
1853	95 26 00.940	25.5	116 57 54.7	296 55 40.6	McNeel	8442.1	3.926449
McNeel	28 53 43.026	1324.6	359 27 41.9	179 27 43.3	Cedar Lake	8380.0	3.923245
1852	95 30 38.648	1047.1	49 08 29.4	229 06 08.6	Rhodes	10451.7	4.019186
Cedar Lake	28 49 10.834	333.5	57 53 06.0	237 50 27.8	Cany	10519.9	4.022011
1852	95 30 15.744	426.8	88 24 48.0	268 20 29.5	Kenner	14548.5	4.162817
Rhodes	28 50 00.841	25.9	280 53 39.0	100 56 01.0	Cedar Lake	8131.2	3.910156
1853	95 35 30.233	819.6	7 21 35.0	187 21 18.6	Cany	7194.8	3.857016
Cany	28 46 09.060	278.9	60 01 48.0	239 59 27.8	Sargent	9129.1	3.960428
1852	95 36 04.207	114.1	98 22 57.7	278 20 18.1	Prairie	9088.4	3.958487
Kenner	28 48 57.453	1768.6	312 35 04.0	132 36 44.1	Cany	7659.0	3.884174
1853	95 39 32.091	870.3	40 57 40.8	220 56 41.2	Prairie	5114.4	3.708791
Mnd Island south base (U. S. E.)	29 05 03.125	96.2	76 53 58.7	256 52 46.6	Hartrick (U. S. E.)	4121.3	3.615033
1906	95 08 27.036	731.2	142 28 03.6	322 27 42.3	Mud Island north base (U. S. E.)	1936.3	3.286980
			252 56 55.4	72 57 41.6	Fence	2687.3	3.429312
			322 27 07.5	142 27 26.3	San Luis (U. S. E.)	1715.1	3.234277
San Luis (U. S. E.)	29 04 18.956	583.6	142 27 55.3	322 27 15.3	Mud Island north base (U. S. E.)	3651.4	3.562458
1912	95 07 48.393	1308.9	215 21 47.1	35 22 14.5	Fence	2633.5	3.420531
Hartrick (U. S. E.)	29 04 32.760	1008.6	228 54 49.8	48 55 40.7	Mud Island north base (U. S. E.)	3759.4	3.575116
1906	95 10 55.444	1499.6	255 19 13.4	75 21 11.7	Fence	6804.7	3.832809
			274 47 20.7	94 48 51.6	San Luis (U. S. E.)	5077.1	3.705616
Pass	29 03 06.784	208.9	139 34 38.3	319 33 57.8	Hartrick (U. S. E.)	3477.2	3.541235
1912	95 09 32.081	867.9	186 27 31.2	6 27 41.6	Mud Island north base (U. S. E.)	5149.9	3.711801
			231 36 26.7	51 37 17.1	San Luis (U. S. E.)	3578.3	3.553677
Red Bluff (U. S. E.)	29 03 16.168	497.8	48 55 43.3	228 53 18.5	Oyster Creek	10707.7	4.029696
1901	95 12 38.438	1039.9	229 44 55.8	49 45 45.8	Hartrick (U. S. E.)	3649.9	3.562284
			273 16 02.2	93 17 32.7	Pass	5049.8	3.703272
Shell	29 01 26.699	822.0	68 58 15.0	248 55 24.2	Oyster Creek	10209.6	4.009007
1912	95 11 44.608	1207.2	156 37 54.0	336 37 27.9	Red Bluff (U. S. E.)	3671.4	3.564836
			193 04 08.3	13 04 32.2	Hartrick (U. S. E.)	5880.6	3.769423
			229 19 05.9	49 20 10.2	Pass	4727.8	3.674659
Rattlesnake 2	28 58 32.258	993.1	56 22 35.7	236 21 03.8	Brazos Lighthouse	6163.3	3.789813
1912	95 15 21.465	581.1	114 57 44.0	294 56 38.4	Oyster Creek	4036.5	3.606002
			206 46 20.2	26 47 39.3	Red Bluff (U. S. E.)	9791.1	3.990830
			227 31 42.2	47 33 27.3	Shell	7955.8	3.900685
Well (U. S. E.)	28 57 08.104	249.5	69 12 21.9	249 11 43.2	Brazos Lighthouse	2318.1	3.365133
1912	95 17 10.952	296.6	170 47 48.0	350 47 35.5	Oyster Creek	4349.7	3.638461
			228 50 27.2	48 51 20.2	Rattlesnake 2	3937.1	3.595173
Brazos River Lighthouse	28 56 41.363	1273.4	110 07 33.9	290 06 21.1	Brazos	4334.6	3.636945
1897	95 18 30.975	838.8	196 01 59.2	16 02 25.5	Oyster Creek	5324.1	3.726247
			250 59 26.5	71 00 03.9	East	2213.9	3.345149

West Bay to Matagorda Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Velasco Hotel dome 1891	28 57 28.119	865.7	239 41 26.8	59 43 19.4	Oyster Creek	7290.3	3.862748
	95 21 29.162	789.7	266 06 38.5	86 06 52.1	Brazos	756.8	2.878958
			275 54 44.7	95 56 48.4	East	6955.3	3.842318
			286 35 55.6	106 37 21.9	Brazos River Lighthouse	5035.3	3.702029
East 1891	28 57 04.780	147.2	97 08 07.2	277 06 17.0	Brazos	6211.0	3.793159
	95 17 13.680	370.5	171 56 55.1	351 56 44.0	Oyster Creek	4439.8	3.647362
West 2 1897	28 55 48.748	1500.7	123 33 48.2	303 32 25.8	Velasco Hotel dome	5535.2	3.743134
	95 18 38.825	1051.6	187 28 37.0	7 28 40.8	Brazos River Lighthouse	1633.7	3.213178
			224 33 54.0	44 34 35.2	East	3285.8	3.516638
Supplementary points							
Christmas Point (U. S. E.) 1906	29 04 42.707	1314.8	192 51 09.1	12 51 24.1	Fort Bayou	3760.5	3.575249
	95 10 24.284	656.8	222 36 41.4	42 37 17.2	Mud Island, north base (U. S. E.)	2940.7	3.468452
Oyster Bay Canal (U. S. E.) Beacon No. 1 1912	29 04 21.661	666.9	12 04 10.7	192 03 50.0	Shell	5508.2	3.741011
	95 11 02.046	55.3	27 42 26.1	207 41 39.7	Rattlesnake Point (U. S. E.)	5565.0	3.745462
			52 17 31.1	232 16 44.3	Red Bluff (U. S. E.)	3296.1	3.518001
Oyster Bay Canal (U. S. E.) Beacon No. 2 1912	29 04 06.144	189.2	10 27 31.8	190 27 15.5	Shell	4991.7	3.698247
	95 11 11.123	300.9	27 45 36.2	207 44 54.2	Rattlesnake Point (U. S. E.)	5027.9	3.701383
			56 55 31.1	236 54 48.7	Red Bluff (U. S. E.)	2818.9	3.450077
Oyster Bay Canal (U. S. E.) Beacon No. 3 1912	29 03 53.302	1641.0	8 48 07.4	188 47 54.8	Shell	4567.2	3.659650
	95 11 18.782	508.1	27 46 09.0	207 45 30.7	Rattlesnake Point (U. S. E.)	4581.5	3.661009
			62 03 25.3	242 02 46.6	Red Bluff (U. S. E.)	2439.3	3.387265
Oyster Bay Canal (U. S. E.) Beacon No. 4 1912	29 03 32.443	998.8	74 36 29.2	254 35 56.6	Red Bluff (U. S. E.)	1887.2	3.275817
	95 11 31.180	843.4	207 29 47.2	27 30 04.6	Hartrick (U. S. E.)	2093.5	3.320874
			283 46 05.2	103 47 03.1	Pass	3317.3	3.520789
Oyster Bay Canal (U. S. E.) Beacon No. 5 1912	29 03 08.167	251.4	359 29 04.3	179 29 04.8	Shell	3124.0	3.494705
	95 11 45.647	1234.9	27 50 52.8	207 50 27.6	Rattlesnake Point (U. S. E.)	3013.4	3.479050
			99 47 27.2	279 47 01.6	Red Bluff (U. S. E.)	1449.3	3.161144
Oyster Bay Canal (U. S. E.) Beacon No. 6 1912	29 02 42.107	1296.3	136 07 17.0	316 06 58.9	Red Bluff (U. S. E.)	1454.9	3.162825
	95 12 01.162	31.4	207 33 11.0	27 33 42.9	Hartrick (U. S. E.)	3842.6	3.584628
			349 04 43.3	169 04 51.3	Shell	2364.4	3.373716
Oyster Bay Canal (U. S. E.) Beacon No. 7 1912	29 01 50.575	1557.1	34-07 24.6	214 07 21.3	Rattlesnake Point (U. S. E.)	333.0	2.522464
	95 12 30.762	832.4	175 29 40.2	355 29 36.5	Red Bluff (U. S. E.)	2643.3	3.422148
			300 28 32.7	120 28 55.1	Shell	1449.2	3.161120
Rattlesnake Point (U. S. E.) 1906	29 01 41.620	1281.4	179 35 20.6	359 35 20.2	Red Bluff (U. S. E.)	2910.9	3.464027
	95 12 37.666	1019.1	287 44 18.5	107 44 44.2	Shell	1507.5	3.178243
Fish House, east gable 1912	29 01 40.399	1243.8	37 21 32.3	217 20 13.1	Rattlesnake 2	7286.2	3.862500
	95 12 38.157	1032.5	179 51 08.3	359 51 08.2	Red Bluff (U. S. E.)	2948.4	3.469588
			286 13 32.7	106 13 58.7	Shell	1509.2	3.178741
Lone House 1912	29 01 35.160	1082.5	23 35 23.6	203 34 39.5	Rattlesnake 2	6144.2	3.788462
	95 13 50.645	1370.5	212 08 03.4	32 08 38.4	Red Bluff (U. S. E.)	3672.5	3.564958
			274 21 33.3	94 22 34.4	Shell	3420.5	3.534095
Tom 1852	28 57 25.920	797.9	160 11 57.2	340 11 33.1	Oyster Creek	3980.6	3.599949
	95 16 46.838	1268.2	229 10 03.1	49 10 46.8	Rattlesnake	3224.0	3.508397
			45 16 38.3	225 16 08.5	Velasco	2683.4	3.428693
Drawbridge 1912	28 57 20.992	646.3	50 35 22.0	230 34 55.5	Brazos River Lighthouse	1921.4	3.283614
	95 17 36.158	979.1	179 48 12.1	359 48 11.8	Oyster Creek	3896.9	3.590723
			300 10 07.0	120 10 19.2	Well (U. S. E.)	789.5	2.897355
Life-saving station, flagstaff 1897	28 57 36.296	1117.3	40 45 12.7	220 44 57.7	East	1280.8	3.107483
	95 16 42.804	1159.1	88 22 37.2	268 20 32.0	Brazos	7001.7	3.845204
			156 57 03.7	336 56 37.6	Oyster Creek	3723.0	3.570897
Surfside Hotel, dome 1897	28 57 07.387	227.4	45 27 07.7	225 26 23.7	West 2	3450.8	3.537919
	95 17 08.028	217.4	70 22 32.9	250 21 52.7	Brazos River Lighthouse	2384.8	3.377456
			96 14 47.4	276 12 54.5	Brazos	6353.6	3.803020
			169 49 19.4	349 49 05.5	Oyster Creek	4384.8	3.641948
Quintana Presbyterian Church, spire 1897	28 56 06.301	194.0	117 06 47.1	297 05 19.1	Velasco Hotel, dome	5529.2	3.742663
	95 18 27.404	742.2	174 52 51.1	354 52 49.4	Brazos River Lighthouse	1083.8	3.034931
			192 30 03.4	12 30 28.0	Oyster Creek	6346.9	3.802562
			227 57 13.5	47 57 49.2	East	2688.4	3.429497
Quintana Church spire [1] 1897	28 56 00.17	5.2	119 48 32	299 47 08	Velasco Hotel, dome	5448.7	3.736296
	95 18 34.56	936.0	227 45 07	47 45 46	East	2958.8	3.471118

[1] No check on this position.

West Bay to Matagorda Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Oil mill stack, Velasco 1897	28 57 11.761 95 20 43.035	362.1 1165.4	111 57 44.5 138 19 28.4 230 20 35.8 272 09 24.8	291 57 22.2 318 19 19.6 50 22 06.1 92 11 06.2	Velasco Hotel, dome Brazos Oyster Creek East	1346.8 743.0 6553.3 5673.3	3.129290 2.870966 3.816457 3.753832
White house, east chimney 1897	28 56 37.921 95 19 52.500	1167.4 1421.9	120 33 51.5 259 06 22.7 267 14 45.5	300 33 04.7 79 07 39.6 87 15 25.0	Velasco Hotel, dome East Brazos River Lighthouse	3039.8 4379.7 2210.3	3.482839 3.641443 3.344456
House on jetty, cupola [1] 1912	28 56 06.11 95 17 54.44	188.1 1474.5	137 39 15 211 40 37	317 38 58 31 40 58	Brazos River Lighthouse Well (U. S. E.)	1468.7 2242.8	3.166919 3.350782
Weather Service display tower [1] 1912	28 57 26.48 95 21 37.75	815.2 1022.2	274 27 34 285 20 32	94 29 43 105 22 03	Well (U. S. E.) Brazos River Lighthouse	7246.6 5245.0	3.860136 3.719747
Sulphur mill, smokestack 1912	28 54 43.781 95 22 36.302	1347.8 983.4	222 51 51.9 241 24 09.9 243 13 12.6	42 54 16.9 61 26 08.6 63 15 50.0	Oyster Creek Brazos River Lighthouse Well (U. S. E.)	11923.7 7566.9 9868.7	4.076412 3.878919 3.994262
Warehouse, west gable 1912	28 56 33.457 95 18 48.313	1030.0 1308.4	199 53 37.8 236 50 29.0 247 58 04.6	19 54 12.5 56 52 09.3 67 58 51.8	Oyster Creek Rattlesnake 2 Well (U. S. E.)	5700.7 6689.4 2844.2	3.755927 3.825384 3.453958

[1] No check on this position.

Matagorda Bay to Espiritu Santo Bay.

Station	Latitude and longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Prairie 1852	28 46 51.986 95 41 35.700	1600.4 968.3	37 13 23.9 59 27 06.5	217 11 05.7 239 25 03.8	East Point Live Oak	12895.9 8031.2	4.110451 3.904782
Kenner Eccentric 1883	28 49 00.269 95 39 34.668	8.3 940.0	318 20 26.9 39 44 18.0	138 21 55.0 219 43 19.7	Sanborn Prairie	7470.8 5135.2	3.873369 3.710556
Sanborn 1883	28 45 58.931 95 36 31.612	1814.2 857.5	59 38 29.7 101 13 15.0	239 36 05.7 281 10 48.6	Brown Prairie	9414.3 8408.7	3.973787 3.924730
Brown 1883	28 43 24.283 95 41 30.942	747.6 839.7	63 57 40.1 108 10 09.9 178 50 37.6	243 55 19.8 288 08 05.0 358 50 35.3	East Point Live Oak Prairie	8826.0 7415.4 6395.5	3.945766 3.870132 3.805876
Sargent 1852	28 43 40.837 95 40 55.629	1257.1 1509.6	60 29 09.2 102 41 49.5 169 32 08.4	240 26 36.2 282 39 27.7 349 31 49.1	Bath Live Oak Prairie	9934.1 8204.4 5984.1	3.997128 3.914046 3.777002
Live Oak 1852	28 44 39.324 95 45 50.609	1210.6 1373.2	8 06 07.2 38 59 54.0 77 49 32.7	188 05 51.6 218 57 47.3 257 46 37.9	East Point West Point Seven Mile	6249.7 11380.3 10094.8	3.795858 4.056154 4.004096
East Point 1883	28 41 18.340 95 46 23.054	564.6 625.9	67 03 53.8 69 34 29.6 114 17 57.7	247 02 02.8 249 31 50.2 294 15 18.6	West Point Duncan Seven Mile	6819.7 9629.4 9860.8	3.833767 3.983598 3.993914
Bath 1852	28 41 01.763 95 46 14.060	54.3 381.7	72 54 26.7 116 19 45.5 185 25 36.4	252 51 43.0 296 17 02.1 5 25 47.6	Duncan Seven Mile Live Oak	9696.5 10299.9 6727.8	3.986613 4.012831 3.827875
Seven Mile 1856	28 43 30.037 95 51 54.220	924.7 1471.4	0 14 21.9 68 43 09.9	180 14 21.4 248 40 16.8	Duncan Matagorda	7418.3 10500.7	3.870306 4.021218
West Point 1883	28 39 51.960 95 50 14.352	1599.6 389.7	75 35 51.3 158 01 01.0	255 35 02.9 338 00 13.1	Duncan Seven Mile	2832.0 7240.3	3.452091 3.859754
Matagorda Peninsula south base 1883	28 39 56.905 95 48 34.871	1751.9 946.9	86 46 48.4 234 58 49.7	266 46 00.7 54 59 53.0	West Point East Point	2705.5 4369.6	3.432254 3.640443
Matagorda Peninsula north base 1883	28 40 56.119 95 48 53.714	1727.7 1458.3	260 29 42.7 344 19 18.1 47 57 01.5	80 30 55.0 164 19 27.1 227 56 22.8	East Point Matagorda Peninsula south base West Point	4147.0 1893.3 2948.7	3.617733 3.277227 3.469632
Duncan 1856	28 39 29.068 95 51 55.362	894.8 1503.4	56 22 52.3 110 17 43.9	236 20 23.3 290 14 51.5	Gulf Shore Matagorda	10145.5 10399.3	4.006274 4.017006
Matagorda 1855	28 41 26.107 95 57 54.652	803.7 1483.7	351 53 56.0 61 05 09.1	171 54 19.2 241 02 02.6	Gulf Shore Mad Island	9316.2 12064.4	3.969240 4.081506

Matagorda Bay to Espiritu Santo Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Gulf Shore	28 36 26.502	815.8	72 10 19.6	252 07 07.5	Three Mounds	11461.3	4.059232
1855	95 57 06.330	172.0	105 56 30.2	285 53 00.8	Mad Island	12347.9	4.091592
Mad Island	28 38 16.473	507.1	352 00 16.0	172 00 33.1	Three Mounds	6967.2	3.843056
1855	96 04 23.468	637.5	66 17 46.0	246 15 10.8	Lake	9615.0	3.982950
Three Mounds	28 34 32.353	996.0	57 05 39.3	237 02 54.4	High Mound	11174.1	4.048213
1856	96 03 47.809	1299.3	107 15 07.4	287 12 15.3	Lake	10233.1	4.010007
Lake	28 36 10.805	332.6	357 29 29.5	177 29 36.5	High Mound	9113.7	3.959696
1856	96 09 47.500	1290.6	39 57 10.7	219 53 19.7	Osgood	20484.2	4.311418
			105 30 29.9	285 25 54.4	Well Point	16199.7	4.209507
Shell Island	28 37 17.178	528.8	228 46 24.2	48 48 58.7	Matagorda	11633.0	4.065691
1855	96 03 16.943	460.3	278 46 59.0	98 49 56.5	Gulf Shore	10188.5	4.008109
			9 23 14.9	189 23 00.2	Three Mounds	5142.9	3.711211
High Mound	28 31 15.039	463.0	64 02 41.9	243 58 44.2	Osgood	15073.5	4.178215
1857	96 09 32.830	892.7	130 00 33.1	309 55 51.1	Well Point	20900.2	4.320151
Well Point	28 38 31.167	959.5	352 56 06.3	172 56 49.9	Osgood	20184.0	4.305007
1856	96 19 22.245	604.2	41 23 16.4	221 19 12.5	La Salle	20978.1	4.321767
Palacios	28 34 34.298	1055.8	128 35 17.5	308 32 36.3	Well Point	11696.9	4.068069
1857	96 13 45.612	1239.6	245 19 16.1	65 21 10.1	Lake	7119.8	3.852465
			270 10 17.2	90 15 03.2	Three Mounds	16246.4	4.210758
			311 44 15.3	131 46 16.1	High Mound	9211.2	3.964314
Shell Reef Point	28 38 30.296	932.7	300 23 29.8	120 25 38.9	Lake	8483.6	3.928579
1859	96 14 16.837	457.3	353 20 16.1	173 20 31.1	Palacios	7314.5	3.864185
			90 12 20.1	270 09 53.7	Well Point	8294.8	3.918807
Turtle Bay	28 40 30.741	946.4	307 16 01.1	127 19 06.6	Lake	13207.3	4.120813
1856	96 16 14.350	389.6	319 16 33.9	139 17 30.3	Shell Reef Point	4892.0	3.689488
			54 12 14.1	234 10 44.0	Well Point	6291.6	3.798762
Osgood	28 27 40.482	1246.2	37 59 09.4	217 56 15.9	Pass Cavallo Lighthouse	16143.1	4.207986
1856	96 17 50.998	1387.4	104 43 06.0	284 38 19.3	La Salle	16906.1	4.228043
La Salle	28 29 59.642	1836.0	339 15 53.1	159 17 45.6	Pass Cavallo Lighthouse	18187.8	4.259780
1857	96 27 52.234	1420.6	22 05 56.2	202 04 23.7	Espiritu Santo	14050.6	4.147695
Pass Cavallo Lighthouse	28 20 47.033	1447.8	61 32 42.3	241 28 37.6	Rahal	15992.8	4.203925
1857	96 23 55.800	1519.8	108 49 47.3	288 46 22.7	Espiritu Santo	12386.0	4.092932
Sand Point	28 35 02.377	73.2	242 37 01.2	62 40 40.2	Well Point	13989.2	4.145792
1857	96 26 59.604	1619.7	8 43 54.0	188 43 28.8	La Salle	9428.7	3.974453
Indianola	28 32 25.572	787.2	233 28 16.6	53 30 11.3	Sand Point	8112.9	3.909175
1857	96 30 59.504	1617.7	311 24 26.2	131 25 55.6	La Salle	6790.4	3.831898
Gallinipper	28 35 00.124	3.8	269 37 37.1	89 41 00.0	Sand Point	11523.6	4.061587
1857	96 34 03.652	99.2	313 32 10.8	133 33 38.9	Indianola	6905.7	3.839208
Sheldon's house	28 38 43.007	1324.0	301 59 16.8	122 02 28.3	Sand Point	12811.9	4.107613
1857	96 33 39.482	1072.3	339 28 39.4	159 29 56.0	Indianola	12405.7	4.093622
			5 28 05.5	185 27 53.9	Gallinipper	6892.7	3.838391
Lavaca	28 37 33.765	1039.4	250 16 30.7	70 18 15.7	Sheldon's house	6320.3	3.800735
1857	96 37 18.543	503.7	311 45 36.0	131 47 09.3	Gallinipper	7099.9	3.851250
Garcitas	28 42 48.451	1491.6	316 00 36.0	136 02 44.8	Sheldon's house	10499.1	4.021154
1857	96 38 07.978	216.5	335 16 12.8	155 18 09.9	Gallinipper	15871.0	4.200605
			352 06 29.6	172 06 53.3	Lavaca	9780.1	3.990345
Bay View	28 41 34.355	1057.6	250 46 26.2	70 49 27.2	Seven Mile	10828.5	4.034569
1906	95 58 10.979	298.0	290 41 28.2	110 44 28.5	Duncan	10903.4	4.037561
Spring	28 37 39.177	1206.0	167 28 44.4	347 28 16.0	Bay View	7416.5	3.870197
1906	95 57 11.750	319.1	218 34 28.4	38 37 00.6	Seven Mile	13820.0	4.140508
			248 29 22.7	68 31 54.4	Duncan	9234.9	3.965432
Mad Island 2	28 38 15.530	478.1	238 54 49.1	58 57 48.6	Bay View	11863.0	4.074196
1906	96 04 25.222	685.1	275 24 03.3	95 27 31.0	Spring	11827.1	4.072877
Three Mounds 2	28 33 34.584	1064.6	179 51 09.2	359 51 08.8	Mad Island 2	8648.9	3.936960
1906	96 04 24.402	663.3	214 27 20.7	34 30 19.7	Bay View	17917.4	4.253276
			237 19 54.8	57 23 21.8	Spring	13960.7	4.144908
Lake 2	28 35 27.382	842.9	245 24 11.4	65 27 31.0	Mad Island 2	12449.6	4.095154
1906	96 11 21.996	597.6	286 59 05.8	107 02 25.5	Three Mounds 2	11868.2	4.074385
High Mound 2	28 30 55.135	1697.3	167 41 03.4	347 40 31.2	Lake 2	8578.6	3.933414
1906	96 10 14.657	398.5	214 59 11.2	35 01 58.3	Mad Island 2	16552.5	4.218863
			242 42 22.7	62 45 10.0	Three Mounds 2	10712.9	4.029906
Osgood 2	28 27 38.676	1190.6	215 52 17.9	35 55 21.3	Lake 2	17811.8	4.250708
1906	96 17 46.100	1254.1	243 44 53.2	63 48 28.5	High Mound 2	13687.5	4.136324
Well Point 2	28 38 43.633	1343.2	298 33 28.6	118 36 44.1	Lake 2	12626.9	4.101297
1906	96 18 10.149	275.6	318 06 35.6	138 10 23.1	High Mound 2	19364.4	4.287004
			358 10 09.6	178 10 21.1	Osgood 2	20480.8	4.311347
			78 55 00.3	258 54 25.7	Well Point	1995.3	3.300012

Matagorda Bay to Espiritu Santo Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Sand Point 1906	28 34 24.451	752.7	244 19 29.4	64 24 22.5	Well Point 2	18442.8	4.265826
1906	96 28 22.174	602.7	305 47 43.5	125 52 47.2	Osgood 2	21335.1	4.329095
			352 16 54.5	172 17 14.5	La Salle 2	8465.8	3.927667
La Salle 2	28 29 51.938	1598.9	223 23 49.0	43 28 21.7	Well Point 2	22540.6	4.352965
1906	96 27 40.369	1098.0	253 45 20.8	73 51 14.7	Halfmoon Reef Lighthouse	20980.8	4.321827
			284 12 02.1	104 16 45.5	Osgood 2	16677.4	4.222128
Big Bayou	28 25 11.301	347.9	146 51 52.4	326 50 13.6	La Salle 2	10318.5	4.013617
1906	96 24 12.979	353.3	246 39 40.2	66 42 44.5	Osgood 2	11463.5	4.059317
Espiritu Santo 2	28 23 35.246	1085.0	196 12 25.7	16 13 24.8	La Salle 2	12076.5	4.081942
1906	96 29 44.306	1206.5	251 49 32.2	71 52 09.8	Big Bayou	9491.1	3.977317
			311 13 47.9	131 15 50.3	Matagorda Lighthouse	9335.2	3.970122
Matagorda Lighthouse	28 20 15.311	471.3	168 24 48.8	348 23 45.2	La Salle 2	18120.7	4.258174
1906	96 25 26.549	723.2	192 23 37.4	12 24 12.4	Big Bayou	9329.2	3.969846
			222 31 59.1	42 35 38.2	Osgood 2	18530.7	4.267892
Hill	28 19 16.226	499.5	143 17 50.7	323 16 07.0	Espiritu Santo 2	9947.1	3.997696
1906	96 26 05.928	161.5	195 42 27.9	15 43 20.8	Big Bayou	11354.9	4.055184
			210 31 40.9	30 31 59.6	Matagorda Lighthouse	2111.6	3.324605
Supplementary points							
Hawkin's house	28 49 38.710	1191.7	315 26 18.4	135 29 30.9	Sargent	15455.8	4.189092
1855	95 47 35.261	956.0	352 06 47.7	172 07 26.8	Bath	16066.2	4.205912
			31 46 13.3	211 44 08.7	Seven Mile	13347.6	4.125402
Eleven-Mile Point [1]	28 44 21.21	652.9	325 38 12	145 39 26	Bath	7437.3	3.871413
1856	95 48 48.68	1320.9	72 38 14	252 36 45	Seven Mile	5275.5	3.722263
Kane's house, north gable [1]	28 40 08.84	272.1	99 50 21	279 45 51	Bay View	15464.5	4.189337
1906	95 48 49.69	1349.3	141 02 57	321 01 28	Seven Mile	7966.0	3.901240
Dean's oil well No. 7	28 44 56.339	1734.4	316 34 03.4	136 34 48.0	Seven Mile	3658.3	3.563274
1906	95 53 26.895	729.8	346 08 27.1	166 09 11.1	Duncan	10377.0	4.016070
			51 07 55.2	231 05 38.7	Bay View	9904.9	3.995850
Shipprian's house, peak of roof	28 43 15.604	480.4	256 35 43.1	76 36 16.1	Seven Mile	1917.2	3.282677
1906	95 53 02.943	79.9	345 15 23.5	165 15 56.0	Duncan	7211.2	3.858010
			69 34 30.4	249 32 02.4	Bay View	8923.1	3.950516
Three-Mile Point [1]	28 42 26.77	824.1	314 48 47	134 50 24	Duncan	7760.1	3.889869
1855	95 55 18.09	491.0	66 17 19	246 16 04	Matagorda	4642.2	3.666720
Ruin Rancho [1]	28 37 25.92	797.9	142 37 36	322 35 56	Matagorda	9305.9	3.968758
1855	95 54 26.57	722.0	227 16 51	47 18 04	Duncan	5589.1	3.747342
Station A, U. S. Fish Commission	28 38 26.800	825.0	71 29 41.3	251 28 24.1	Spring	4616.5	3.664311
1906	95 54 30.585	830.7	133 59 20.5	313 57 34.8	Bay View	8315.7	3.919900
			204 26 35.5	24 27 50.5	Seven Mile	10255.1	4.010941
			245 32 12.1	65 33 26.6	Duncan	4630.9	3.665666
Watkin's house, west chimney	28 41 58.674	1806.2	302 33 23.2	122 35 30.7	Duncan	8554.4	3.932192
1906	95 56 20.877	566.7	9 48 50.0	189 48 25.7	Spring	8107.2	3.908871
			75 56 39.5	255 55 46.6	Bay View	3081.1	3.488710
Matagorda Pavilion flagstaff	28 41 12.292	378.4	351 50 43.9	171 51 00.7	Spring	6627.7	3.821366
1906	95 57 46.359	1258.5	135 27 40.3	315 27 28.5	Bay View	952.9	2.979051
			246 03 07.0	66 05 56.2	Seven Mile	10456.6	4.019391
			288 25 01.5	108 27 50.0	Duncan	10046.1	4.001996
Matagorda Methodist Church spire	28 41 27.832	856.8	348 37 40.1	168 38 05.1	Spring	7180.0	3.856126
1906	95 58 03.870	105.1	136 08 25.0	316 08 21.6	Bay View	278.5	2.444837
			249 25 16.2	69 28 13.5	Seven Mile	10715.4	4.030009
			290 02 54.5	110 05 51.2	Duncan	10652.6	4.027454
Matagorda Episcopal Church spire	28 41 31.401	966.7	349 02 55.1	169 03 19.7	Spring	7281.6	3.862226
1906	95 58 02.676	72.6	111 57 50.6	291 57 46.6	Bay View	243.0	2.385695
			249 54 49.2	69 57 46.2	Seven Mile	10646.8	4.027220
			290 39 47.8	110 42 44.1	Duncan	10660.4	4.027773
Matagorda 2	28 41 35.247	1085.1	333 20 11	153 20 13	Methodist Church	255.4	2.40726
1911	95 58 08.092	219.7	308 49 40	128 49 42	Episcopal Church	188.8	2.27591
			70 41 48	250 41 46	Bay View	83.0	1.9192
Matagorda longitude station	28 41 35.317	1087.2	0	180	Matagorda 2	2.13	0.3284
1911	95 58 08.092	219.7					
Dog Island	28 39 07.508	231.1	226 30 25.1	46 31 49.3	Bay View	6569.6	3.817542
1906	96 01 06.545	177.7	241 38 18.2	61 42 43.2	Seven Mile	17033.7	4.231310
			293 04 42.4	113 06 34.9	Spring	6932.6	3.840899
Station B, U. S. Fish Commission	28 36 48.979	1507.8	55 33 31.3	235 30 57.7	Three Mounds 2	10575.6	4.024303
1906	95 59 03.525	95.8	106 58 42.4	286 56 08.3	Mad Island 2	9135.7	3.960743
			189 13 20.4	9 13 45.6	Bay View	8900.4	3.949411
			243 01 09.3	63 02 02.8	Spring	3407.0	3.532373
Barn [1]	28 34 30.57	941.1	161 38 24	341 37 54	Shell Island	5404.3	3.732741
1855	96 02 14.28	388.1	208 50 56	28 53 01	Matagorda	14607.4	4.164572

[1] No check on this position.

Matagorda Bay to Espiritu Santo Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
House chimney [1] 1855	28 35 13.37 96 00 26.48	411.6 719.6	129 27 48 199 45 23	309 26 26 19 46 36	Shell Island Matagorda	5998.1 12193.2	3.778017 4.086116
Duffy's house, east gable 1906	28 33 50.346 96 03 53.154	1549.7 1444.7	60 15 47.7 103 47 25.8 173 54 35.9	240 15 32.8 283 43 51.1 353 54 20.5	Three Mounds 2 Lake 2 Mad Island 2	978.2 12558.3 8210.0	2.990426 4.098931 3.914342
Station D, U. S. Fish Commission 1906	28 37 31.031 96 06 11.205	955.3 304.4	65 45 15.7 244 32 39.3 338 15 21.6	245 42 46.9 64 33 30.1 158 16 12.7	Lake 2 Mad Island 2 Three Mounds 2	9262.0 3188.1 7836.1	3.966706 3.503529 3.894101
Mad Island, west [1] 1856	28 37 30.58 96 06 16.31	941.4 383.0	323 39 34 66 50 24	143 40 45 246 48 43	Three Mounds Lake	6810.6 6240.8	3.833187 3.795242
Station C, U. S. Fish Commission' 1906	28 33 32.069 96 06 12.916	987.2 351.1	112 55 48.1 198 31 49.2 268 29 20.2	292 53 20.3 18 32 40.8 88 30 12.1	Lake 2 Mad Island 2 Three Mounds 2	9119.1 9203.8 2950.5	3.959954 3.963968 3.469895
Greens Line [1] 1856	28 32 53.73 96 05 57.16	1654.0 1553.8	134 07 03 229 10 44	314 05 12 49 11 45	Lake Three Mounds	8717.5 4645.1	3.940390 3.666998
Four-Mile Mott, U. S. Fish Commission 1906	28 36 19.460 96 09 34.951	599.1 949.6	301 00 13.5 6 10 18.8 61 08 34.7	121 02 42.1 186 09 59.9 241 07 43.5	Three Mounds 2 High Mound 2 Lake 2	9847.9 10042.4 3321.1	3.993344 4.001836 3.521280
Station F, U. S. Fish Commission [1] 1906	28 31 56.64 96 10 12.75	1743.6 346.6	1 34 05 163 49 35	181 34 04 343 49 02	High Mound 2 Lake 2	1894.2 6755.0	3.277423 3.829626
Phillip's house [1] 1856	28 29 52.11 96 12 28.10	1604.2 764.2	200 31 12 241 48 57	20 32 28 61 50 20	Lake High Mound	12448.4 5406.9	4.095115 3.732952
Half-moon Reef [1] 1857	28 32 52.28 96 15 23.34	1609.4 634.5	148 07 29 236 10 19	328 05 34 56 13 00	Well Point Lake	12287.1 10984.3	4.089451 4.040771
Half-moon Reef Lighthouse 1906	28 33 02.026 96 15 19.350	62.4 526.1	21 51 24.0 156 11 59.5 235 14 11.0 295 13 32.9	201 50 14.0 336 10 37.7 55 16 04.5 115 15 58.4	Osgood 2 Well Point 2 Lake 2 High Mound 2	10724.3 11494.7 7850.9 9158.7	4.030368 4.060499 3.894919 3.961835
Palacios Point, U. S. Fish Commission 1906	28 34 37.843 96 13 43.018	1165.0 1169.1	27 08 20.9 136 12 46.4 248 17 24.7 277 16 19.7 320 25 26.1	207 06 24.9 316 10 38.5 68 18 32.2 97 20 46.8 140 27 05.7	Osgood 2 Well Point 2 Lake 2 Three Mounds 2 High Mound 2	14498.2 10484.3 4124.5 15306.7 8893.1	4.161313 4.020541 3.615370 4.184882 3.949051
Grimes' house [1] 1856	28 36 03.09 96 13 45.15	95.1 1226.7	267 52 37 322 15 50	87 54 30 142 17 50	Lake High Mound	6461.4 11210.1	3.810328 4.049610
Tarantula [1] 1856	28 41 40.06 96 14 17.69	1233.3 480.2	359 46 21 56 02 08	179 46 21 236 01 12	Shell Reef Point Turtle Bay	5842.0 3819.0	3.766560 3.581949
Mott [1] 1856	28 40 51.20 96 11 57.59	1576.2 1563.5	41 05 13 111 35 08	221 04 06 291 34 01	Shell Reef Point Tarantula	5754.5 4090.0	3.760009 3.611726
Baptist College cupola 1906	28 43 28.246 96 12 19.811	869.5 537.5	47 22 17.4 51 27 28.1	227 19 29.2 231 24 05.3	Well Point 2 Well Point	12931.9 14668.7	4.111661 4.166393
Fiber's house [1] 1856	28 37 59.62 96 21 06.68	1835.4 181.4	251 05 28 344 23 35	71 06 18 164 25 09	Well Point Osgood	2998.1 19788.1	3.476852 4.296405
Carankway [1] 1856	28 39 48.15 96 24 34.40	1482.3 934.1	285 35 54 24 09 30	105 38 23 204 08 20	Well Point Sand Point	8802.3 9641.2	3.944597 3.984131
Wolf Point [1] 1857	28 42 17.91 96 24 31.16	551.4 845.8	309 44 52 1 05 38	129 47 20 181 05 37	Well Point Carankway	10912.3 4611.3	4.037915 3.663827
Cherry's house, east chimney 1906	28 27 19.312 96 17 31.889	594.5 867.7	105 53 15.1 147 01 59.7 240 46 50.9	285 48 24.9 327 01 52.9 60 50 19.4	La Salle 2 Osgood 2 High Mound 2	17206.2 710.5 13622.7	4.235684 2.851577 4.134263
Dunbar house [1] 1857	28 26 21.30 96 19 09.01	657.5 245.2	115 18 22 221 03 51	295 14 12 41 04 28	La Salle Osgood	15740.3 3230.8	4.197013 3.509304
Brant house [1] 1856	28 35 35.81 96 25 59.27	1102.4 1610.6	243 23 06 317 45 04	63 26 16 137 48 57	Well Point Osgood	12061.1 19757.5	4.081386 4.295733
Frelkeld house [1] 1856	28 37 14.36 96 26 37.90	442.1 1029.6	258 40 16 8 15 40	78 43 44 188 15 29	Well Point Sand Point	12067.3 4105.6	4.081609 3.613375
Brant's barn [1] 1856	28 35 12.81 96 28 42.26	394.4 1148.4	276 33 40 35 56 05	96 34 29 215 55 00	Sand Point Indianola	2808.0 6357.7	3.448393 3.803303
Noble's house [1] 1856	28 38 39.20 96 30 53.98	1206.8 1466.3	325 32 05 18 19 28	145 33 26 198 19 16	Gallinipper Lavaca	8179.1 2122.1	3.912706 3.326772
House, south end of Lavaca [1] 1856	28 36 04.52 96 36 48.12	139.2 1307.4	163 15 40 293 54 35	343 15 25 113 55 53	Lavaca Gallinipper	2869.1 4889.0	3.457741 3.689216
Caslmir house [1] 1856	28 30 52.41 96 29 20.96	1613.4 569.9	229 00 12 287 25 49	49 04 58 107 31 18	Well Point Osgood	21545.0 19674.6	4.333346 4.293907

[1] No check on this position.

Matagorda Bay to Espiritu Santo Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Bruce's windmill	28 28 42.317	1302.7	69 48 31.2	249 46 57.9	Osgood 2	5672.6	3.753781
1906	96 14 30.411	827.2	202 19 42.2	22 20 42.2	Lake 2	13480.8	4.129717
Alligator Point [1]	28 27 10.70	329.4	131 09 20	311 07 36	La Salle	7904.9	3.897897
1857	96 24 13.39	364.3	162 43 17	342 41 58	Sand Point	15207.5	4.182057
Alligator Head Mott [1]	28 28 05.91	181.9	137 06 14	317 05 17	La Salle	4779.7	3.679399
1857	96 25 52.61	1431.3	273 23 14	93 27 04	Osgood	13125.7	4.118121
O'Connor's windmill	28 26 56.220	1730.7	7 14 48.2	187 14 20.7	Matagorda Lighthouse	12440.7	4.094846
1906	96 24 28.934	787.6	54 14 13.7	234 11 43.6	Espiritu Santo 2	10580.6	4.024509
			136 06 05.4	316 04 34.1	La Salle 2	7508.7	3.875564
			263 10 23.5	83 13 35.4	Osgood 2	11037.8	4.042884
			352 20 33.9	172 20 41.5	Big Bayou	3258.9	3.513066
O'Connor's house, east chimney	28 26 55.033	1694.1	54 38 37.3	234 36 05.8	Espiritu Santo 2	10622.8	4.026241
1906	96 24 26.063	709.4	262 56 07.7	82 59 18.3	Osgood 2	10964.7	4.039998
			353 38 13.0	173 38 19.2	Big Bayou	3213.1	3.506919
Quarantine Station, flagstaff	28 26 48.111	1481.0	2 22 51.2	182 22 49.0	Big Bayou	2982.8	3.474622
1906	96 24 08.436	229.6	9 58 50.2	189 58 13.0	Matagorda Lighthouse	12277.4	4.089108
			57 01 10.9	236 58 31.1	Espiritu Santo 2	10900.3	4.037440
			134 28 46.7	314 27 05.8	La Salle 2	8078.7	3.907341
			261 27 51.7	81 30 53.9	Osgood 2	10518.2	4.021940
Decros Point	28 24 07.011	215.8	40 53 35.1	220 51 47.4	Matagorda Lighthouse	9433.3	3.974665
1906	96 21 39.821	1083.9	85 47 30.3	265 43 40.0	Espiritu Santo 2	13225.0	4.121396
			115 24 19.9	295 23 07.1	Big Bayou	4614.7	3.664146
			224 17 34.9	44 19 26.3	Osgood 2	9105.6	3.959307
Decro's house, chimney [1]	28 24 17.91	551.4	139 13 33	319 10 54	La Salle	13896.3	4.142898
1857	96 22 18.54	504.7	229 24 03	49 26 11	Osgood	9586.2	3.981647
Old lighthouse, iron pile [1]	28 24 45.04	1386.5	28 13 48	208 12 31	Matagorda Lighthouse	9423.2	3.974198
1906	96 22 42.90	1167.7	108 15 24	288 14 41	Big Bayou	2581.5	3.411871
Saluria Lighthouse [1]	28 24 04.70	144.7	354 50 48	174 50 57	Pass Cavallo Lighthouse	6109.7	3.786023
1856	96 24 15.95	434.2	79 25 00	259 21 45	Espiritu Santo	11367.9	4.055681
Saluria [1]	28 23 53.26	1639.5	150 45 41	330 43 50	La Salle	12927.4	4.111511
1857	96 24 00.06	1.6	235 07 15	55 10 11	Osgood	12239.3	4.087757
Old Back Range	28 21 52.233	1607.9	27 22 35.6	207 22 08.7	Matagorda Lighthouse	3359.8	3.526313
1906	96 24 29.828	812.5	110 20 35.3	290 18 05.9	Espiritu Santo 2	9130.7	3.960504
			184 16 45.8	4 16 53.9	Big Bayou	6145.2	3.788535
Back Range, tall pole	28 21 23.343	718.6	37 57 29.7	217 57 01.2	Matagorda Lighthouse	2656.0	3.424232
1906	96 24 26.570	723.8	115 09 49.0	295 07 18.1	Espiritu Santo 2	9556.9	3.980315
			183 01 02.2	3 01 08.7	Big Bayou	7027.1	3.846778
Life-saving station, cupola	28 21 21.954	675.8	38 44 17.9	218 43 49.2	Matagorda Lighthouse	2629.9	3.419945
1906	96 24 26.128	711.7	115 21 52.3	295 19 21.2	Espiritu Santo 2	9586.0	3.981637
			182 54 06.3	2 54 12.6	Big Bayou	7069.2	3.849373
East Range	28 21 25.326	779.6	42 05 05.4	222 04 31.4	Matagorda Lighthouse	2903.9	3.462980
1906	96 24 15.094	411.2	114 04 01.1	294 01 24.5	Espiritu Santo 2	9815.6	3.991916
			180 28 26.3	0 28 27.3	Big Bayou	6956.6	3.842397
Hause's windmill, north	28 21 00.807	24.8	33 08 26.5	213 07 50.3	Hill	3844.5	3.584844
1906	96 24 48.774	1328.6	36 18 13.2	216 17 55.2	Matagorda Lighthouse	1737.8	3.240000
			120 35 39.4	300 33 19.0	Espiritu Santo 2	9346.5	3.970649
			187 12 02.0	7 12 19.0	Big Bayou	7772.5	3.890559
Hause's windmill, south	28 20 23.546	724.8	13 58 27.7	193 58 18.7	Hill	2135.6	3.329510
1906	96 25 46.997	1280.2	132 25 07.3	312 23 14.6	Espiritu Santo 2	8751.1	3.942062
			196 06 44.0	16 07 28.0	Big Bayou	9220.6	3.964758
			294 28 31.1	114 28 40.1	Matagorda Lighthouse	612.0	2.786719
Boat house at life-saving station, north gable, Gulf shore [1]	28 20 04.22	129.9	59 08 56	239 08 13	Hill	2880.4	3.459448
1906	96 24 35.16	957.8	103 42 44	283 42 20	Matagorda Lighthouse	1440.9	3.158635
Boathouse on lighthouse wharf, east gable	28 20 42.533	1309.3	133 49 22.2	313 47 45.5	Espiritu Santo 2	7680.3	3.885378
1906	96 26 20.761	565.5	202 47 52.1	22 48 52.8	Big Bayou	8975.4	3.953053
			299 34 19.6	119 34 45.3	Matagorda Lighthouse	1697.8	3.229884
Hause's house, east chimney	28 20 41.296	1271.2	21 45 14.3	201 44 56.6	Hill	2819.5	3.450171
1906	96 25 27.569	751.0	127 28 04.9	307 26 03.0	Espiritu Santo 2	8806.0	3.944780
			193 43 30.3	13 44 05.8	Big Bayou	8556.2	3.932283
			358 00 39.1	178 00 39.6	Matagorda Lighthouse	800.4	2.903312
Hill's windmill	28 18 53.575	1649.3	167 18 20.8	347 17 46.8	Espiritu Santo 2	8888.2	3.948818
1906	96 28 32.560	887.3	211 16 40.0	31 18 43.4	Big Bayou	13607.6	4.133782
			243 34 48.5	63 36 16.8	Matagorda Lighthouse	5657.4	3.752616
			260 05 18.0	80 06 28.4	Hill	4055.0	3.607997
Wilkinson house	28 20 02.56	78.8	125 54 20	305 52 11	Espiritu Santo	9145.2	3.961193
1857	96 26 34.31	934.6	252 23 46	72 25 01	Pass Cavallo L. H.	4529.2	3.656025

[1] No check on this position.

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Espiritu Santo 1857	28 22 56.709 96 31 06.383	1745.7 173.8	11 19 11.9 63 29 27.5	191 18 31.4 243 24 58.4	Rahal Grass Island	11850.6 17253.8	4.073740 4.236884
Rahal 1857	28 16 39.224 96 32 31.736	1207.4 864.9	55 41 05.2 106 37 38.9	235 37 08.7 286 33 50.7	Panther Point Grass Island	16506.1 13688.7	4.217644 4.136299
Grass Island 1859	28 18 46.214 96 40 33.105	1422.6 901.9	2 11 00.8 71 29 42.5	182 10 52.0 251 26 08.5	Panther Point Sand Mounds	13231.8 12975.4	4.121619 4.113122
Panther Point 1859	28 11 36.686 96 40 51.590	1129.3 1407.2	52 08 19.5 127 38 51.0	232 04 32.8 307 35 26.2	Cedar Bayou Sand Mounds	16615.9 14904.1	4.220523 4.173306
Shell Island 1859	28 16 35.778 96 44 06.605	1101.4 180.0	235 22 21.9 329 58 53.5	55 24 03.1 150 00 25.7	Grass Island Panther Point	7068.7 10631.9	3.849337 4.026611
Mosquito Point 1859	28 20 48.307 96 42 27.780	1487.0 756.6	320 15 43.1 19 06 35.2 49 21 26.1	140 16 37.5 199 05 48.3 229 18 46.3	Grass Island Shell Island Sand Mounds	4887.1 8226.8 12097.3	3.689049 3.915230 4.082690
Sand Mounds 1859	28 16 32.226 96 48 04.593	992.0 125.2	3 50 52.0 41 07 56.9	183 50 29.5 221 04 43.0	Cedar Bayou St. Charles	19346.4 17005.9	4.286600 4.230599
Cedar Bayou 1859	28 06 05.160 96 48 52.152	158.8 1423.6	44 17 43.0 123 17 19.0	224 14 43.0 303 14 28.1	Littles St. Charles	14972.6 11830.1	4.175297 4.072987
St. Charles 1859	28 09 35.959 96 54 54.613	1106.9 1490.0	1 50 25.8 53 17 05.2	181 50 16.3 233 13 38.4	Littles Big Mound	17219.0 14943.7	4.236008 4.174458
Littles 1859	28 00 16.868 96 55 14.854	519.2 405.8	40 33 33.0 85 23 37.7	220 29 44.3 265 19 36.8	Aransas Lighthouse (old) Shell Bank	20535.3 14065.6	4.312501 4.148158
Big Mound 1859	28 04 45.537 97 02 13.356	1401.7 364.6	305 51 33.7 4 33 28.0 15 21 45.7	125 54 50.4 184 32 55.3 195 21 01.2	Littles Aransas Lighthouse (old) Shell Bank	14108.5 23954.6 9756.3	4.149482 4.379389 3.989285
Ballou House (1859) 1859	28 08 04.206 96 59 32.004	129.5 873.4	249 31 06.3 333 57 58.4 11 53 42.1 35 46 17.1	69 33 17.1 153 59 59.4 191 51 53.6 215 45 01.1	St. Charles Littles Aransas Lighthouse (old) Big Mound	8078.7 16007.9 30651.0 7536.4	3.907343 4.204334 4.486444 3.877166
Copano House 1859	28 08 45.206 97 07 39.938	1391.6 1089.8	275 22 58.5 309 35 28.9	95 26 48.6 129 38 02.8	Ballou House (1859) Big Mound	13374.3 11571.0	4.126272 4.063372
Black Point House, chimney 1859	28 05 22.333 97 12 50.136	687.5 1368.8	233 33 59.9 257 03 51.1 273 41 09.6	53 36 26.1 77 10 07.2 93 46 09.4	Copano House Ballou House (1859) Big Mound	10520.4 22347.6 17422.2	4.022033 4.349230 4.241103
Shell Bank 1859	27 59 39.906 97 03 47.949	1228.4 1310.1 30 56 32.2	357 17 33.5	177 17 45.2 210 53 31.6	Aransas Lighthouse (old) Dagger Island	14487.2 20537.2	4.160985 4.312541
Aransas Lighthouse (old) 1860	27 51 49.786 97 03 22.936	1532.5 627.4	26 41 28.2 74 23 02.9 75 53 11.8	206 39 41.4 254 19 51.0 255 48 33.6	Mustang Island Dagger Island McGloins Bluff	13961.4 11675.1 16814.5	4.144929 4.067261 4.225685
Espiritu Santo Eccentric 1911	28 22 56.753 96 31 06.382	1747.1 173.8	0 53 242 03 28.3 298 12 51.7	180 53 62 04 07.3 118 15 33.1	Espiritu Santo Espiritu Santo 2 Matagorda Lighthouse	1.34 2529.3 10504.3	0.1271 3.402995 4.021369
Cactus 1911	28 19 42.255 96 29 08.862	1300.8 241.4	151 52 53.6 172 20 16.3 260 26 48.0	331 51 57.8 352 19 59.5 80 28 33.5	Espiritu Santo Eccentric Espiritu Santo 2 Matagorda Lighthouse	6789.0 7236.9 6140.4	3.831808 3.859555 3.788200
Contee 1911	28 18 07.857 96 33 19.022	241.9 518.3 246 53 26.8	202 05 57.5	22 07 00.5 66 55 25.5	Espiritu Santo Eccentric Cactus	9599.0 7408.9	3.982226 3.869752
Long 1911	28 20 30.233 96 35 37.895	930.7 1032.1	238 35 51.4 277 54 32.6 319 11 28.1	58 38 00.4 97 57 37.3 139 12 34.0	Espiritu Santo Eccentric Cactus Contee	8660.8 10699.0 5789.8	3.937559 4.029345 3.762663
Greek 1911	28 15 39.202 96 37 50.786	1208.7 1384.3	202 00 07.9 238 16 54.1	22 01 10.9 58 19 02.9	Long Contee	9661.2 8704.8	3.985032 3.939759
Steam 1911	28 18 35.286 96 37 01.896	1086.3 51.7 13 49 00.5	212 53 04.1 277 54 06.8	32 53 43.9 97 55 52.5 193 48 37.3	Long Contee Greek	4213.9 6130.8 5580.0	3.624682 3.787518 3.746632
Nest 1911	28 18 46.687 96 40 32.694	1437.2 890.7 322 35 00.5	248 19 51.7 273 28 59.1	68 22 11.6 93 30 39.1 142 36 17.2	Long Steam Greek	8639.9 5753.8 7263.2	3.936507 3.759952 3.861128
Heron 1911	28 16 35.828 96 44 06.537	1102.9 178.2	235 19 45.2 279 37 29.4	55 21 26.6 99 40 27.4	Nest Greek	7083.8 10388.2	3.850266 4.016539
Pan 1911	28 12 58.046 96 42 10.326	1786.9 281.6	154 42 50.9 193 55 10.0 234 56 19.5	334 41 55.9 13 55 56.3 54 58 22.3	Heron Nest Greek	7414.9 11057.2 8642.7	3.870101 4.043646 3.936648

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Mosquito Point 2	28 20 48.773	1501.4	302 46 34	122 46 34	Mosquito Point	26.51	1.423410
1911	96 42 28.598	778.9	319 57 34.0	139 58 29.0	Nest	4908.4	3.690939
			18 55 19.1	198 54 32.6	Heron	8231.0	3.915452
Dagger	28 16 34.465	1061.0	188 58 05.6	8 58 18.7	Webb	4850.0	3.685738
1911	96 47 51.197	1395.3	269 35 32.4	89 37 18.8	Heron	6122.9	3.786954
			305 36 54.8	125 39 36.1	Pan	11433.8	4.058191
Webb	28 19 10.089	310.6	249 15 41.0	69 18 00.9	Mosquito Point 2	8586.6	3.933821
1911	96 47 23.445	638.8	273 39 23.1	93 42 37.9	Nest	11213.3	4.049734
			311 29 53.4	131 31 26.7	Heron	7164.9	3.855211
Sharp	28 21 32.843	1011.0	279 20 30.7	99 22 54.2	Mosquito Point 2	8339.9	3.921161
1911	96 47 30.754	837.5	357 24 20.3	177 24 23.8	Webb	4399.0	3.643352
Swan	28 23 18.523	570.2	356 22 08.7	176 22 13.8	Mosquito Point 2	4619.1	3.664559
1911	96 42 39.339	1071.0	45 21 07.6	225 18 52.7	Webb	10878.9	4.036586
			67 43 33.5	247 41 15.0	Sharp	8575.8	3.933273
Marsh	28 23 51.369	1581.3	278 25 49.4	98 27 48.3	Swan	6883.4	3.837802
1911	96 46 49.443	1345.9	14 46 43.6	194 46 23.9	Sbarp	4410.2	3.644454
Terry	28 24 59.899	1843.9	310 26 24.4	130 27 28.4	Swan	4810.2	3.682167
1911	96 44 53.813	1464.6	33 50 44.8	213 49 30.2	Sharp	7673.5	3.884996
			56 10 30.0	236 09 35.1	Marsh	3789.1	3.578532
Nipper	28 24 35.647	1097.4	261 32 24.9	81 33 52.8	Terry	5082.1	3.706045
1911	96 47 58.504	1592.4	305 56 24.6	125 56 57.6	Marsh	2322.0	3.365870
			352 21 05.4	172 21 18.6	Sharp	5677.9	3.754184
Austin	28 22 42.243	1300.4	216 42 55.5	36 43 41.0	Nipper	4355.3	3.639020
1911	96 49 34.164	930.2	244 36 14.9	64 37 33.3	Marsh	4963.8	3.695810
			302 26 15.7	122 27 14.4	Sharp	3982.0	3.600104
Duck	28 25 38.976	1199.8	305 07 22.3	125 08 10.7	Nipper	3388.0	3.529938
1911	96 49 40.311	1097.0	358 14 17.9	178 14 20.8	Austin	5443.1	3.735846
Crescent	28 23 57.854	1781.0	210 30 36.6	30 31 08.7	Duck	3613.4	3.557915
1911	96 50 47.718	1298.9	255 48 48.7	75 50 09.2	Nipper	4750.7	3.676762
			319 17 21.2	139 17 56.2	Austin	3070.4	3.487200
Oil	28 25 39.941	1229.5	301 37 54.6	121 38 29.6	Terry	2350.0	3.371065
1911	96 46 07.327	199.4	16 37 48.4	196 37 08.8	Sharp	7938.4	3.899734
			56 49 08.3	236 48 15.4	Nipper	3615.7	3.558195
Range Beacon	28 26 38.231	1176.9	338 17 53.3	158 18 14.4	Terry	3257.9	3.512938
1911	96 45 38.075	1036.0	18 04 39.0	198 03 45.5	Sharp	9888.7	3.995141
			23 55 28.5	203 55 14.6	Oil	1963.0	3.292930
False	28 13 39.481	1215.3	223 40 59.7	43 42 29.8	Heron	7508.1	3.875529
1911	96 47 16.813	458.4	278 39 27.5	98 41 52.5	Pan	8453.8	3.927051
Snake	28 10 34.540	1063.2	156 52 41.7	336 51 59.5	False	6190.5	3.791727
1911	96 45 47.656	1299.9	193 55 00.0	13 55 47.8	Heron	11458.1	4.059114
			233 17 22.2	53 19 04.9	Pan	7392.4	3.868788
Ayres	28 10 31.557	971.4	223 46 46.9	43 48 23.0	False	8014.0	3.903848
1911	96 50 40.175	1095.9	269 19 17.0	89 21 35.2	Snako	7980.1	3.902007
Bray	28 08 19.156	589.7	134 16 31.1	314 15 18.7	Ayres	5839.2	3.766355
1911	96 48 06.912	188.6	187 53 12.3	7 53 35.9	False	9954.7	3.998030
			222 20 42.3	42 21 48.0	Snake	5639.4	3.751236
Cedar	28 05 43.127	1327.6	173 14 46.2	353 14 27.9	Ayres	8940.7	3.951372
1911	96 50 01.630	44.5	213 05 35.4	33 06 29.4	Bray	5733.4	3.758413
Gaston	28 08 53.026	1632.3	231 37 09.8	51 38 16.0	Ayres	4886.1	3.688959
1911	96 53 00.584	15.9	277 23 37.5	97 25 56.0	Bray	8081.0	3.907464
			320 06 31.4	140 07 55.8	Cedar	7617.4	3.881808
Joe	28 03 58.492	1800.5	194 57 54.7	14 58 36.5	Gaston	9385.0	3.972436
1911	96 54 29.404	802.9	246 12 22.6	66 14 28.7	Cedar	7989.0	3.902495
Dun	28 07 24.303	748.1	239 0 12.3	59 51 33.5	Gaston	5437.3	3.735384
1911	96 55 52.874	1443.0	287 58 23.4	108 01 08.9	Cedar	10080.6	4.003487
			340 12 43.2	160 13 22.5	Joe	6732.7	3.828188
Center	28 04 41.501	1277.5	214 47 19.5	34 48 19.6	Dun	6102.7	3.785523
1911	96 58 00.454	12.4	282 55 29.4	102 57 08.7	Joe	5912.9	3.771797
Car	28 00 52.397	1612.9	170 19 14.9	350 18 54.2	Center	7154.2	3.854561
1911	96 57 16.400	448.0	218 31 02.4	38 32 20.9	Joe	7322.5	3.864657
Milo	28 01 56.025	1724.6	228 36 45.7	48 38 25.2	Center	7706.5	3.886856
1911	97 01 32.216	879.9	285 38 23.8	105 40 23.9	Car	7257.5	3.860787
Ballou House	28 08 04.207	129.5	281 35 35.7	101 37 19.0	Dun	6104.9	3.785679
1911	96 59 31.999	873.3	338 10 09.7	158 10 52.8	Center	6721.5	3.827468
Oak	28 04 45.504	1400.7	215 44 06.6	35 45 22.6	Ballou House	7536.2	3.877155
1911	97 02 13.288	362.8	271 00 21.9	91 02 20.9	Center	6904.3	3.839121
			347 51 48.0	167 52 07.4	Mile	5336.1	3.727228

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Decker	28 06 50.518	1555.0	245 29 59.2	65 31 25.2	Ballou House	5472.3	3.738172
1911	97 02 34.474	940.9	351 27 06.3	171 27 16.3	Oak	3891.4	3.590111
Rat	28 10 39.862	1227.1	303 40 09.8	123 42 14.1	Ballou House	8638.8	3.936451
1911	97 03 55.458	1512.9	342 36 50.8	162 37 29.0	Decker	7397.6	3.869089
			345 39 16.0	165 40 04.2	Oak	11258.8	4.051491
End	28 11 48.522	1493.6	11 54 53.0	191 54 19.6	Decker	9375.2	3.971980
1911	97 01 23.559	642.5	60 55 02.2	240 52 03.9	Cop	11798.9	4.071843
			62 58 57.1	242 57 45.4	Rat	4651.1	3.667559
Cop	28 08 42.067	1294.9	239 31 29.9	59 33 16.5	Rat	7152.8	3.854476
1911	97 07 41.449	1131.0	292 16 03.6	112 18 28.3	Decker	9053.9	3.956836
			309 05 20.9	129 07 55.5	Oak	11543.7	4.062346
Hans	28 04 38.360	1180.8	159 47 41.4	339 46 53.7	Cop	7994.2	3.902774
1911	97 06 00.262	7.1	197 00 35.8	17 01 34.5	Rat	11637.5	4.065861
			234 04 34.8	54 06 11.7	Decker	6936.1	3.841116
Miss	28 07 36.220	1115.0	238 26 13.2	58 27 10.2	Cap	3873.2	3.588075
1911	97 09 42.397	1157.0	312 03 52.4	132 05 37.0	Hans	8169.7	3.912207
			50 58 02.4	230 56 34.2	Mary	6575.7	3.817945
Port	28 03 32.496	1000.3	89 06 57.2	269 05 35.8	Star	4726.3	3.674524
1911	97 07 44.313	1210.1	180 28 11.5	0 28 12.9	Cop	9529.7	3.979078
			234 28 56.1	54 29 45.1	Hans	3490.4	3.542879
Mary	28 05 21.655	666.6	233 42 37.5	53 45 02.7	Cop	10428.3	4.018212
1911	97 12 49.496	1351.3	276 46 31.3	96 49 44.0	Hans	11252.2	4.051238
			313 34 39.4	133 35 41.6	Star	4980.9	3.697304
Star	28 03 30.097	926.5	206 33 20.4	26 34 43.3	Cop	10736.9	4.030880
1911	97 10 37.364	1020.3	254 27 41.3	74 29 51.7	Hans	7853.0	3.895033
Rock	27 59 39.431	1213.8	221 27 30.2	41 28 34.1	Mile	5611.1	3.749050
1911	97 03 48.220	1317.6	258 07 32.0	78 10 35.9	Car	10938.5	4.038956
			307 51 14.7	127 53 04.8	Mud	8123.3	3.909735
			357 15 48.1	177 15 59.9	Aransas Lighthouse (new)	14472.7	4.160550
Mud	27 56 57.432	1767.8	163 39 49.7	343 39 03.4	Mile	9578.2	3.981285
1911	96 59 53.585	1464.7	210 41 46.5	30 43 00.2	Car	8412.1	3.924902
			31 10 22.0	211 08 44.0	Aransas Lighthouse (new)	11066.1	4.043994
Entrance Beacon, large built up	27 55 12.970	399.2	180 43 45.9	0 43 47.7	Rock	8202.8	3.913962
1911	97 03 52.042	1423.0	197 06 36.3	17 07 41.9	Mile	12981.9	4.113338
			243 43 51.2	63 45 42.9	Mud	7269.2	3.861486
Ridge	27 53 11.061	340.5	14 05 40.6	194 05 29.9	Aransas Lighthouse (new)	2579.2	3.411489
1899	97 03 00.003	0.1	159 14 03.2	339 13 38.9	Entrance Beacon	4013.3	3.603506
			240 48 01.5	60 49 02.5	Lone Tree Knoll	4083.5	3.611031
			358 13 54.9	178 13 58.0	Entrance	5775.9	3.761623
Blind	27 53 08.400	258.6	44 44 53.7	224 44 12.7	Aransas Lighthouse (new)	3406.7	3.532331
1912	97 01 55.298	1512.6	92 39 14.0	272 38 43.7	Ridge	1771.7	3.248392
			140 13 32.3	320 12 37.7	Entrance Beacon	4989.6	3.698067
Lone Tree Knoll	27 54 15.763	485.2	23 34 42.1	203 33 44.2	Entrance	8471.6	3.927965
1899	97 00 49.658	1358.1	43 01 55.5	223 00 43.8	Aransas Lighthouse (new)	6145.9	3.788585
Entrance	27 50 03.507	107.9	39 58 38.4	219 57 39.8	Lost	5349.3	3.728298
1899	97 02 53.490	1463.8	166 09 21.0	346 09 07.2	Aransas Lighthouse (new)	3369.5	3.527567
Lost	27 47 50.320	1548.9	103 26 14.8	283 22 21.6	McGloins Bluff	14061.8	4.148042
1899	97 04 59.041	1616.2	199 37 29.4	19 38 14.2	Aransas Lighthouse (new)	7826.1	3.893547
Rogers	27 46 51.873	1596.7					
1905	97 37 09.319	255.1					
Kaleta	27 54 08.160	251.2	32 26 47.69	212 24 22.08	Rogers	15910.12	4.2016735
1905	97 31 57.540	1573.7					
Corpus	27 47 18.341	564.6	87 48 17.47	267 42 23.52	Rogers	20803.89	4.3181445
1905	97 24 30.008	821.5	135 52 48.39	315 49 19.36	Kaleta	17580.74	4.2450372
Portland	27 53 02.343	72.1	34 05 21.81	214 03 19.60	Corpus	12783.31	4.1066432
1905	97 20 08.292	226.8	67 51 51.79	247 43 55.09	Rogers	30178.27	4.4796043
			96 00 30.52	275 54 58.72	Kaleta	19503.56	4.2901138
McGloins Bluff	27 49 36.229	1115.1	77 02 06.23	256 56 53.11	Corpus	18855.87	4.2754466
1860	97 13 18.803	514.6	119 32 56.92	299 29 45.59	Portland	12875.15	4.1097524
Mustang	27 41 50.533	1555.4	114 16 14.83	294 09 53.54	Corpus	24597.73	4.3908950
1905	97 10 50.923	1395.2	143 36 48.54	323 32 28.66	Portland	25699.01	4.4099164
			164 14 05.98	344 12 57.10	McGloins Bluff	14895.51	4.1730554
Laguna Madre north base	27 40 10.565	325.2	134 30 49.51	314 27 01.76	Corpus	18791.92	4.2739712
1882	97 16 20.529	502.6	165 18 23.01	345 16 36.86	Portland	24560.89	4.3902441
			195 56 24.20	15 57 48.81	McGloins Bluff	18108.92	4.2578927
			251 09 56.15	71 12 29.28	Mustang	9541.85	3.9796327

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Principal points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Laguna Madre south base 1882	27 37 25.926 97 17 37.263	798.0 1021.6	148 13 20.86 202 32 12.50	328 10 08.96 22 32 48.11	Corpus Laguna Madre north base	21456.51 5486.855	4.3315592 3.7393234
			233 47 42.86	53 50 51.50	Mustang	13797.55	4.1398019
Padre 1905	27 36 56.350 97 13 45.396	1734.4 1244.8	98 09 50.11	278 08 02.64	Laguna Madre south base	6422.30	3.8076907
			144 34 57.79	324 33 45.82	Laguna Madre north base	7336.31	3.8654778
			181 46 56.00	1 47 08.38	McGloins Bluff	23400.96	4.3692337
			207 49 42.04	27 51 03.04	Mustang	10240.32	4.0103136
Grants 1877	27 38 28.423 97 11 17.315	874.8 474.7	79 33 39.85	259 30 43.63	Laguna Madre south base	10592.57	4.0250015
			110 44 26.37	290 42 05.63	Laguna Madre north base	8885.80	3.9486965
			170 48 45.04	350 47 48.49	McGloins Bluff	20823.17	4.3185469
Chappa 1877	27 32 59.795 97 14 14.066	1840.4 386.0	145 47 02.58	325 45 28.48	Laguna Madre south base	9907.59	3.9959680
			165 21 05.55	345 20 06.94	Laguna Madre north base	13705.19	4.1368849
			205 35 34.23	25 36 56.11	Grants	11216.70	4.0498657
Flour Bluff 1860	27 42 00.463 97 16 12.878	14.2 352.8	198 45 18.39	18 46 39.48	McGloins Bluff	14816.56	4.1707474
			308 50 27.71	128 52 44.97	Grants	10402.41	4.0171338
			348 55 02.40	168 55 57.48	Chappa	16957.74	4.2293680
			17 09 49.80	197 08 40.29	Peat Island	13925.95	4.1438247
Thompsons 1876	27 43 11.501 97 08 37.946	354.0 1039.4	26 37 51.93	206 36 37.90	Grants	9746.51	3.9888490
			80 04 42.62	260 01 11.08	Flour Bluff	12653.69	4.1022170
			147 01 12.03	326 59 01.16	McGloins Bluff	14120.01	4.1498349
			208 22 14.88	28 24 41.74	Aransas Lighthouse	18134.74	4.2585113
Aransas Lighthouse 1860	27 51 49.792 97 03 22.962	1532.7 628.1	31 50 05.3	211 45 15.6	Padre	32356.1	4.509956
			33 38 55.2	213 35 26.4	Mustang	22176.4	4.345891
			44 44 25.5	224 38 23.3	Laguna Madre north base	30274.6	4.481078
			75 53 07.9	255 48 29.6	McGloins Bluff	16813.9	4.225668
Dagger Island 1860	27 50 07.516 97 10 13.837	231.4 378.7	33 16 42.5	213 13 55.3	Flour Bluff	17927.9	4.253529
			79 14 22.0	259 12 55.7	McGloins Bluff	5152.5	3.712021
Mustang Island 1860	27 45 04.496 97 07 11.931	138.4 326.8	69 06 48.8	249 02 37.1	Flour Bluff	15863.5	4.200400
			129 48 39.6	309 45 48.6	McGloins Bluff	13070.3	4.116287
			151 54 52.6	331 53 27.8	Dagger Island	10573.3	4.024212
Peat Island 1877	27 34 48.160 97 18 42.708	1482.4 1171.4	200 16 43.69	20 17 14.01	Laguna Madre south base	5177.09	3.7140861
			240 56 08.14	60 59 34.58	Grants	13968.66	4.1451548
			294 20 05.09	114 22 09.41	Chappa	8089.12	3.9079014
Oso 1912	27 42 40.650 97 18 43.169	1251.2 1182.7	214 45 06.2	34 47 37.3	McGloins Bluff	15572.9	4.192369
			276 46 07.2	96 49 46.8	Mustang	13030.0	4.114943
Shamrock 1912	27 45 34.816 97 10 17.924	1071.7 490.8	7 27 41.8	187 27 26.5	Mustang	6962.5	3.842765
			68 51 23.7	248 47 28.6	Oso	14840.6	4.171452
			146 20 03.2	326 18 38.9	McGloins Bluff	8929.6	3.950831
Demit 1912	27 41 36.057 97 15 02.786	1109.9 76.3	266 17 22.0	86 19 19.1	Mustang	6915.3	3.839814
			38 59 51.9	218 59 15.8	Laguna Madre north base	3385.8	3.529658
Grants 191	27 37 33.861 97 11 50.716	1042.2 1390.5	88 32 58.9	268 30 18.3	Laguna Madre south base	9504.5	3.977929
			123 07 42.1	303 05 36.9	Laguna Madre north base	8829.8	3.945952
			191 42 53.8	11 43 21.6	Mustang	8068.7	3.906802
Island 1912	27 36 08.151 97 17 07.598	250.9 208.4	161 14 06.1	341 13 52.4	Laguna Madre south base	2528.3	3.402835
			253 05 23.8	73 07 50.6	Grants 2	9080.6	3.958113
Pass 1912	27 34 41.333 97 13 13.951	1272.2 382.7	112 39 08.3	292 37 20.1	Island	6942.9	3.841539
			203 15 13.1	23 15 51.6	Grants 2	5780.2	3.761944
Sandhill 1912	27 31 37.520 97 15 06.728	1154.9 184.6	158 18 10.4	338 17 14.5	Island	8965.7	3.952584
			208 39 57.0	28 40 49.2	Pass	6448.5	3.809460
Hardpan 1912	27 33 44.114 97 19 28.814	1357.8 790.5	204 07 46.6	24 08 38.3	Laguna Madre south base	5942.9	3.773997
			221 07 57.0	41 09 02.4	Island	5887.1	3.769901
			298 26 06.5	118 28 07.7	Sandhill	8178.8	3.912688
Supplementary points							
Rahal's house [1] 1857	28 18 14.56 96 29 54.09	448.2 1473.7	167 13 55 244 17 39	347 13 21 64 20 29	Espiritu Santo Pass Cavallo Lighthouse	8905.8 10830.0	3.949671 4.034630
Cant Island 1857	28 21 39.140 96 33 57.259	1204.9 1559.3	242 49 17.2	62 50 38.4	Espiritu Santo	5229.7	3.718479
			275 33 11.9	95 37 57.5	Pass Cavallo Lighthouse	16458.2	4.216382
			345 49 52.5	165 50 33.1	Rahal	9521.9	3.978722

[1] No check on this position.

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Pavilion cupola, south 1911	28 26 57.873 96 24 04.796	1781.5 130.5	3 53 01.1 10 11 12.5 31 42 26.8	183 52 57.2 190 10 33.6 211 40 02.3	Big Bayou Matagorda Lighthouse Cactus	3288.3 12590.6 15759.2	3.516966 4.100048 4.197535
Pavilion cupola, north 1911	28 26 58.222 96 24 04.977	1792.3 135.4	3 47 09.1 10 09 22.1 31 40 18.2	183 47 05.3 190 08 43.3 211 37 53.8	Big Bayou Matagorda Lighthouse Cactus	3298.7 12600.3 15765.8	3.518337 4.100382 4.197715
Railroad water tank, Espiritu Santo 1911	28 26 32.266 96 24 38.342	993.3 1043.3	344 31 10.0 6 27 20.9 30 16 57.0 56 49 12.8	164 31 22.1 186 26 57.9 210 14 48.3 236 46 47.2	Big Bayou Matagorda Lighthouse Cactus Espiritu Santo 2	2586.2 11678.0 14613.3 9952.0	3.412667 4.067370 4.164749 3.997911
Beacon No. 2, Espiritu Santo 1911	28 25 00.429 96 23 53.097	13.2 1445.1	16 10 23.6 74 41 05.1 121 44 16.1	196 09 39.2 254 38 18.1 301 44 06.7	Matagorda Lighthouse Espiritu Santo 2 Big Bayou	9138.4 9913.2 636.3	3.960868 3.996213 2.803651
Beacon No. 3, Espiritu Santo 1911	28 25 15.489 96 24 09.415	476.8 256.2	12 48 33.9 36 58 11.6 71 19 13.2	192 47 57.2 216 58 09.9 251 16 33.9	Matagorda Lighthouse Big Bayou Espiritu Santo 2	9476.2 161.3 9623.9	3.976634 2.207689 3.983349
Beacon No. 4, Espiritu Santo 1911	28 25 23.712 96 24 19.449	730.0 529.4	335 15 14.4 10 53 48.5 69 20 04.2	155 15 17.5 190 53 16.6 249 17 29.7	Big Bayou Matagorda Lighthouse Espiritu Santo 2	420.7 9667.9 9451.9	2.623966 3.985332 3.975518
Beacon No. 5, Espiritu Santo 1911	28 25 16.056 96 26 06.602	494.3 179.7	272 42 09.3 353 16 45.5 62 22 26.0	92 43 03.4 173 17 04.5 242 20 42.4	Big Bayou Matagorda Lighthouse Espiritu Santo 2	3095.9 9322.1 6689.3	3.490784 3.969512 3.825380
Beacon No. 6, Espiritu Santo 1911	28 25 06.878 96 26 29.533	211.7 803.9	267 53 34.7 349 10 43.7 61 59 51.6	87 54 30.7 169 11 13.6 241 58 18.9	Big Bayou Matagorda Lighthouse Espiritu Santo 2	3719.1 9137.9 6005.4	3.570438 3.960845 3.778543
Beacon No. 7, Espiritu Santo 1911	28 24 54.602 96 27 03.868	1680.8 105.3	263 40 54.2 342 51 51.4 60 47 22.5	83 42 15.5 162 52 37.6 240 46 06.2	Big Bayou Matagorda Lighthouse Espiritu Santo 2	4679.4 8996.7 5004.0	3.670194 3.954082 3.699320
Beacon No. 8, Espiritu Santo 1911	28 18 59.811 96 36 52.019	1841.2 1417.1	215 57 06.6 285 23 39.9 14 32 45.2 86 10 12.0	35 57 41.8 105 25 20.9 194 32 17.3 266 08 27.3	Long Contee Greek Nest	3438.7 6019.4 6377.9 6025.5	3.536395 3.779556 3.804676 3.779995
Beacon No. 9, Espiritu Santo 1911	28 18 57.552 96 37 10.206	1771.6 278.0	221 23 07.1 283 38 11.1 10 16 16.2 86 32 38.3	41 23 50.8 103 40 00.7 190 15 57.0 266 31 02.2	Long Contee Greek Nest	3803.0 6481.7 6203.3 5526.6	3.580127 3.811691 3.792626 3.742461
Beacon No. 10, Espiritu Santo 1911	28 18 51.045 96 37 34.553	1571.4 941.3	226 08 10.9 280 47 40.5 4 17 10.1 88 25 42.0	46 09 06.3 100 49 41.7 184 17 02.4 268 24 17.5	Long Contee Greek Nest	4406.9 7087.8 5920.2 4855.1	3.644138 3.850512 3.772340 3.686197
Beacon No. 11, Espiritu Santo 1911	28 18 49.194 96 37 44.118	1514.4 1201.9	227 51 32.4 279 58 29.2 1 46 50.4 89 02 54.5	47 52 32.3 100 00 34.9 181 46 47.2 269 01 34.5	Long Contee Greek Nest	4636.4 7333.8 5849.5 4593.3	3.666181 3.865332 3.767121 3.662127
Beacon No. 12, Espiritu Santo 1911	28 18 21.000 96 38 22.457	646.4 611.9	228 24 08.8 272 46 55.4 350 09 48.3 102 34 16.9	48 25 26.9 92 49 19.3 170 10 03.3 282 33 15.1	Long Contee Greek Nest	5993.5 8277.4 5053.1 3635.3	3.777682 3.917892 3.703556 3.560543
Beacon No. 13, Espiritu Santo 1911	28 15 06.181 96 42 47.111	190.3 1284.2	345 43 54.3 30 30 01.6 141 53 28.9 208 20 42.0	165 44 11.7 210 28 36.3 321 52 51.3 28 21 45.7	Pan Snake Heron Nest	4069.9 9703.6 3507.4 7713.2	3.609582 3.986934 3.544988 3.887234
Beacon No. 14, Espiritu Santo 1911	28 15 02.866 96 42 53.170	88.2 1449.4	343 05 14.1 29 57 19.5 145 03 31.5 209 02 56.1	163 05 34.4 209 55 57.1 325 02 56.8 29 04 02.7	Pan Snake Heron Nest	4016.0 9532.3 3491.1 7882.0	3.603792 3.979197 3.542962 3.896637
Bar 1911	28 22 09.354 96 32 59.162	288.0 1612.0	244 34 37.6 305 48 43.6 54 47 38.4	64 35 31.2 125 50 33.0 234 46 23.0	Espiritu Santo Eccentric Cactus Long	3399.8 7736.0 5291.2	3.531454 3.888514 3.723552
Windmill No. 2 1911	28 19 53.108 96 26 48.403	1634.8 1318.4	85 01 09.2 128 50 23.9 145 00 03.3 252 57 05.2	265 00 02.5 308 48 21.3 324 58 39.7 72 57 44.0	Cactus Espiritu Santo Eccentric Espiritu Santo 2 Matagorda Lighthouse	3840.6 9017.6 8349.0 2332.0	3.584400 3.955090 3.921636 3.367727
Windmill No. 3 1911	28 19 21.612 96 27 34.515	565.3 940.3	76 25 26.6 103 53 41.8 138 57 03.1 244 37 11.8	256 22 43.2 283 52 57.0 318 55 22.5 64 38 12.5	Contee Cactus Espiritu Santo Eccentric Matagorda Lighthouse	9656.5 2647.5 8783.7 3857.9	3.984818 3.422830 3.943679 3.586346
Windmill No. 4 1911	28 18 53.567 96 28 32.547	1649.0 886.7	146 34 32.4 150 46 34.1 167 18 14.0 243 34 35.8	326 34 15.2 330 45 21.1 347 17 40.0 63 36 04.1	Cactus Espiritu Santo Eccentric Espiritu Santo 2 Matagorda Lighthouse	1795.8 8578.8 8888.6 5657.2	3.254270 3.933426 3.948832 3.752598

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Windmill No. 5	28 18 20.736	638.3	86 15 06.0	266 13 21.1	Contee	6040.8	3.781096
1911	96 29 37.788	1029.6	164 09 07.4	344 08 25.4	Espiritu Santo Eccentric	8832.8	3.946097
			197 25 53.8	17 26 07.5	Cactus	2630.3	3.420003
			242 43 11.9	62 45 11.2	Matagorda Lighthouse	7699.5	3.886464
Windmill 2	28 25 21.060	648.3	260 17 07.2	80 18 03.6	Duck	3271.2	3.514705
1911	96 51 38.786	1055.6	283 06 38.2	103 08 23.0	Nipper	6156.4	3.789324
			325 14 08.2	145 15 07.5	Austin	5950.7	3.774565
			331 30 32.7	151 30 57.0	Crescent	2914.2	3.464526
Windmill No. 6	28 17 52.582	1618.6	95 54 23.9	275 53 04.7	Contee	4577.8	3.660655
1911	96 30 31.902	869.2	174 16 28.7	354 16 12.3	Espiritu Santo Eccentric	9410.4	3.973610
			213 49 13.5	33 49 52.9	Cactus	4064.0	3.608957
Rear Range Beacon, Steamboat Pass	28 19 19.420	597.8	227 08 33.4	47 09 14.3	Long	3205.2	3.505857
1911	96 37 04.161	113.3	289 44 29.1	109 46 15.9	Contee	6517.3	3.814070
			10 37 16.0	190 36 53.9	Greek	6895.2	3.838549
			79 57 21.6	259 55 42.7	Nest	5769.7	3.761153
Front Range Beacon, Steamboat Pass	28 19 04.376	134.7	227 43 27.1	47 44 17.7	Long	3929.5	3.594332
1911	96 37 24.643	671.4	284 33 28.2	104 35 24.7	Contee	6914.4	3.839752
			6 26 20.4	186 26 08.0	Greek	6354.1	3.803055
			83 56 43.6	263 55 14.4	Nest	5152.0	3.711975
Port Beacon	28 18 57.157	1759.5	223 35 43.5	43 36 31.0	Long	3956.7	3.597330
1911	96 37 18.068	492.2	283 06 05.6	103 07 59.0	Contee	6687.3	3.825250
			8 19 43.1	188 19 27.6	Greek	6156.7	3.789350
			86 32 04.2	266 30 31.9	Nest	5312.1	3.725266
Steamboat Pass	28 18 46.833	1441.7	231 41 55.6	51 44 45.3	Espiritu Santo	12417.1	4.094020
1857	96 37 04.289	116.8	297 51 28.8	117 53 38.0	Rahal	8401.6	3.924360
			25 05 29.0	205 03 41.4	Panther Point	14619.2	4.164925
Northerly gable, Espiritu Santo	28 18 31.113	957.8	218 21 54.5	38 22 45.0	Long	4677.2	3.669989
1911	96 37 24.480	667.0	7 43 07.9	187 42 55.4	Greek	5338.5	3.727416
			95 21 13.8	275 19 44.5	Nest	5150.2	3.711820
Windmill E1	28 15 03.440	105.9	109 02 42.8	289 01 47.3	Greek	3380.6	3.528995
1911	96 35 53.550	1459.8	132 06 45.2	312 04 33.0	Nest	10251.7	4.010797
			216 33 34.1	36 34 47.3	Contee	7068.4	3.849324
Windmill E2	28 15 04.260	131.1	108 47 57.1	288 47 02.1	Greek	3345.0	3.524393
1911	96 35 54.614	1488.5	132 07 00.1	312 04 48.4	Nest	10213.3	4.009165
			216 52 12.2	36 53 25.9	Contee	7065.6	3.849147
Windmill E3	28 12 35.970	1107.3	99 48 19.9	279 45 03.0	False	11511.8	4.061145
1911	96 40 20.771	566.4	140 12 03.8	320 10 16.9	Heron	9612.4	3.982833
			178 22 10.6	358 22 05.0	Nest	11416.5	4.057532
			215 55 19.6	35 56 30.6	Greek	6968.3	3.843125
Windmill E4	28 11 52.914	1628.8	109 10 29.0	289 07 45.2	False	9999.1	2.999962
1911	96 41 30.428	829.9	153 57 56.6	333 56 42.7	Heron	9693.3	3.986470
			187 02 23.4	7 02 50.9	Nest	12834.1	4.108364
			220 39 51.0	40 41 35.1	Greek	9187.6	3.963202
Windmill E5	28 11 26.068	802.4	115 59 18.7	295 56 52.4	False	9379.1	3.972160
1911	96 42 07.608	207.5	161 13 37.5	341 12 41.2	Heron	10071.5	4.003096
			178 30 01.2	358 29 59.9	Pan	2832.3	3.452143
			221 55 16.5	41 57 18.0	Greek	10477.7	4.020267
Windmill H9	28 23 11.155	343.4	307 21 44.5	127 23 37.6	Long	8159.6	3.911669
1911	96 39 36.022	980.7	10 44 18.9	190 43 52.0	Nest	8286.3	3.918359
			47 00 21.1	226 58 59.1	Mosquito Point 2	6426.1	3.807946
Windmill H10	28 23 37.176	1144.4	312 46 43.5	132 48 31.9	Long	8070.9	3.927929
1911	96 39 26.171	712.4	11 27 25.6	191 26 54.0	Nest	9124.0	3.960183
			43 47 21.4	223 45 54.7	Mosquito Point 2	7179.8	3.856111
Windmill H11	28 24 59.749	1839.3	300 30 32.0	120 31 49.1	Espiritu Santo 2	5122.4	3.709472
1911	96 32 26.416	719.0	330 04 41.5	150 05 19.6	Espiritu Santo Eccentric	4368.3	3.640316
			6 26 58.6	186 26 33.7	Contee	10135.8	4.005857
Northerly gable, San Antonio Bay [1]	28 17 49.61	1527.2	287 33 21	107 35 25	Heron	7522.6	3.876370
1911	96 48 29.71	809.6	335 35 42	155 36 00	Dagger	2540.2	3.404860
Beacon No. 1, San Antonio Bay	28 21 14.125	434.8	48 19 32.5	228 18 17.7	Webb	5741.5	3.759023
1911	96 44 46.024	1253.3	97 19 49.2	277 18 30.9	Sharp	4522.9	3.655420
			178 15 10.1	358 15 06.3	Terry	6953.4	3.842197
			222 00 14.0	42 01 14.2	Swan	5154.0	3.712143
			281 46 09.3	101 47 14.5	Mosquito Point 2	3823.2	3.582427
Beacon No. 2, San Antonio Bay	28 22 05.409	166.5	36 57 33.2	216 56 22.4	Webb	6753.2	3.829512
1911	96 44 54.398	1471.2	76 45 40.2	256 44 25.9	Sharp	4374.2	3.640894
			180 10 12.0	0 10 12.2	Terry	5371.5	3.730094
			238 31 20.0	58 32 24.2	Swan	4311.4	3.634619
			300 42 27.3	120 43 36.5	Mosquito Point 2	4618.5	3.664500

[1] No check on this position.

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Beacon No. 3, San Antonio Bay 1911	28 22 57.144	1759.1	28 43 26.4	208 42 19.7	Webb	7969.6	3.901438
	96 45 02.850	77.6	57 12 48.3	237 11 38.1	Sharp	4791.0	3.680425
			183 43 26.1	3 43 30.4	Terry	3786.9	3.578282
			260 25 44.9	80 26 53.1	Swan	3962.2	3.597934
			313 14 33.3	133 15 46.6	Mosquito Point 2	5767.1	3.760956
Beacon No. 4, San Antonio Bay 1911	28 23 48.534	1494.1	22 47 03.1	202 46 00.4	Webb	9296.4	3.968314
	96 45 11.292	307.4	42 16 54.5	222 15 48.2	Sharp	5645.0	3.751666
			192 13 07.4	12 13 15.7	Terry	2247.8	3.351761
			282 34 45.9	102 35 58.2	Swan	4238.6	3.627224
			321 18 38.1	141 19 55.5	Mosquito Point 2	7088.5	3.850553
Beacon No. 5, San Antonio Bay 1911	28 24 40.879	1258.4	18 17 24.8	198 16 26.3	Webb	10724.1	4.030362
	96 45 19.900	541.7	31 37 10.3	211 36 08.1	Sharp	6796.9	3.832311
			144 37 49.0	324 37 26.4	Oil	2229.8	3.348262
			172 12 17.3	352 12 08.6	Range Beacon	3646.3	3.561850
			230 29 15.2	50 29 27.6	Terry	920.3	2.963939
			300 06 13.6	120 07 30.1	Swan	5052.8	3.703534
Beacon No. 6, San Antonio Bay 1911	28 25 34.820	1071.9	318 28 17.6	138 28 34.3	Terry	1435.9	3.157127
	96 45 28.790	783.6	24 01 57.0	204 00 59.1	Sharp	8155.4	3.911447
			98 33 02.7	278 32 44.4	Oil	1060.5	3.025529
			172 37 32.6	352 37 28.2	Range Beacon	1968.3	3.294098
Beacon No. 7, San Antonio Bay 1911	28 26 13.807	425.0	227 00 02.6	47 00 16.7	Range Beacon	1102.5	3.042376
	96 46 07.707	209.7	318 31 18.1	138 31 53.3	Terry	3036.6	3.482382
			359 25 49.4	179 25 49.6	Oil	1042.6	3.018116
Beacon No. 8, San Antonio Bay 1911	28 20 51.696	1591.4	282 12 07.7	102 12 41.2	Range Beacon	1960.5	3.292356
	96 45 48.495	1319.5	317 47 23.7	137 48 18.3	Terry	4645.9	3.667070
			333 06 18.9	153 06 38.5	Oil	2476.8	3.393884
Railroad water tank 1911	28 24 54.098	1665.4	357 18 42.1	177 18 48.3	Mosquito Point 2	7560.3	3.878539
	96 42 41.618	1132.7	358 47 30.6	178 47 31.7	Swan	2942.8	3.468762
			35 56 54.3	215 54 40.5	Webb	13078.1	4.116545
			51 48 54.0	231 46 36.6	Sharp	10017.3	4.000751
			70 09 22.4	250 06 06.3	Austin	11941.6	4.077061
Windmill, Sharp's 1911	28 21 04.873	150.0	175 53 31.8	355 53 23.6	Nipper	6505.1	3.813255
	96 47 41.384	1127.0	195 25 21.1	15 25 45.8	Marsh	5316.9	3.725658
			243 24 14.2	63 26 37.7	Swan	9196.2	3.963607
Windmill H8 1911	28 24 55.511	1708.9	323 44 00.7	143 44 39.0	Swan	3702.8	3.568527
	96 43 59.794	1627.4	42 38 45.9	222 37 05.6	Sharp	8479.9	3.928393
			95 15 12.2	275 14 46.5	Terry	1476.5	3.169225
Windmill H6 1911	28 26 43.194	1329.7	343 24 09.3	163 24 25.9	Terry	3318.0	3.520880
	96 45 28.636	779.2	28 24 13.2	208 23 54.8	Oil	2213.6	3.345102
			59 15 22.6	239 15 18.1	Range Beacon	298.9	2.475458
Windmill H7 1911	28 25 49.359	1519.5	12 37 35.7	192 37 29.7	Terry	1560.3	3.193208
	96 44 41.281	1123.4	30 18 25.0	210 17 04.4	Sharp	9145.5	3.961207
			134 14 01.5	314 13 34.4	Range Beacon	2156.8	3.333818
Windmill, Austin 1911	28 22 32.768	1008.7	138 23 20.6	318 22 39.9	Crescent	3503.6	3.544509
	96 49 22.250	605.8	175 05 57.1	355 05 48.5	Duck	5753.3	3.759914
			211 04 19.7	31 04 59.5	Nipper	4416.0	3.645089
			239 48 24.4	59 49 37.1	Marsh	4812.7	3.682385
			301 16 21.7	121 17 14.7	Sharp	3552.5	3.550535
Windmill, Red 1911	28 25 47.910	1474.9	327 12 45.8	147 13 10.8	Nipper	2646.0	3.422586
	96 48 51.145	1391.8	11 34 53.0	191 34 32.5	Austin	5834.2	3.765985
			43 07 48.8	223 06 53.3	Crescent	4641.7	3.666675
Windmill, Crescent 1911	28 23 32.889	1012.5	209 19 18.9	29 19 57.0	Duck	4452.0	3.648558
	96 51 00.423	11.5	248 40 33.7	68 42 00.2	Nipper	5315.6	3.725550
			204 13 40.7	24 13 46.7	Crescent	842.8	2.925700
Windmill H2 1911	28 22 50.966	1568.9	214 42 06.1	34 43 08.7	Duck	6291.7	3.798765
	96 51 51.925	1413.7	243 05 38.0	63 07 29.0	Nipper	7124.8	3.852772
			220 19 28.2	40 19 58.7	Crescent	2701.0	3.431519
Windmill H3 1911	28 24 24.731	761.3	243 23 33.7	63 24 53.5	Duck	5105.1	3.708007
	96 52 28.032	763.0	267 21 34.5	87 23 42.7	Nipper	7344.1	3.865940
			286 50 59.4	106 51 47.1	Crescent	2853.2	3.455335
Windmill H4 1911	28 26 25.789	793.9	294 52 26.3	114 53 20.7	Duck	3425.1	3.534667
	96 51 34.489	938.5	299 57 46.6	119 59 29.4	Nipper	6785.8	3.831604
			334 32 27.5	154 33 24.8	Austin	7621.2	3.882024
			344 22 49.0	164 23 11.3	Crescent	4728.6	3.674729
Windmill H5 1911	28 26 51.579	1587.8	302 16 30.6	122 17 32.5	Duck	4184.5	3.621645
	96 51 50.313	1368.9	303 32 29.5	123 34 19.8	Nipper	7570.2	3.879106
			342 19 36.6	162 20 06.4	Crescent	5612.7	3.749172
Beacon No. 15, Mesquite Bay[1] 1911	28 11 59.26	1824.2	60 35 38	240 34 15	Ayres	5496.4	3.740081
	96 47 44.64	1217.5	193 49 04	13 49 17	False	3177.1	3.502033
Beacon No. 10, Mesquite Bay 1911	28 11 28.080	864 4	291 00 23.2	111 07 37.1	Snake	4574.6	3.660356
	96 48 24.105	657.4	64 53 32.0	244 52 27.7	Ayres	4099.1	3.612693
			204 23 53.2	24 24 25.0	False	4441.7	3.647550

[1] No check on this position.

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Beacon No. 17, Mesquite Bay 1911	28 10 45.208	1391.6	11 02 15.4	191 01 44.1	Cedar	9474.0	3.976532
	96 48 55.188	1505.4	62 43 51.4	242 41 55.6	Gaston	7533.0	3.876969
			81 39 33.6	261 38 44.0	Ayres	2894.5	3.461580
			206 33 47.2	26 34 33.7	False	5998.1	3.778011
			273 39 38.2	93 41 06.8	Snake	5126.1	3.709785
Beacon No. 18, Mesquite Bay 1911	28 09 58.056	1787.1	314 18 48.0	134 19 41.9	Bray	4357.4	3.639227
	96 50 01.167	31.8	0 05 31.6	180 05 31.4	Cedar	7847.4	3.894724
			67 46 13.1	247 44 48.5	Gaston	5288.6	3.723341
			134 06 16.1	314 05 57.7	Ayres	1481.8	3.170802
Beacon No. 19, Mesquite Bay 1911	28 09 37.421	1151.9	195 15 15.4	15 15 23.2	Ayres	1727.3	3.237379
	96 50 56.835	1550.5	297 26 46.3	117 28 06.5	Bray	5225.0	3.718087
			348 11 49.5	168 12 15.6	Cedar	7367.8	3.867339
			67 58 21.9	247 57 23.5	Gaston	3642.5	3.561396
Beacon No. 21, Mesquite Bay 1911	28 09 02.931	90.2	229 59 16.4	50 00 12.6	Ayres	4243.9	3.627763
	96 52 39.330	1073.2	280 15 25.4	100 17 33.9	Bray	7554.5	3.878208
			325 00 21.9	145 01 36.3	Cedar	7506.8	3.875456
			62 16 03.1	242 15 53.1	Gaston	655.2	2.816369
Beacon No. 22, Mesquite Bay 1911	28 08 41.548	1279.0	212 35 13.0	32 35 16.9	Gaston	419.3	2.622556
	96 53 08.861	241.8	274 45 44.5	94 48 06.9	Bray	8268.2	3.917412
			317 03 07.6	137 04 35.9	Cedar	7501.9	3.875169
			62 01 51.1	242 00 33.8	Dun	5068.2	3.704856
Beacon No. 23, Mesquite Bay 1911	28 08 11.341	349.1	210 45 49.3	30 46 02.5	Gaston	1493.3	3.174159
	96 53 28.578	779.9	226 46 43.5	46 48 02.9	Ayres	6304.0	3.799619
			308 54 54.4	128 56 32.0	Cedar	7260.9	3.860989
			69 49 16.1	249 48 08.1	Dun	4195.7	3.622801
Beacon No. 24, Mesquite Bay 1911	28 07 35.252	1085.2	210 34 33.1	30 34 57.5	Gaston	2780.8	3.444174
	96 53 52.426	1430.8	224 00 46.1	44 02 16.8	Ayres	7547.8	3.877823
			298 42 09.6	118 43 58.3	Cedar	7183.2	3.856317
			84 09 13.3	264 08 16.5	Dun	3304.5	3.519102
Front Range 1[1] 1911	28 11 18.47	568.6	66 37 45	246 36 47	Ayres	3639.6	3.561058
	96 48 37.70	1028.3	206 55 59	26 56 37	False	4868.9	3.687431
Rear Range A 1911	28 10 03.203	98.6	319 25 41.1	139 26 28.6	Bray	4216.1	3.624914
	96 49 47.401	1293.1	2 46 39.8	182 46 33.2	Cedar	8015.2	3.903915
			67 43 33.1	247 42 02.0	Gaston	5696.2	3.755585
			121 13 49.9	301 13 25.0	Ayres	1683.6	3.226232
Front Range A 1911	28 09 59.925	1844.7	316 02 20.7	136 03 12.5	Bray	4308.8	3.634360
	96 49 56.522	1542.0	1 00 38.4	181 00 36.1	Cedar	7906.1	3.897963
			67 42 53.6	247 41 26.8	Gaston	5427.7	3.734616
			129 16 28.6	309 16 08.0	Ayres	1538.3	3.187036
Front Range 3 1911	28 10 05.744	176 8	317 01 49.5	137 02 42.4	Bray	4483.5	3.651621
	96 49 68.902	1606.9	65 42 30.8	245 41 05.1	Gaston	5438.9	3.735508
			125 12 54.0	305 12 34.5	Ayres	1378.1	3.139268
Rear Range 3[1] 1911	28 10 03.47	106.8	65 57 40	245 56 16	Gaston	5320.9	3.725987
	96 50 02.49	67.9	130 03 56	310 03 38	Ayres	1343.3	3.128157
Chimney on house 1911	28 07 49.674	1529.2	102 31 58.0	282 29 26.2	Gaston	9001.9	3.954332
	96 47 38.536	1051.7	135 10 08.7	315 08 43.0	Ayres	7028.1	3.846835
			139 31 47.0	319 31 33.6	Bray	1193.0	3.076639
Windmill M4 1911	28 07 02.943	90.6	57 28 16.2	237 27 09.8	Cedar	4568.0	3.659724
	96 47 40.550	1106.7	111 13 37.8	291 11 06.9	Gaston	9368.0	3.971646
			142 39 34.1	322 38 09.3	Ayres	8078.4	3.907326
Windmill M5 1911	28 07 36.735	1130.8	103 37 13.3	283 34 25.6	Gaston	9989.4	3.999541
	96 47 04.777	130.4	127 36 15.0	307 35 45.7	Bray	2140.2	3.330452
			132 29 36.0	312 27 54.4	Ayres	7968.8	3.901392
Windmill M6 1911	28 07 47.943	1475.8	102 55 13.3	282 52 42.2	Gaston	8974.4	3.953005
	96 47 40.008	1091.8	135 42 24.0	315 40 59.0	Ayres	7037.8	3.847440
			142 37 03.9	322 36 51.3	Bray	1209.2	3.082507
Front Range Beacon G 1911	28 08 51.240	1577.3	231 41 13.1	51 42 20.7	Ayres	4982.1	3.697411
	96 53 03.477	94.9	276 56 19.7	96 58 39.6	Bray	8152.4	3.911288
			319 23 18.3	139 24 44.1	Cedar	7626.5	3.882323
			235 08 34.7	55 08 36.1	Gaston	96.2	1.983143
			59 56 37.5	239 55 17.7	Dun	5341.4	3.727659
Rear Range Beacon G 1911	28 08 54.988	1692.7	232 15 51.4	52 16 57.8	Ayres	4858.1	3.686468
	96 53 01.016	27.7	277 48 24.0	97 50 42.8	Bray	8100.7	3.908521
			320 19 49.3	140 21 14.0	Cedar	7671.4	3.884875
			348 56 45.9	168 56 46.1	Gaston	61.55	1.789244
			59 14 54.8	239 13 33.9	Dun	5457.8	3.737014
Carlos Beacon 1911	28 07 18.888	681.4	99 12 11.1	279 09 42.0	Ballou House	8742.1	3.941615
	96 54 15.773	430.4	93 36 19.4	273 35 33.6	Dun	2655.3	3.424121
			215 17 45.7	35 18 21.1	Gaston	3550.7	3.550313
Rear Range Beacon D 1911	28 06 45.804	1410.0	108 38 42.4	288 36 38.7	Ballou House	7555.7	3.878273
	96 55 09.657	263.6	135 08 12.8	315 07 52.4	Dun	1672.1	3.223251
			221 57 40.8	41 58 41.6	Gaston	5267.3	3.721588

[1] No check on this position.

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station.	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Front Range Beacon D 1911	28 06 49.038 96 55 04.480	1509.5 122.3	107 36 08.0 129 25 07.5 221 31 45.5	287 34 01.9 309 24 44.7 41 32 43.9	Ballou House Dun Gaston	7659.0 1709.7 5099.0	3.884171 3.232914 3.707481
Windmill M1 1911	28 04 54.162 96 51 02.704	1667.2 73.8	73 07 24.6 120 16 54.0 183 23 11.0 217 14 17.0 227 53 00.2	253 05 47.3 300 14 37.3 3 23 21.5 37 15 39.8 47 53 29.0	Joe Dun Ayres Bray Cedar	5898.3 9170.6 10404.0 7927.3 2247.6	3.770727 3.962399 4.017202 3.899126 3.351727
Windmill M2 1911	28 04 52.722 96 51 01.988	1622.9 54.3	73 35 25.7 120 27 31.3 183 15 54.4 216 53 57.6 226 43 08.2	253 33 48.1 300 25 14.2 3 16 04.5 36 57 20.0 46 43 36.6	Joe Dun Ayres Bray Cedar	5904.3 9209.9 10447.2 7950.9 2263.4	3.771170 3.964256 4.019000 3.900416 3.354752
Windmill M3 1911	28 04 51.368 96 51 01.839	1581.2 50.2	73 59 23.8 183 13 48.0 216 43 46.7 225 53 23.9	253 57 46.1 3 13 58.1 36 45 09.1 45 53 52.3	Joe Ayres Bray Cedar	5896.6 10488.6 7981.8 2289.2	3.770602 4.020716 3.902102 3.359682
Oil Well 1911	28 03 27.853 96 51 47.532	857.4 1298.0	61 58 35.4 102 03 17.1 137 23 40.6	241 56 00.9 282 02 01.0 317 31 45.1	Car Joe Dun	10177.8 4519.8 9891.3	4.007654 3.655121 3.995255
Beacon No. 25, Aransas Bay 1911	28 06 55.187 96 54 52.023	1699.0 1419.9	105 33 26.0 118 21 28.0 219 58 07.1	285 31 14.0 298 20 59.3 39 58 59.6	Ballou House Dun Gaston	7930.9 1887.2 4733.6	3.899322 3.275825 3.675189
Beacon No. 26, Aransas Bay 1911	28 06 31.884 96 55 04.162	981.5 113.6	140 30 56.3 280 16 50.0 111 15 45.0	320 30 33.4 100 19 12.5 291 13 38.7	Dun Cedar Ballou House	2090.8 8393.7 7842.9	3.320308 3.923951 3.894479
Beacon No. 27, Aransas Bay 1911	28 06 05.667 96 55 18.348	174.4 500.9	117 48 33.5 158 43 50.0 216 06 49.2 341 08 58.5	297 46 33.9 338 43 33.7 36 07 54.1 161 09 21.5	Ballou House Dun Gaston Joe	7825.8 2597.6 6377.8 4136.5	3.893527 3.414566 3.804672 3.616637
Beacon No. 28, Aransas Bay 1911	28 05 57.936 96 55 35.417	1783.4 966.8	169 50 22.8 218 05 14.2 333 52 55.8	349 50 14.6 38 06 27.2 153 53 26.9	Dun Gaston Joe	2701.0 6848.8 4094.7	3.431517 3.835612 3.612226
Beacon No. 29, Aransas Bay 1911	28 05 29.222 96 56 46.311	899.5 1264.3	163 32 31.6 202 22 34.6 306 45 22.9	316 31 13.6 22 22 59.8 126 46 27.4	Ballou House Dun Joe	6573.6 3831.0 4666.2	3.817805 3.583313 3.668960
Beacon No. 30, Aransas Bay 1911	28 04 46.756 96 57 47.991	1439.3 1310.3	89 42 45.6 154 58 11.0 212 56 02.8 285 18 33.6 353 10 39.7 49 22 35.4	269 40 40.7 334 57 22.0 32 56 57.0 105 20 07.0 173 10 54.5 229 20 50.0	Oak Ballou House Dun Joe Car Mile	7243.6 6708.4 5778.8 5622.2 7265.5 8069.4	3.859952 3.826618 3.761835 3.749909 3.861263 3.906842
Beacon No. 31, Aransas Bay 1911	28 04 41.576 96 57 54.364	1279.8 1484.3	90 59 50.0 156 52 15.5 213 29 57.6 283 19 06.6 351 38 09.8 49 25 55.7	270 57 48.1 336 51 29.5 33 30 54.8 103 20 43.0 171 38 27.6 229 24 13.3	Oak Ballou House Dun Joe Car Mile	7070.5 6783.0 6007.5 5751.4 7130.4 7833.5	3.849450 3.831422 3.778693 3.759776 3.853113 3.893956
Beacon No. 32, Aransas Bay 1911	28 01 24.896 97 01 14.614	766.3 399.2	153 21 15.3 165 27 24.5 344 56 29.4 52 17 09.6	333 21 07.0 345 26 56.9 164 57 07.4 232 15 57.4	Mile Oak Mud Rock	1072.1 6379.7 8525.6 5305.8	3.030231 3.804799 3.930724 3.724749
Fulton Mansion, staff on cupola 1911	28 03 26.034 97 02 05.571	801.4 152.1	175 04 37.1 206 04 35.1 341 47 45.8	355 04 33.5 26 05 47.4 161 48 03.7	Oak Ballou House Mllo	2455.3 9534.0 2916.6	3.390106 3.979275 3.464877
Third windmill [1] 1911	27 59 32.64 96 56 13.29	1004.7 363.1	90 59 34 144 55 18	270 56 01 324 54 49	Rock Car	12432.7 3000.1	4.094565 3.477129
Second windmill 1911	27 58 43.050 96 57 31.131	1325.1 850.8	50 08 52.5 99 35 05.1 132 03 36.8 185 46 18.6	230 07 45.7 279 32 08.2 312 01 43.7 5 46 25.5	Mud Rock Mile Car	5072.5 10449.7 8869.7 4001.8	3.705218 4.019105 3.947911 3.602259
First windmill 1911	27 57 22.448 96 58 44.502	691.0 1216.4	67 49 12.2 116 57 00.0 151 27 22.8	247 48 39.8 296 54 37.5 331 26 04.1	Mud Rock Mllo	2039.4 9310.1 9587.4	3.309497 3.968953 3.981699
Windmill 1911	27 55 56.275 96 59 49.422	1732.2 1351.2	136 28 43.9 165 46 21.5 176 32 27.2	316 26 51.9 345 45 33.3 356 32 25.3	Rock Mile Mud	9475.6 11424.5 1886.0	3.976605 4.057837 3.275534
Windmill, W. & A 1911	27 56 52.400 96 58 56.519	1613.0 1545.0	95 40 28.4 122 50 16.0 155 32 03.6	275 40 01.6 302 47 59.1 335 30 50.5	Mud Rock Mlle	1567.6 9486.5 10269.0	3.195247 3.977107 4.011527
Windmill, Mud 1911	27 56 36.166 96 59 16.279	1113.2 445.1	122 41 53.9 127 12 58.4 159 20 18.2	302 41 36.4 307 10 50.8 339 19 14.4	Mud Rock Mllo	1211.8 9330.9 10523.3	3.083446 3.969922 4.022150

[1] No check on this position.

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
School cupola 1911	28 01 41.921	1290.4	261 04 35.2	81 06 22.8	Mile	2800.9	3.447302
	97 03 13.515	369.1	278 51 29.0	98 54 16.7	Car	9874.0	3.994494
			328 01 40.8	148 03 14.7	Mud	10321.6	4.013745
			14 07 03.6	194 06 47.3	Rock	3887.8	3.589708
			196 13 27.3	16 13 55.5	Oak	5885.6	3.769790
Rockport court house, spire 1911	28 01 32.078	987.4	254 40 18.6	74 41 04.9	Mile	2789.6	3.445549
	97 03 10.711	292.6	277 10 09.5	97 12 55.9	Car	9755.9	3.989268
			327 28 58.3	147 30 30.9	Mud	10024.4	4.001058
			16 28 01.7	196 27 44.1	Rock	3615.7	3.558197
			194 45 07.7	14 45 34.6	Oak	6157.1	3.789378
Red spire 1911	28 01 09.388	289.0	273 01 36.4	93 04 24.9	Car	9830.1	3.992556
	97 03 15.714	429.3	324 31 41.8	144 33 16.6	Mud	9521.6	3.978711
			17 47 05.5	197 46 50.2	Rock	2908.0	3.463595
National Bank, cupola 1911	28 01 14.517	446.9	274 05 52.6	94 08 35.1	Car	9476.0	3.976626
	97 03 02.371	64.8	326 53 12.0	146 54 40.6	Mud	9446.7	3.975278
			242 34 24.7	62 35 07.1	Mile	2774.5	3.443180
Weather Bureau, signal tower 1911	28 01 13.052	401.8	273 49 33.5	93 52 16.0	Car	9473.0	3.976487
	97 03 02.374	648.6	326 44 11.0	146 45 39.4	Mud	9409.0	3.973542
			241 45 15.4	61 45 57.7	Mile	2795.6	3.446472
Pavilion flagstaff 1911	28 01 12.964	399.1	273 51 47.3	93 54 27.6	Car	9343.2	3.970496
	97 02 57.619	1574.1	327 23 40.2	147 25 06.6	Mud	9336.0	3.970163
			240 23 27.2	60 24 07.3	Mile	2683.2	3.428651
Hotel cupola 1911	28 00 51.023	1570.6	233 47 28.2	53 48 15.2	Mile	3387.7	3.529902
	97 03 12.285	335.6	269 43 39.1	89 46 26.2	Car	9722.7	3.987788
			322 55 39.0	142 57 12.3	Mud	9010.3	3.954741
Lamar Church, cross 1911	28 08 07.064	217.4	34 50 17.1	214 49 02.6	Oak	7558.5	3.878433
	96 59 35.144	959.1	123 31 53.9	303 29 51.1	Rat	8518.6	3.930367
			315 42 19.7	135 42 21.1	Ballou House	122.9	2.089590
Windmill C 1911	28 14 01.616	49.7	6 34 12.1	186 34 03.9	End	4124.1	3.615327
	97 01 06.258	170.6	10 17 02.9	190 16 21.2	Decker	13486.8	4.129909
			36 37 21.1	216 36 01.2	Rat	7737.1	3.888579
Windmill C1 1911	28 11 50.111	1542.6	35 43 34.6	215 41 40.1	Decker	11357.8	4.055295
	96 58 31.494	858.9	76 16 11.7	256 13 38.7	Rat	9097.1	3.958905
			89 24 50.8	269 23 29.5	End	4693.1	3.671456
Windmill C2 1911	28 11 48.922	1506.0	35 38 01.4	215 36 07.6	Decker	11299.6	4.053064
	96 58 33.282	907.7	76 25 17.9	256 22 45.7	Rat	9041.1	3.956222
			89 51 33.1	269 50 12.6	End	4644.1	3.666898
Windmill C3 1911	28 11 40.436	1244.7	32 04 32.8	212 02 56.2	Decker	10530.7	4.022457
	96 59 09.588	261.5	76 34 11.6	256 31 56.6	Rat	8017.3	3.904027
			93 54 21.5	273 53 18.2	End	3662.4	3.563760
East chimney, Copano ruins 1911	28 08 45.379	1396.9	240 02 40.7	60 04 26.4	Rat	7060.8	3.848856
	97 07 39.725	1083.9	340 20 42.1	160 21 29.0	Hans	8074.0	3.907088
			0 44 42.9	180 44 40.7	Port	9632.1	3.983722
			24 46 05.8	204 46 05.0	Cop	112.3	2.050247
Windmill, Mission 1911	28 10 51.089	1572.7	330 50 31.0	150 52 21.5	Hans	13136.5	4.118479
	97 09 54.676	1491.4	345 13 39.8	165 14 41.2	Port	13961.9	4.144946
			356 48 09.8	176 48 15.6	Miss	6007.9	3.778722
			4 54 30.1	184 54 10.0	Star	13624.7	4.134328
Northerly gable, Copano Bay 1911	28 03 25.847	795.6	91 16 17.3	271 14 34.6	Star	5962.0	3.775391
	97 06 59.098	1613.9	99 24 52.5	279 24 31.2	Port	1251.6	3.097466
			110 27 29.4	290 24 44.5	Mary	10210.1	4.009029
			149 57 50.8	329 56 34.0	Miss	8903.6	3.949564
Bayside Hotel, center of lookout 1911	28 05 31.729	976.7	234 48 18.4	54 50 42.0	Cop	10170.7	4.007351
	97 12 46.047	1257.1	278 24 29.6	98 27 40.7	Hans	11199.8	4.049212
			293 59 35.1	114 01 57.2	Port	9019.2	3.955167
			316 48 39.4	136 49 40.0	Star	5134.6	3.710505
			16 53 23.0	196 53 21.4	Mary	324.1	2.510666
Windmill P [1] 1911	28 00 25.92	797.9	190 36 30	10 36 48	Star	5768.0	3.761025
	97 11 16.25	444.0	225 12 48	45 14 28	Port	8154.6	3.911400
Windmill P1 1911	28 02 41.962	1291.7	188 13 07.1	8 13 19.4	Mary	4966.7	3.696071
	97 13 15.503	423.4	212 41 58.7	32 43 39.2	Miss	10765.5	4.032036
			251 03 13.9	71 04 28.3	Star	4565.9	3.659527
			260 13 12.2	80 15 48.0	Port	9177.6	3.962730
Windmill P3 1911	28 02 51.739	1592.6	185 45 58.9	5 46 06.9	Mary	4638.2	3.666353
	97 13 06.566	179.3	212 27 52.2	32 29 28.4	Miss	10380.5	4.016220
			253 49 48.8	73 50 59.0	Star	4242.3	3.627602
			261 51 56.8	81 54 28.4	Port	8889.6	3.948883
Windmill P2 1911	28 02 42.004	1293.0	188 23 04.3	8 23 16.8	Mary	4967.6	3.696143
	97 13 16.028	437.7	212 46 02.9	32 47 43.5	Miss	10772.3	4.032307
			251 07 37.6	71 08 52.2	Star	4579.1	3.660777
			260 14 34.9	80 17 10.8	Port	9191.6	3.963389

[1] No check on this position.

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Island house chimney 1911	27 59 14.644	450.8	199 55 29.0	19 55 33.7	Rock	811.6	2.909333
	97 03 58.342	1594.3	218 46 41.3	38 47 49.9	Mile	6373.0	3.804346
			302 15 05.6	122 17 00.4	Mud	7911.3	3.898248
Easterly gable [1] 1911	27 58 29.67	913.3	194 41 27	14 41 37	Rock	2219.8	3.346321
	97 04 08.82	241.0	292 07 47	112 09 46	Mud	7532.1	3.876914
Murrays Shoal beacon [1] 1911	27 54 03.77	116.0	169 12 23	349 11 49	Rock	10518.5	4.021956
	97 02 36.13	988.2	219 43 45	39 45 01	Mud	6951.8	3.842100
Beacon "A," Aransas Bay 1912	27 53 13.998	430.9	299 43 57.7	119 44 02.9	Blind	347.4	2.540819
	97 02 06.326	173.0	38 58 12.5	218 57 36.7	Aransas Lighthouse	3333.6	3.522916
			86 28 49.5	266 28 24.4	Ridge	1470.9	3.167592
Beacon "C," Aransas Bay 1912	27 53 47.868	1473.5	333 15 15.5	153 15 26.0	Blind	1360.4	3.133666
	97 02 17.681	483.6	26 10 09.1	206 09 38.6	Aransas Lighthouse	4049.5	3.607403
			45 37 02.4	225 36 42.6	Ridge	1619.7	3.209440
Center chimney [1] 1911	27 54 36.13	1112.2	179 11 09	359 11 07	Rock	9337.1	3.970214
	97 03 43.36	1185.7	235 17 19	55 19 06	Mud	7641.2	3.883161
Southerly chimney [1] 1911	27 54 34.90	1074.3	178 57 52	358 57 49	Rock	9375.4	3.971990
	97 03 42.02	1149.1	234 53 56	54 55 43	Mud	7632.6	3.882670
Northerly gable [1] 1911	27 54 34.16	1051.5	178 49 24	358 49 21	Rock	9398.9	3.973078
	97 03 41.16	1125.6	234 39 20	54 41 06	Mud	7626.6	3.882331
Tarpon Inn, flagstaff 1912	27 50 14.247	438.5	186 48 47.3	6 48 53.3	Aransas Lighthouse	2961.9	3.471572
	97 03 35.806	979.8	190 11 59.8	10 12 16.5	Ridge	5530.0	3.742727
			207 08 55.1	27 09 42.1	Blind	6024.8	3.779940
Weather Service, display tower 1912	27 50 16.258	500.4	185 56 02.4	5 56 07.5	Aransas Lighthouse	2894.6	3.461591
	97 03 33.901	927.7	189 46 36.2	9 46 52.0	Ridge	5460.0	3.737194
			206 58 26.3	26 59 12.4	Blind	5945.9	3.774219
Klines lookout 1912	27 50 34.326	1056.6	183 01 35.7	3 01 37.8	Aransas Lighthouse	2326.2	3.366644
	97 03 27.452	751.2	188 50 42.3	8 50 55.1	Ridge	4882.6	3.688652
			207 59 17.8	28 00 00.9	Blind	5371.1	3.730060
Ransom Point Beacon [1] 1912	27 51 20.16	620.7	244 52 38	64 54 43	Ridge	8045.5	3.905551
	97 07 26.32	720.2	262 11 05	82 12 59	Aransas Lighthouse	6720.2	3.827381
Hotel cupola [1] 1912	27 54 04.82	148.4	279 48 19	99 51 03	Ridge	9694.8	3.986538
	97 08 49.27	1347.5	294 56 57	114 59 30	Aransas Lighthouse	9845.8	3.993252
Ice factory smokestack [1] 1912	27 53 54.79	1686.4	278 09 50	98 12 30	Ridge	9452.4	3.975541
	97 08 42.09	1151.0	293 45 57	113 48 26	Aransas Lighthouse	9539.4	3.979519
Windmill A 1912	27 41 42.613	1311.7	268 12 56.5	88 15 10.6	Mustang	7912.1	3.898293
	97 15 39.555	1083.8	281 19 24.7	101 19 41.8	Demit	1027.5	3.011770
			21 37 14.6	201 36 55.6	Laguna Madre north base	3047.7	3.483968
Welburn's house 1912	27 41 38.327	1179.7	229 07 03.5	49 09 26.2	Shamrock	11126.2	4.046347
	97 15 25.115	688.2	267 07 09.8	87 09 17.2	Mustang	7522.1	3.876341
			29 20 42.5	209 20 16.8	Laguna Madre north base	3098.9	3.491211
Shed on wharf, northeast gable [1] 1912	27 41 22.42	690.1	235 55 36	55 55 46	Demit	749.5	2.874781
	97 15 25.44	697.1	34 19 08	214 18 42	Laguna Madre north base	2677.7	3.427755
Windmill D 1912	27 40 31.573	971.8	223 33 43.0	43 34 15.0	Demit	2739.4	3.437650
	97 16 11.683	320.2	307 23 16.0	127 25 17.1	Grants 2	9005.1	3.954487
			20 33 04.6	200 33 00.5	Laguna Madre north base	690.6	2.839216
House, red roof [1] 1912	27 39 26.89	827.7	320 16 32	140 18 35	Pass	11425.2	4.057865
	97 17 40.16	1100.8	351 41 43	171 41 58	Island	6182.1	3.791139
Windmill, near green-roofed house [1] 1912	27 38 53.90	1659.0	1 42 16	181 42 13	Island	5104.1	3.707918
	97 17 02.06	56.5	19 36 59	199 36 43	Laguna Madre south base	2874.7	3.458595
Windmill, near barn [1] 1912	27 38 52.55	1617.5	318 32 26	138 34 21	Pass	10315.4	4.013488
	97 17 22.95	629.1	344 24 05	164 25 08	Sandhill	13901.7	4.143069
Mexican house [1] 1912	27 38 50.07	1541.2	0 35 39	180 35 38	Island	4984.3	3.697601
	97 17 05.71	156.5	18 28 05	198 27 50	Laguna Madre south base	2730.7	3.436270
Brighton Schoolhouse, east gable [1] 1912	27 38 38.45	1183.5	357 06 49	177 06 53	Island	4632.1	3.665782
	97 17 16.10	441.3	14 34 03	194 33 53	Laguna Madre south base	2306.5	3.362951
Windmill (McGloins Bluff) 1912	27 49 33.422	1028.8	327 21 01.4	147 22 21.5	Shamrock	8721.8	3.940606
	97 13 09.757	267.0	345 03 05.0	165 04 09.7	Mustang	14746.6	4.168691
			35 43 12.1	215 40 36.9	Oso	15645.2	4.194382

[1] No check on this position.

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters*	
Windmill at Barnes' house 1912	27 34 38.672	1190.3	235 03 25.8	55 04 32.4	Island	4809.7	3.682118
	97 19 31.369	860.4	269 31 21.1	89 34 15.8	Pass	10352.5	4.015046
			307 30 22.5	127 32 24.9	Sandhill	9154.5	3.961636
			357 36 36.2	177 36 37.4	Hardpan	1680.8	3.225515
Barnes' house, south gable 1912	27 34 37.759	1162.2	234 45 44.3	54 46 50.8	Island	4823.3	3.683348
	97 19 31.257	857.4	257 19 47.8	77 20 14.1	Puzzle	1598.3	3.203657
			357 40 32.7	177 40 33.8	Hardpan	1652.6	3.218157
Puzzle 1912	27 34 49.145	1512.7	224 23 09.5	44 23 49.7	Island	3403.2	3.531885
	97 18 34.405	943.7	315 58 39.8	136 00 15.9	Sandhill	8200.7	3.913852
Bay View College recitation hall, belfry 1905	27 52 11.976	368.6	99 52 40.0	279 46 47.0	Kaleta	20950.4	4.321192
	97 19 22.824	624.4	141 15 59.7	321 15 38.4	Portland	1987.6	3.298325
			295 40 44.5	115 43 34.5	McGloins Bluff	11053.8	4.043513
			323 44 18.0	143 48 16.6	Mustang	23713.1	4.374989
Bay View College dormitory, chimney 1905	27 52 10.736	330.5	99 59 01.6	279 53 08.2	Kaleta	20950.5	4.321194
	97 19 23.068	631.0	142 05 34.1	322 05 13.0	Portland	2013.4	3.303931
			295 29 08.7	115 31 58.9	McGloins Bluff	11043.4	4.043102
			347 16 55.9	167 18 21.0	Laguna Madre north base	22724.1	4.356486
Corpus Christi Lighthouse 1905	27 47 21.187	652.2	88 18 53.8	268 18 03.3	Corpus	2966.2	3.472202
	97 22 41.706	1141.7	201 46 48.5	21 48 00.1	Portland	11309.3	4.053434
			254 51 54.9	74 56 17.5	McGloins Bluff	15958.3	4.202988
Corpus Christi standpipe 1905	27 47 41.837	1298.0	23 51 04.9	203 50 59.5	Corpus	790.8	2.898041
	97 24 18.328	501.8	85 52 57.2	265 46 57.8	Rogers	21163.0	4.325578
			133 27 11.4	313 23 37.0	Kaleta	17299.7	4.238038
			214 43 32.1	34 45 28.9	Portland	12005.9	4.079394
			258 55 11.5	79 00 19.2	McGloins Bluff	18391.9	4.264627
			296 00 26.1	116 06 42.1	Mustang	24614.7	4.391195
			316 40 29.1	136 44 11.5	Laguna Madre north base	19084.5	4.280681
Corpus Christi colored church spire 1905	27 47 54.005	1662.4	85 04 23.9	264 58 10.0	Rogers	22036.5	4.343143
	97 23 47.404	1297.6	130 41 15.9	310 37 26.9	Kaleta	17677.3	4.247415
			259 35 42.2	79 40 35.5	McGloins Bluff	17490.4	4.242800
			297 41 57.3	117 47 58.9	Mustang	24028.6	4.380729
			319 20 24.7	139 23 52.7	Laguna Madre north base	18796.5	4.274076
Corpus Christi Catholic Church spire 1905	27 47 48.511	1493.1	85 29 20.7	265 23 08.6	Rogers	21915.5	4.340751
	97 23 51.330	1405.2	131 19 43.9	311 15 56.7	Kaleta	17707.1	4.248148
			212 16 09.5	32 17 53.7	Portland	11426.5	4.057915
			259 07 01.2	79 11 56.4	McGloins Bluff	17627.2	4.246184
			297 13 23.0	117 19 26.4	Mustang	24046.0	4.381042
			318 45 13.1	138 48 42.9	Laguna Madre north base	18739.2	4.272750
Corpus Christi King Memorial Episcopal Church spire 1905	27 47 47.277	1455.2	52 38 47.6	232 38 27.7	Corpus	1467.9	3.166693
	97 23 47.386	1297.2	211 42 33.4	31 44 15.6	Portland	11401.6	4.056965
			318 55 35.9	138 59 03.8	Laguna Madre north base	18639.5	4.270434
Windmill No. 1 1905	27 40 34.401	1058.9	257 27 48.0	77 30 47.1	Mustang	10817.0	4.034106
	97 17 16.302	446.8	295 38 16.4	115 38 42.3	Laguna Madre north base	1695.4	3.229284
			5 39 26.9	185 39 17.2	Laguna Madre south base	5829.7	3.765648
Alta Vista Hotel, south spire 1905	27 45 34.048	1048.0	95 48 43.2	275 41 58.8	Rogers	23886.4	4.378151
	97 22 41.344	1132.2	137 10 58.8	317 10 08.1	Corpus	4376.9	3.641171
			196 52 33.4	16 53 44.8	Portland	14420.8	4.158989
			289 25 30.9	109 31 01.4	Mustang	20639.8	4.314706
Corpus Christi, Dr. Spohn's house, cupola 1905	27 47 37.027	1139.7	63 31 41.4	243 31 21.7	Corpus	1290.2	3.110652
	97 23 47.822	1309.1	86 25 39.2	266 19 25.5	Rogers	21986.3	4.342152
			210 56 43.0	30 58 25.5	Portland	11677.3	4.067342
			257 55 42.9	78 00 36.3	McGloins Bluff	17603.5	4.245599
			318 15 12.5	138 18 40.6	Laguna Madre north base	18410.8	4.265072
Water tank near Laguna Madre north base 1905	27 40 12.629	388.8	134 24 57.9	314 21 10.4	Corpus	18733.8	4.272627
	97 16 21.226	581.7	196 03 13.1	16 04 38.0	McGloins Bluff	18053.1	4.256552
			251 33 49.1	71 36 22.6	Mustang	9539.7	3.979533
			324 43 38.5	144 44 50.7	Padre	7399.2	3.869183
			343 15 42.3	163 15 42.6	Laguna Madre north base	66.3	1.821734
			22 06 43.5	202 06 08.2	Laguna Madre south base	5538.4	3.743381
Epworth League pavilion, center 1905	27 49 33.235	1023.0	28 49 14.0	208 48 35.1	Corpus	4739.0	3.675685
	97 23 06.560	179.5	120 15 29.6	300 11 21.4	Kaleta	16811.5	4.225607
			217 08 30.0	37 09 53.3	Portland	8075.8	3.907186
			269 38 00.9	89 42 35.3	McGloins Bluff	16085.3	4.206430
Ritter's windmill 1905	27 39 13.336	410.5	210 09 57.3	30 10 14.6	Laguna Madre north base	2037.5	3.309101
	97 16 57.888	1586.7	308 36 45.8	128 38 15.2	Padre	6754.8	3.829610
			18 05 02.4	198 04 44.2	Laguna Madre south base	3477.9	3.541314

Espiritu Santo Bay to Aransas Pass and Corpus Christi Bay—Continued.

Station	Latitude and Longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
Supplementary points—Continued.	° ′ ″		° ′ ″	° ′ ″		*Meters.*	
Windmill No. 2 1905	27 41 33.146	1020.2	266 02 54.4	86 05 06.5	Mustang	7802.7	3.892243
	97 15 35.022	959.7	340 33 57.0	160 34 47.9	Padre	9034.2	3.955892
			23 46 18.4	203 45 21.7	Laguna Madre south base	8314.5	3.919837
			26 08 06.5	206 07 45.4	Laguna Madre north base	2831.3	3.451984
Shamrock Island barn, southwest gable 1905	27 45 47.685	1467.8	9 02 42.9	189 02 23.2	Mustang	7391.6	3.868736
	97 10 08.511	233.1	19 59 02.0	199 57 21.2	Padre	17401.1	4.240576
			44 30 25.9	224 27 32.9	Laguna Madre north base	14544.4	4.162695
Rosita ranch house, south chimney [1] 1905	27 52 27.57	848.6	326 40 31	146 42 17	Corpus	11389.7	4.056513
	97 28 18.57	508.0	117 21 09	297 19 26	Kaleta	6742.0	3.828789
McHarry's barn, cupola [1] 1905	27 54 18.54	570.7	347 49 29	167 49 38	Portland	2399.3	3.380077
	97 20 26.79	732.6	89 04 35	268 59 12	Kaleta	18893.0	4.276300
Brighton post office, north gable [2] 1905	27 36 41.82	1287.2	204 40 19	24 40 30	Laguna Madre south base	1493.8	3.174307
	97 18 00.01	0.3	266 19 09	86 21 07	Padre	6995.7	3.844834

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

DESCRIPTIONS OF STATIONS.

This list may be conveniently consulted by reference to the illustrations at the end of this publication or to the index. All azimuths given in the descriptions are reckoned continuously from true south around by west to 360°, south being 0°, west 90°, north 180°, and east 270°. Where magnetic azimuths are given they are indicated as such. In a number of cases where azimuths are not available, directions are given, referred to some initial point as 0°. These are not azimuths, and express only the angular relations at the station between the various objects enumerated.

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

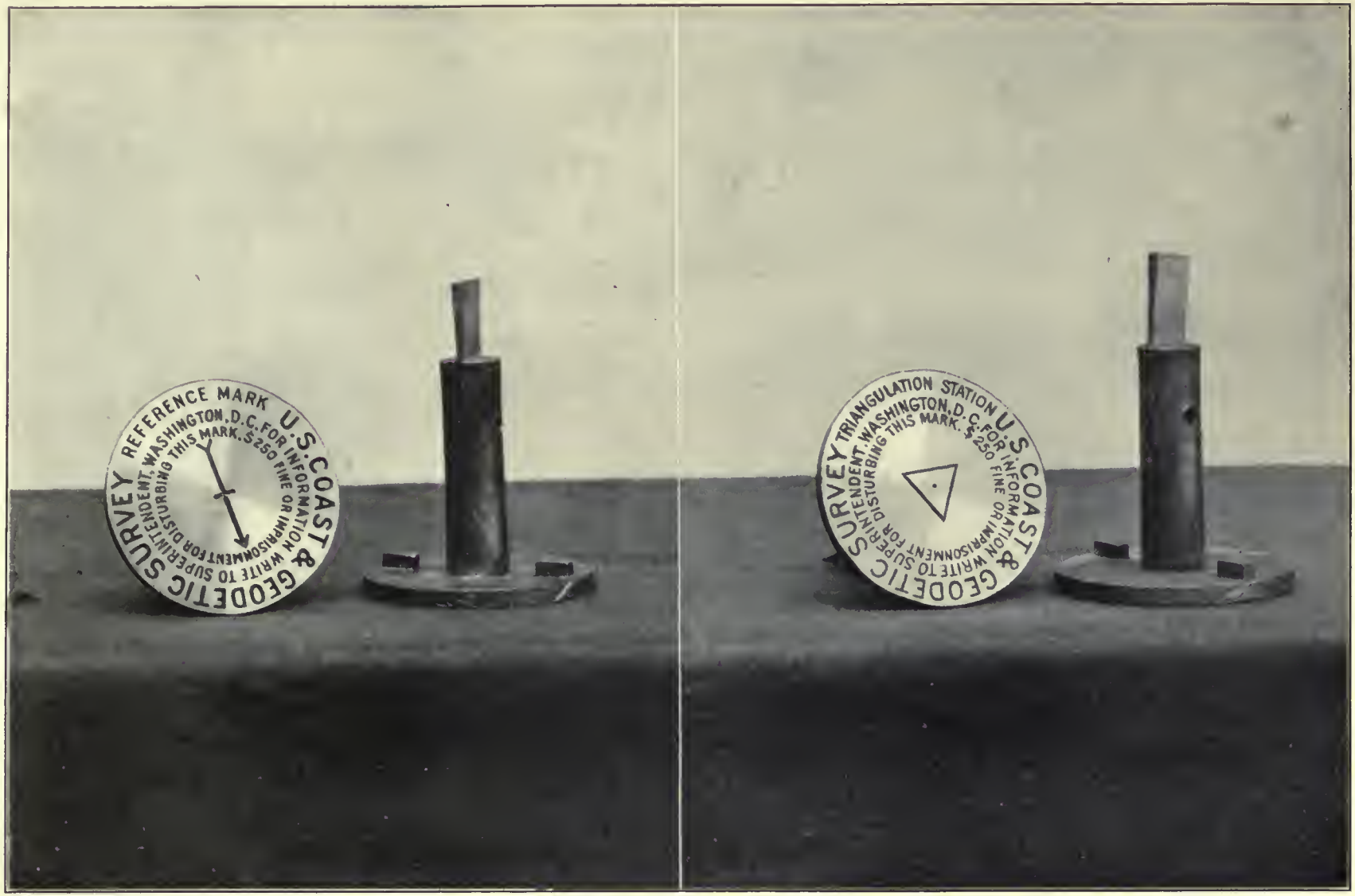
The initials and dates given in each description immediately after the county refer to the date of the establishment of the station, the man by whom it was established, and the date when the station was last recovered or determined as lost.

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 Superintendent, Coast and Geodetic Survey, Washington, D. C.

MARKING OF STATIONS.

The standard disk station and reference marks, referred to in the following descriptions and notes, consist of a disk and shank of brass cast in one piece, as shown in illustration No. 1. The disk of the station mark is 90 mm. in diameter, with a hole at the center surrounded by a 20 mm. 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." The shank is 25 mm. in diameter and 80 mm. long, with a slit at the lower end into which a wedge is inserted so that when it is driven into a drill hole in the rock it will bulge at the bottom and hold the mark firmly in place.

The standard disk reference mark, shown in illustration No. 1, is the same size and shape as the station mark, with an arrow on the top in place of the triangle, which, when properly set, points to the station. The legend is the same, except that the words "reference mark" take the place of the words "triangulation station."



STANDARD DISC TRIANGULATION STATION AND REFERENCE MARKS.

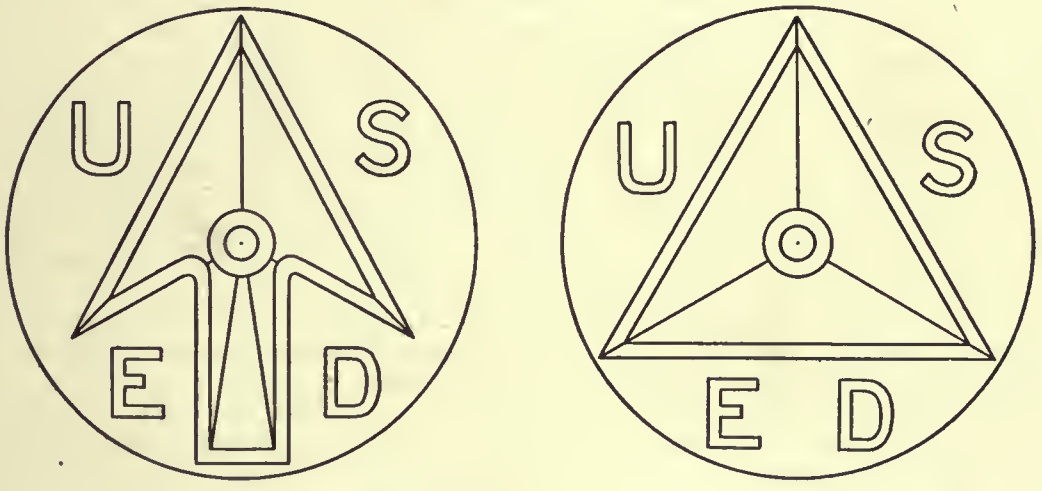
The United States Engineers standard cast-iron station and reference marks are circular plates, 3¼ inches in diameter, as shown in illustration No. 2, set in the top of hollow cast-iron monuments. The monument is 1½ feet long and is usually set about 1¼ feet in the ground. The station mark has a $\frac{5}{16}$-inch hole at the center, surrounded by a raised equilateral triangle. The reference mark has a similar hole at the center, and bears an arrow which should point to the station when properly set. Both marks bear the legend, "U. S. E. D.," in raised letters.

GENERAL NOTES REGARDING THE MARKING OF STATIONS.

NOTE 1.—The station is marked with a standard disk station mark set in a core of cement 2 feet in diameter and 2½ feet deep. The underground or subsurface mark is a bottle or a spike also set in concrete from 2½ to 3½ feet below the surface.

NOTE 2.—Same as note 1, with the addition that reference mark number one is a bottle embedded in a concrete core 2½ feet below the surface, the surface mark being also a bottle set in a core of concrete about 18 inches in diameter. Reference mark number two is a standard disk reference mark embedded in concrete with a bottle as an underground mark also set in a

No. 2.



REFERENCE MARK STATION MARK

U. S. ENGINEERS TRIANGULATION STATION AND REFERENCE MARKS.

core of concrete 2½ feet below the surface. In some cases the underground mark is a spike instead of a bottle.

NOTE 3.—The station is marked by a subsurface mark and a surface mark. The subsurface mark consists of a piece of terra-cotta sewer pipe, 4 inches in diameter and 2 feet long, filled with and incased in a cylinder of concrete 1 foot in diameter and 2 feet long. In the center of its top is embedded a 60-penny steel spike, head down, the point of the spike projecting about one-fourth inch above the surface and marking the station. It is 2½ feet below the surface of the ground. Above the whole is placed a layer of sand 6 inches deep. Resting on this layer of sand is placed the surface mark, consisting of another piece of terra-cotta sewer pipe, 4 inches in diameter and 2 feet long, filled with concrete and embedded in a cylinder of concrete 18 inches in diameter and 2 feet long. In the center of its top is placed a 60-penny steel spike, head down, its point projecting about one-fourth inch above the surface of the concrete, which was finished with one-half inch of neat cement mortar and marked "U. S. C. & G. S. 1905." The point of the spike marks the station and is very little above the surface of the ground. The reference mark is a cylinder of pipe and concrete similar to the subsurface mark, placed with its top even with the surface of the ground. The point of a steel spike, in the cement, is the reference mark, and it is nowhere less than 10 meters from the station.

NOTE 4.—The station is marked by a surface and a subsurface mark. The subsurface mark is a standard disk station mark set in a cylinder of concrete 8 inches in diameter and 2 feet deep. The top of this mark is about 2½ feet below the general surface of the ground. The surface mark is a standard disk station mark set in a cylinder of concrete 20 inches in diameter and 2 feet deep, flush with the general surface of the ground. A standard disk reference mark is set in a cylinder of concrete 8 inches in diameter and 2 feet deep, so that the top is level with the general surface of the ground.

NOTE 5.—The station is marked with both underground and surface marks. The underground mark is a bottle placed 3 feet below the surface, covered with 6 inches of sand, on which rests a 4-inch tile, 2 feet long, flange down, filled with and incased in a cylinder of concrete 30 inches in diameter. On the top surface of the concrete "C. G. S. 1906" is inscribed. A spike in the center of the tile marks the station. There are two reference marks, both concrete posts 8 inches square and 2 feet long, set so as to project about 4 inches above the general level of the ground. The top is marked with an arrow pointing to the station, and a spike for the center mark.

NOTE 6.—There are no descriptions for the stations that are referred to this note, except as follows: The station is marked by a bottle buried about 3 feet underground; four iron reference marks were placed around the station at distances of about 6 feet, on lines intersecting at the center in approximate right angles; if the ground was marshy or the station was considered unsafe, a mark was set 50 feet from the station; on the same line with this a second mark was placed 100 feet from the station. On a line at right angles to this two more marks were placed similar to the first, so that the lines produced intersect at the station. These iron marks have, in some instances, been recovered and are described as follows: The mark is cast iron, trough shaped, 26 inches long, with a flat, square flange for a base, and at the top has a flat triangular flange 16 centimeters on each side with a raised triangular pyramid. On the faces of the pyramid are the raised letters "U. S. C. S."

NOTE 7.—The station is marked by a standard disk station mark in the top of a 4-inch tile or a length of stone pipe filled with and set in concrete. The reference mark is a standard disk reference mark set in the same manner as the station mark.

NOTE 8.—The station is marked by a brass plug, ⅝ inch in diameter, with a ⅛-inch hole in the center or with cross lines on the top. This plug is embedded in a sandstone block, usually about 4 inches square by 6 or 8 inches long, and buried about 2 feet below the surface. Above the plug is a United States Engineers standard cast-iron station mark projecting 3 inches above the surface. The reference marks are United States Engineers standard cast-iron reference marks projecting 3 inches above the surface, and are 100 feet, or 30.48 meters from the station, unless otherwise stated.

NOTE 9.—The station is marked by a concrete pyramid or coral rock buried 3 to 4 feet below the surface of the ground and having in its top a drill hole filled with lead. Above the underground mark was placed a cedar stub with a copper tack in its top, the stub projecting from 6 to 18 inches above the surface of the ground. Four reference stubs were placed around the station at the distances given, on lines intersecting at the center in approximate right angles; these stubs were usually of cedar.

NECHES RIVER, LAKE SABINE, AND SABINE PASS TO EAST BAY.

PRINCIPAL POINTS.

Pat Glennons Bayou (Cameron County, La., J. N. M., 1874; 1912).—On the north bank of Pat Glennons Bayou, about 300 meters from the mouth and 16 meters back from the bank of the bayou on marshy ground entirely submerged at high water. The station is marked by a ⅝-inch hole in the top of a sandstone monument 2 feet 5 inches long and 5 inches square at the top, inscribed "U. S. C. & G. S." The underground mark is a 5-inch tile filled with a piece of wood, and set 2 feet below the surface.

Louisiana (U. S. E.) (Cameron County, La., U. S. E., 1909; 1912).—Lost.

Sabine Pass southwest base (Jefferson County, J. N. M., 1874; 1912).—In the town of Sabine Pass, on uninclosed ground between the shell road leading to the cemetery and the fence in front of J. J. Welsh's house, 110 meters from the cemetery gate, 8 meters from the fence, 16 meters from the road, and 88 meters from a twin live oak marked with a triangle. The station is marked by a 3-inch galvanized pipe, filled with and set in conerete, and projecting 18 inches above the ground. The underground mark is the apex of an earthenware pyramid 3 feet below the surface, above that is a copper tack in a piece of wood fitted into a 4-inch tile.

Sabine Pass northeast base (Jefferson County, J. N. M., 1874; 1912).—Lost.

Mud Bayou (Jefferson County, J. N. M., 1874).—On the east side of Mud Bayou. It is marked by a stone pot placed even with the surface. This station can be recovered, if at all, by triangulation only.

Niggerville (Cameron County, La., J. N. M., 1874).—On the east side of Sabine Pass, north of the lighthouse, on a ridge of land known by the name of Niggerville, 20 meters from the south corner of a small house and 5.5 meters from the high-water mark. The station can be recovered, if at all, by triangulation only.

Texas Point (Jefferson County, J. N. M., 1874).—On the west side of Sabine Pass just below the mouth of Texas Bayou, nearly abreast of the lighthouse, and 11 meters from the high-water mark. The station is marked by an earthenware pot placed even with the surrounding surface of the ground.

Louisiana Point (Cameron County, La., J. N. M., 1874).—On the east side of Sabine Pass. The station is marked by a stone pot placed even with the surrounding surface.

Gulf Bayou (Jefferson County, J. N. M., 1874; 1912).—Lost.

Keith (*U. S. E.*) (Jefferson County, U. S. E., 1909).—On the point of land between the Port Arthur Ship Canal and Keith Lake, 48 meters north of the railroad bridge across the inlet from the canal to the lake, 23 meters from the shell road from Sabine to Port Arthur, and 70 meters from the shore of Keith Lake. An old one-story wooden house stands 62 meters south of the station. The station is marked by a 3-inch galvanized-iron pipe 4½ feet long, with a flange at the bottom, filled with and set in eoncrete, and projecting 20 inches above the ground.

Garrison (*U. S. E.*) (Cameron County, La., U. S. E., 1909; 1912).—On the east side of Sabine Lake, near a one-story house surrounded by fruit and shade trees and occupied by A. Berwick. The station is 40 meters from the Lake shore, and near a cultivated field, and is marked by a 3-inch galvanized-iron pipe, filled with and set in concrete, projecting 18 inches above the ground. The following distances and azimuths are given: Lone tree on Lake shore, 43 meters, 156° 02′; corner of fence, 46 meters, 263° 22′; gable of old house, 250 meters, 306° 47′.

Docks (*U. S. E.*) (Jefferson County, U. S. E., 1909; 1912).—On that portion of land, between the Port Arthur Ship Canal and the Turning Basin, known as the Island. It is 48 meters from the canal, 15 meters south of a large oil tank, and 1 meter south of a ditch along the road across the Island. The station is marked by a 3-inch galvanized-iron pipe, with a flange at the bottom, filled with and set in concrete, projecting 18 inches above the surface.

Port Arthur (*U. S. E.*) (Jefferson County, U. S. E., 1909; 1912).—Six meters west of the Sabine Lake Canal, 2½ miles north of the drawbridge at Port Arthur, 14 meters from a ditch along the road running northwest from the canal, and 85 meters from a house occupied by W. E. Townsend. The station is marked by a 3-inch galvanized-iron pipe, filled with and set in concrete, projecting 1 foot above the surface.

Johnsons Bayou (*U. S. E.*) (Cameron County, La., U. S. E., 1909; 1912).—On the east side of Sabine Lake, 300 meters north of Johnsons Bayou, 70 meters east of the Lake shore, and 95 meters from the Lake shore to the south. The station is marked by a 3-inch galvanized iron pipe, filled with and set in concrete, projecting 18 inches above the surface.

Pine (*U. S. E.*) (Cameron County, La., U. S. E., 1909).—On the east side of Sabine Lake, 4 miles south of the East Pass to Sabine River, 60 meters from the Lake shore, 725 meters south

of a cattle pen. The station is marked by a 3-inch galvanized-iron pipe, filled with and set in concrete, projecting 18 inches above the surface.

Neches (*U. S. E.*) (Jefferson County, U. S. E., 1909).—On the west side of the Sabine Lake Canal, ⅛ mile west of the mouth of the Neches River and ¼ mile from the canal, on a shell bank covered with scattered trees. This is the first grove of trees near the canal, above Port Arthur. The station is marked by a 3-inch galvanized-iron pipe, filled with and set in concrete, projecting 18 inches above the surface.

Sabine (*U. S. E.*) (Orange County, U. S. E., 1909).—On the north bank of Point Young at the entrance to Sabine Lake from Sabine River, 3 meters from the bank of the pass and 8 meters from the Lake. The station is marked by a 3-inch galvanized-iron pipe, with a flange at the lower end, filled with and set in concrete, and projecting 1½ feet above the surface.

Spur (*U. S. E.*) (Jefferson County, U. S. E., 1909).—Located 134 meters south of the road from Port Arthur to Beaumont, 15 meters east of the railroad spur, and 46 meters west of the Doomboss lot. The station is marked by a 3-inch galvanized-iron pipe 4.5 feet long, with a flange at the bottom, filled with and set in concrete, and projecting 0.9 foot above the surface. The following distances and azimuths are given: Concrete bridge, 109.57 meters, 225° 54′; small wooden bridge over ditch, 51.82 meters, 242° 46′; inside of rail of the spur, 15.33 meters, 98° 20′.

Grigsby (*U. S. E.*) (Jefferson County, U. S. E., 1911).—Located in the yard of The Texas Co.'s refinery, at Port Neches. The station is marked by a 3-inch galvanized-iron pipe filled with cement and projecting 1 foot above the ground. The following distances and azimuths are given: Northeast corner of warehouse, 29.35 meters, 36° 33′; southeast corner of the most northerly of the line of warehouses along the west side of the refinery yard, 17.43 meters, 61° 39′; the inside of the rail of the track which runs along the west side of the yard, 11.43 meters, 101° 40′; point of frog, 11.92 meters, 260° 27′; fire hydrant, 26.85 meters, 294° 48′; most northerly oil tank in the yard, 47.79 meters, 351° 12′.

Nederland (*U. S. E.*) (Jefferson County, U. S. E., 1911).—Just east of the town of Nederland, about 3 meters south of the main street, or the street that passes the Jones drug store and the post office. The station is marked by a 3-inch galvanized-iron pipe 4.5 feet long, with a flange at the bottom, filled with and set in concrete, and projecting 0.9 foot above the surface. The following distances and azimuths are given: Northeast corner of F. A. Butler's garden, 65.8 meters, 323° 32′; northeast corner of F. A. Butler's orchard, 32.95 meters, 2° 18′; northeast corner of George Harris's lot, 125.62 meters, 40° 10′; southeast corner of the district school property, 99.43 meters, 86° 54′.

Sun (*U. S. E.*) (Jefferson County, U. S. E., 1911).—Near the northwest corner of the Sun Co.'s tank field, on the Kansas City Southern Railroad, about 1 mile above Nederland, 300 meters east of the Port Arthur and Beaumont road, and just west of the marsh line. The station is marked by a 3-inch galvanized-iron pipe, 4.5 feet long, with a flange at the bottom, filled with and set in concrete, and projecting 0.9 foot above the ground. The following distances and azimuths are given: The southeast one of a set of four underground tanks, 6.06 meters, 46° 00′; willow tree, 10 inches in diameter, marked with a cross 3 feet above the ground, 30.42 meters, 191° 46′; china ball tree, 8 inches in diameter, marked with a cross 3 feet above the ground, 24.32 meters, 236° 10′.

Floyd (*U. S. E.*) (Orange County, U. S. E., 1911).—On the east bank of the Neches River, 6 meters from the top of the river bank, and about 12 meters above the mouth of Floyd Bayou. The station is marked by a 3-inch iron pipe, 4.5 feet long, with a flange at the bottom, set in and filled with concrete, and projecting 0.9 foot above the surface. The following distances and azimuths are given: Cypress tree 18 inches in diameter, with a triangle cut 6 feet above the ground, 8.78 meters, 251° 50′; oak tree with a triangle cut 4.5 feet above the ground, 7.92 meters, 24° 30′.

Spindle Top (*U. S. E.*) (Jefferson County, U. S. E., 1911).—About 12 miles above the mouth of the Neches River, 107 meters from the end of the Union Canal, and 32 meters from the Kansas City Southern Railroad tracks. The station is marked by a 3-inch galvanized-iron

pipe, 4.5 feet long, with a flange at the bottom, filled with and set in eonerete. The following distanees and azimuths are given: Pillar of the agitator at the filter plant, marked by a triangle 4 feet above the ground, 11.3 meters, 206° 51′; pillar of the agitator at the filter plant, marked by a triangle 3 feet above the ground, 12.5 meters, 252° 36′; pin oak tree, 20 inehes in diameter, marked by a triangle 5 feet above the ground, 18.0 meters, 86° 27′.

Beaumont (*U. S. E.*) (Jefferson County, U. S. E., 1911).—On the east bank of the Neehes River, 35 meters from the edge of the water, and 150 meters below the slaughterhouse. The station is marked by a 3-ineh galvanized-iron pipe, 4.5 feet long, with a flange at the lower end, set in eonerete, and projeeting 1 foot above the surfaee. The following distanees and azimuths are given: Southeast eorner of the slaughterhouse, 152.4 meters, 71° 22′; 18-ineh pine tree marked with a eross, 33.65 meters, 321° 40′; 18-ineh pine tree marked with a eross, 35.05 meters, 313° 38′; 12-ineh pine tree marked with a cross, 32.16 meters, 277° 34′; 27-ineh pine tree marked with a eross, 37.73 meters, 196° 43′.

Keith (Jefferson County, F. W. P., 1882; 1912).—Lost.

Gulf Bayou 2 (Jefferson County, F. W. P., 1882).—On the southwest side of Gulf Bayou, about 1 mile southwest of Texas Point, 10 meters from the bank of the bayou and 32 meters from the grass line along the Gulf shore. The station is marked by a drill hole in the top of a sandstone post, 5 inehes square, inseribed "U. S. C. & G. S." on the side faeing the bayou, and underground, by an inverted earthenware jar, 3 feet below the surfaee.

Johnson 2 (Jefferson County, F. W. P., 1882; 1912).—About 6 miles west of Sabine Pass on what is known as the Reufro property, now owned by the Texas Land Co., 10 feet east of the line fenee between this property and that owned by Mr. Armiger. The station is marked by a drill hole in the top of a sandstone monument, 5 inehes square on top, inseribed "U. S. C. & G. S.," set in a mass of eonerete, 30 inehes in diameter, inseribed "C. G. S., 1906." The underground mark is a hole in the bottom of an inverted earthen jar, 3 feet below the surfaee. Two referenee marks, eaeh a spike in the top of a tile, filled with and ineased in eonerete, are set, one near the road at the end of the fenee above mentioned and the other on a line with Armiger's house. They are 42.565 meters north 23° east from the station, and 4.16 meters south 61° west, respeetively.

Fort (Jefferson County, F. W. P., 1882).—About 7 miles west of the entranee to Sabine Pass, on the parapet of an old Confederate fort, about 275 meters southwest of Bradley Johnson's house and 15 meters from the southwest eorner of the fort. The station is marked by a copper taek in a cypress post and underground by a quart ehampagne bottle buried 3 feet below the surfaee, 6 inehes above this by the apex of an earthenware pyramid, 6 inehes on every edge, with the letters U. S. C. S. eut on its faees.

Rebecca (Jefferson County, F. W. P., 1882; 1912).—On the shell ridge 9 miles southwest of Sabine Pass, 2 miles south of MeFaddan's raneh house, 142 meters north of the only buneh of trees along this portion of the eoast. The station is marked by a spike in a 4-ineh tile, set in a cylinder of conerete 2½ feet deep and 30 inehes in diameter and inseribed "C. G. S., 1906." The underground mark is an earthen jar filled with eonerete, with a hole through the eenter, set 4 feet under the surfaee. Three referenee marks, eaeh a spike in the eenter of a 4-ineh tile, set in concrete, are 15.29 meters, 15.22 meters, and 15.30 meters north, east, and west, respectively.

Gum (Jefferson County, F. W. P., 1882).—In Asworth Cove Prairie, 8 miles southwest of Taylors Bayou, on a mound 4 feet high about halfway between the two westernmost of a group of three large heavily wooded mounds known loeally as Gum Islands. The station is marked by a eopper taek in the top of a 4 by 4 ineh pine post and underground by a quart glass flask buried 2½ feet below the surfaee.

Scaffold (Jefferson County, F. W. P., 1882).—The station is marked by a eopper taek in a pine stake, and 3 feet below the surfaee by a hole through a 2-gallon jar filled with eement, and 1 foot above this by an earthenware pyramid, 6 inehes on an edge, and surrounded by three bottles with their neeks pointing to the station. This station ean be reeovered, if at all, by triangulation only.

Fence (Jefferson County, F. W. P., 1882; 1912).—Lost.

Salt (Galveston County, F. W. P., 1882; 1912).—Lost.

Big Hill (Jefferson County, F. W. P., 1882).—On the southwest brow of a prominent hill, known locally as Big Hill. The hill is flat on top and contains several hundred acres of land. The underground mark is a copper tack in the neck of a black bottle, filled with earth, 2½ feet below the surface. Wm. Adam's house is one-half mile north 38° 30′ east, and his barn is north 40° 20′ east.

Cross (Jefferson County, F. W. P., 1882; 1912).—Lost.

Trueman (Jefferson County, F. W. P., 1882).—The station is marked by a spike in the top of a concrete post. The station can be recovered, if at all, by triangulation only.

Wolcott 2 (Jefferson County, F. W. P., 1882).—On a sand ridge about 4 miles northeast of High Island and 64 meters from the high-water mark of the Gulf. The station is marked by a copper tack in the top of a walnut post, and underground by a hole through a jar filled with concrete, 3 feet below the surface, and by the apex of an earthen pyramid, 6 inches on a side, inscribed "U. S. C. S.," 2½ feet below the surface. The diagonal lines from copper tacks in the tops of four walnut posts, each 6 feet distant, intersect at right angles over the station. Two 6 by 8 inch pine posts with triangles on the sides facing the station are each 30.48 meters distant, the angle between them at the station being 90°.

Lad (Jefferson County, F. W. P., 1882).—Marked underground by the apex of an earthenware pyramid, 6 inches on each edge, placed 2 feet below the surface, and a beer bottle 16 inches below the surface, and at the surface by a copper tack in a 4-inch square pine post. The station can be recovered, if at all, by triangulation only.

Gilbert (Jefferson County, S. C. M., 1873).—On the beach, about 8 miles northeast of High Island, 18 meters back from the high-water mark. The station is marked by a terra-cotta cone, buried 6 inches below the surface, surrounded by 4 oaken posts, each 3 feet from the station, to the north, south, east, and west.

Pierce (Jefferson County, S. C. M., 1873; 1882).—About 3 miles north of the Gulf shore, 21 meters west of a small bayou leading into Mud Lake, and about 1½ miles north of the lake. The station is marked by the surface mark described in note 6[1] and the underground mark is a hole through a jar filled with concrete, 2 feet below the surface; above this is a 4-inch tile, 17 inches long. Diagonal lines from copper tacks in the tops of four oak stakes, each 1.83 meters from the station, intersect at right angles over the station. Around the station is a mound of earth 8 feet in diameter and 1 foot high.

Wolcott (Jefferson County, S. C. M., 1872; 1912).—Lost.

County Line (Jefferson and Chambers Counties, F. W. P., 1882).—This station is marked by a spike in a concrete post. It is probably lost and can be recovered, if at all, by triangulation only.

Highland 2 (Galveston County, S. C. M., 1872; 1912).—This station is identical with the United States Engineers' station High Island 2. About 7 miles northeast of Rollover, and 4½ miles east of the mouth of East Bay Bayou, about 30 feet above mean low water, and about 250 meters northeast of a small frame house occupied by E. Meyrig. Two earthenware pyramids, 6 inches on an edge with the letters U. S. C. S. cut into the faces, were used as underground marks, one being buried 3 feet below the surface and the other 2 feet. The surface mark is a standard U. S. E. station mark. There are two reference marks each 30.48 meters from the station, one on range with station *Rollover* (*U. S. E.*) and the other on range with *N. W. Bend* (*U. S. E.*). In 1912 when the station was last visited the marks were in good condition, a tripod 45 feet high erected by the United States Engineers in 1900 was standing and in good condition.

Hampshire (Galveston County, S. C. M., 1873).—On the Gulf beach opposite High Island. The station is marked underground by a terra-cotta cone and at the surface by a palmetto stub 12 inches in diameter, over which is an oak board.

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[1] See pp. 45–46.

Northwest Bend (Chambers County, G. B., 1861; 1912).—On marshy ground on the west side of East Bay Bayou, about 6 miles from its mouth, 20 meters from the bank of the bayou, and about 2½ feet above mean low water. There is a two-masted schooner aground on the west bank of the bayou, 110 meters above the station. The station is marked underground by a hole through a 2-gallon jar filled with cement and buried 3 feet below the surface of the ground. The surface mark is an iron mark the same as is described in note 6.[1] A triangular mound of earth was made over the station, and a drainage ditch was dug around it, making a mound 30 feet in diameter with a small ditch leading to the bayou. The following azimuths are given: Chimney on west end of small house on High Island 310° 42′, southwest end of lower clump of trees 316° 42′. When last visited in 1912 the station was in good condition and a tripod 20 feet high erected by the United States Engineers was standing over the station.

East Bay Bayou (Chambers County, G. B., 1861; 1911).—Lost.

Sand (Galveston County, F. W. P., 1882; 1911).—Lost.

Midway (Galveston County, G. B., 1860; 1911).—Lost.

Oyster Bayou (Chambers County, G. B., 1860; 1882).—On the east side of Oyster Bayou, about 400 meters from the mouth, and about 15 meters from the bank. The station is marked 22 inches below the surface by a ¾-inch bolt, 17 inches long, with a saucer immediately above it, and at the surface by a copper tack in the top of a pine stake.

Mortar (Jefferson County, J. N. M., 1874).—On the sand beach, 30 meters from the Gulf shore. The station is marked by a stone pot placed on a level with the surrounding surface.

SUPPLEMENTARY POINTS.

Brousard's house, cupola (Jefferson County, F. W. P., 1882).—The station is the center of the railed platform, 14 feet long by 6 feet wide, on the top of Brousard's house, a large, white, two-story, frame building, about 5 miles southwest of Sabine Pass.

Mud Flat (Jefferson County, J. N. M., 1874).—On the extremity of Texas Point, 24 meters from the water line. The station is marked by a stone pot placed level with the surrounding surface.

Sabine Longitude Station (Jefferson County, C. V. H., 1911).—About 200 meters south of the railroad station on the unimproved marshy flats, and in the south corner of the intersection of two graded but unsurfaced and untraveled streets, about 20 meters from the middle of the street to the northwest and about 30 meters from the street to the northeast. The station is marked by a pier of concrete with foundation 2½ feet below the surface, and with a cross section of 18 inches by 34 inches. In the middle of the north and south notch in the top of the pier is a brass station mark bearing the regular warning along with the words "Astronomical Station."

EAST BAY, GALVESTON BAY, AND WEST BAY.

PRINCIPAL POINTS.

Midway 2 (Galveston County, S. C. M., 1872).—The station is marked underground by a terra-cotta cone, 18 inches in diameter, and at the surface by an oak stub. The station can be recovered, if at all, by triangulation only.

Rollover 2 (Galveston County, S. C. M., 1873; 1883).—On the upper part of Bolivar Peninsula 106 meters southwest of Hamshire's old house and 42 meters from high-water mark. The station is marked underground by a terra-cotta cone and at the surface by a copper tack in the top of a cedar post. Four other cedar posts with a nail in the top of each, distant 0.76 meter, are set so that the diagonal lines from the nails intersect at right angles over the station.

Rollover (Galveston County, R. H. F., 1849; 1911).—Lost.

Robinsons Bayou (Chambers County, G. B., 1860).—On the east bank of Robinsons Bayou, about ½ mile from the mouth, on the highest land in the vicinity. The station is marked by a cast-iron station mark described in note 6.[1]

Shaw (Galveston County, G. B., 1860).—The underground mark is a cone placed 3 feet below the surface of the ground, over which is a cast-iron station mark described in note 6.[1]

[1] See pp. 45–46.

Stevenson (Chambers County, R. D. C., 1850; 1860).—The station is marked underground by an earthenware cone, over which is a cast-iron station mark, described in note 6.[1] This station can be recovered, if at all, by triangulation only.

Parrs Grove (Galveston County, R. H. F., 1849; 1860).—Marked with a cast-iron station mark described in note 6.[1] This station can be recovered, if at all, by triangulation only.

Smith Point (Chambers County, R. D. C., 1848; 1911).—Lost.

Dollar Point (Galveston County, F. H. G., 1847; 1911).—Lost.

Bolivar Point (Galveston County, W. S., 1848; 1873).—On Bolivar Point, Galveston Bay. The station is marked by a 15-inch square pine post. It can be recovered, if at all, by triangulation only.

Virginia Point (Galveston County, S. A. G., 1847; 1911).—Lost.

Highland Bayou (Galveston County, R. D. C., 1850).—On the north side of Highland Bayou, about 9 miles from its mouth, 140 meters north of Col. Butler's house and across the bayou. The station is marked by an earthen cone buried 3 feet below the surface. Six feet to the north, south, and east are cedar stakes with copper tacks in the tops. The station can be recovered, if at all, by triangulation only.

Black Point (Galveston County, R. D. C., 1850).—On the north shore of West Bay, on a shell bank about 5 feet high and 6 meters from the water. The station is marked by an earthen cone 2 feet below the surface. The station can be recovered, if at all, by triangulation only.

Halls Bayou (Galveston County, R. D. C., 1850).—On the open prairie, about 2½ miles north of Halls Bayou and 5 miles from the shore of West Bay. The station is marked by an earthen cone buried 2 feet below the surface, and can be recovered, if at all, by triangulation only.

Galveston Island west base (Galveston County, R. D. C., 1850; 1873).—On Galveston Island one-half mile from West Bay and 180 meters from the Gulf shore. The station is marked by a cross on the top of a copper bolt in the top of a cylindrical cement post, 2 feet below the surface.

Galveston Island east base (Galveston County, R. D. C., 1850; 1853).—On Galveston Island, about one-half mile from the Gulf shore. The station is marked by a cross in a bolt in the top of a cement post, 2 feet below the surface. The station can be recovered, if at all, by triangulation only.

Mustang Bayou (Brazoria County, R. D. C., 1850).—On the northeast side of Chocolate Bay, 137 meters east of the mouth of Mustang Bayou. The center is marked by an earthen cone buried 3 feet below the surface. There are three cedar stakes, each 1.83 meters from the station, north, south, and east.

Chocolate Bayou (Brazoria County, R. D. C., 1850).—On the western shore, near the head of Chocolate Bay, 100 meters from the edge of the water. The station is marked by an earthen cone buried 3 feet below the surface. There were three cedar stakes, each distant 1.83 meters, to the north, south, and east of the station.

West End (Galveston County, J. S. W., 1850; 1912).—Lost.

Rollover (*U. S. E.*) (Galveston County, U. S. E., 1900; 1912).—On Bolivar Peninsula, 84 meters back from the Gulf shore, about one-third mile east of Rollover post office and one-half mile west of the hotel. The station is on the railroad right of way about 8 meters north of the tracks. The station is marked according to note 8;[1] one reference mark is in line with *Robinson Bayou* and the other bears east-northeast.

Robinsons Bayou (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—On a shell mound, 8 feet above mean low water, on the east bank of Robinsons Bayou, one-half mile northeast on a direct line from the mouth of the bayou. The station is marked according to note 8,[1] one reference mark being 5 feet north of the range to *Jackson* and the other 10 feet east to the range to *Marsh Point*, or approximately east and south, respectively, of the station.

Shaw (*U. S. E.*) (Galveston County, U. S. E., 1900; 1912).—Located about the middle of Bolivar Peninsula, 198 meters from the Gulf shore, one-half mile north of the railroad station

[1] See pp. 45–46.

Patton, and 40 meters from the tracks of the Gulf & Interstate Railroad. The station is marked according to note 8,[1] the reference marks being northeast and southwest, respectively.

Stevenson Point (*U. S. E.*) (Chambers County, U. S. E., 1901; 1911).—On the north shore of East Bay, 166 meters from the edge of the bank, 117.3 meters south from the north line of Sweeney's field fence. The station is marked according to note 8,[1] one reference mark being in azimuth 77° 09′ and the other on range with Bolivar Point Lighthouse.

Parrs Grove (*U. S. E.*) (Galveston County, U. S. E., 1900; 1912).—On Bolivar Peninsula about 6½ miles northeast of Bolivar Lighthouse, one-half mile from the Gulf of Mexico, and on a low ridge 45 meters north of a wagon road. The station is marked by a U. S. E. standard station mark, with a copper bolt set in concrete 2 feet below the surface of the ground as a subsurface mark. The U. S. E. standard station marks were used as reference marks, one 30.48 meters north 49° 31′ west and the other 30.48 meters south 30° 05′ west.

Smith Point (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—Located about 2 miles southwest from the extreme western portion of Smith Point, 152 meters north of the bluff bank on the bay, 104 meters southeast of the southeast corner of W. Heiman's lot, 130 meters southwest of the northwest corner of H. Heiman's field fence, and 13 feet above mean low water. The station is marked according to note 8,[1] except that there is only one reference mark, it being in azimuth 77° 06′.

Four E (*U. S. E.*) (Galveston County, U. S. E., 1901; 1911).—Lost.

Galveston north base (*U. S. E.*) (Galveston County, U. S. E., 1900; 1912).—In the open prairie, about 2 miles north of Texas City and 1621 meters south of Dollar Point on land belonging to Herbert Bros., of Texas City. The station is 7 feet above mean low water. Three small rain-water ponds, forming a triangle, just to the eastward are generally dry during July and August. The station is marked by a hole in the center of a ¾-inch brass plug, set in a concrete monument, 2 feet below the surface. The plug is covered with a milled cap of brass. Above the plug and separated from it by a layer of dirt, is a U. S. E. standard station mark, the top being 2½ inches above the surface. Three U. S. E. standard reference marks are each 30.48 meters from the station in azimuths 11° 14′ 49″, 191° 14′ 49″, and 296° 15′ 28″, respectively. Each kilometer point of the Galveston base is marked by a brass bolt embedded in a monument of concrete similar to that at the station.

Galveston south base (*U. S. E.*) (Galveston County, U. S. E., 1900; 1911).—In the open prairie, about 2 miles northwest of Virginia Point railway station and about 4½ miles south of Texas City, near the west line of block 175, Virginia Point City. The soil is a sandy loam, covered with weesatch, with sloughs on either side of the station. The elevation of the ground is 7.5 feet above mean low water. The station is marked by a hole in the center of a ¾-inch brass plug set in a concrete monument, 2½ feet below the surface. The plug is covered with a brass mill headed cap. The surface mark is a U. S. E. standard station mark. Two pieces of 8 by 12 inch pine timber, painted black, are set in the ground, each 4 feet from the station, in azimuths 11° 14′ and 191° 14′. Each kilometer point of the Galveston base is marked by a brass bolt embedded in a monument of concrete similar to that at the station.

Edwards Point (*U. S. E.*) (Galveston County, U. S. E., 1900; 1911).—On Edwards Point, 110 meters back from the top of the bluff at the end, nearly due west of two small islands near the eastern extremity of the point, and 20 meters east of the road leading to the grove on the point. The station is marked according to note 8,[1] the reference marks being in azimuths 349° 23′ and 236° 50′, respectively.

Cedar Point (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—On Cedar Point, 120 meters northwest of the bluff bank, 350 meters northeast of a gully, on an open space in the prairie with timber to the northeast and the southwest. The station is marked according to note 8,[1] one reference mark being east of the station and the other in azimuth 215° 38′.

Double Bayou (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—Located 34 meters from the bluff bank of the east shore of Galveston Bay, about 2 miles north of the mouth of Double Bayou, just inside a wire fence, on property owned by Geo. Wheeler & Co., of Phila-

[1] See pp. 45–46.

delphia. The station is marked according to note 8,[1] the reference marks being in azimuths 201° 16′ and 320° 29′, respectively.

Lawrence Cove (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—On the west shore of Lawrence Cove, 150 meters west of Cross Bayou, on a brush-covered shell mound 30 meters in diameter, and about 4 feet above mean low water. The station is marked according to note 8,[1] one reference mark bearing south 80° 30′ west (magnetic), and the other north 46° 05′ west (magnetic) from the station.

Wiggins 2 (Chambers County, I. W., 1911).—On the north side of Turtle Bay, about 60 meters from the shore on a ridge of comparatively hard ground between the bay and the soft marsh. Five cypress trees stand in the water outside the grass line in front of the station. These are the last trees standing outside the marsh line on the north shore, going west from Turtle Bayou. The station is marked according to note 7,[1] with the exception that there is no reference mark.

Anahuac (Chambers County, R. D. C., 1850; 1911).—On the south bank of Turtle Bay, 3 meters from the edge of the bluff bank, about ½ mile east of Anahuac, where the prairie comes near the bay road to Turtle Bay. This road runs 3 meters south of the station. The station is marked by two inverted claret bottles, one above the other, about 2 feet below the surface, above which is a U. S. E. standard station mark, projecting about 4 inches above the surface. The reference mark, the same as described in note 7,[1] is 25.83 meters from the station in azimuth 304° 02′. The following azimuths and distances are given: Oak tree with 3 horizontal lines, 8.65 meters, 231° 32′; oak tree with 3 horizontal lines, 10.35 meters, 236° 22′; oak tree with a triangle, 11.10 meters, 278° 53′; oak tree with triangle, 11.40 meters, 281° 27′.

Red Bluff (*U. S. E.*) (Harris County, U. S. E., 1901; 1911).—About 3 miles northeast of Seabrook, on land owned by G. M. Harris, 350 meters northeast of his residence, and 100 meters from the extremity of Red Bluff Point at an elevation of 19 feet. The station is marked according to note 8,[1] the reference marks being in azimuths 6° 55′ and 97° 23′. There is a lone oak tree, with a triangle cut in it, 45 meters from the station in azimuth 101° 59′.

Morgan Point (*U. S. E.*) (Harris County, U. S. E., 1901; 1911).—On the crest of Aliens Hill, on the south edge of San Jacinto Bay, on a bluff bank about 10 meters from F. Alien's fence, and 18 meters southwest of an old fort or trench. The station is marked by a U. S. E. standard station mark, and 3 feet below the ground by a rock with a copper wire in the center. There are two standard U. S. E. reference marks, one on range between the house on the north end of Atkinson Island and the station, distant 18.29 meters; the other distant 18.41 meters, in azimuth 358° 09′.

Mesquite Knoll (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—On a point known as Mesquite Knoll, 2 kilometers south of the mouth of Cedar Bayou, on a shell and gravel bank 35 meters from the highwater mark. The station is marked by a U. S. E. standard station mark. There are two U. S. E. standard reference marks, one set 30 meters from the station in azimuth 114° 45′, the other 33 meters from the station in azimuth 40° 19′.

Doctor Smith (*U. S. E.*) (Harris County, U. S. E., 1900; 1911).—Lost.

Jennings (*U. S. E.*) (Harris County, U. S. E., 1900).—On Spillman's or Jennings Island, on the southwest side of the main channel of the San Jacinto River, on marshy ground 1,450 meters from the Jennings residence, 50 meters from the river, and 70 meters east of where a large flat begins and extends to the westward. The station is marked by a U. S. E. standard station mark. There are two U. S. E. standard reference marks, one distant 30.48 meters, in azimuth 54° 09′, and the other distant 30.48 meters, in azimuth 12° 04′.

Davis (*U. S. E.*) (Harris County, U. S. E., 1900).—On the east shore of Scotts Bay, on the old Davis place near Midway Landing, 46 meters from the shore, on a hill 29.1 feet above sea level. The station is marked according to note 8,[1] one of the reference marks being in azimuth 65° 24′ and the other in azimuth 102° 09′.

Santa Anna (*U. S. E.*) (Harris County, U. S. E., 1900).—On swampy ground on the southwest side of the San Jacinto River, 30 meters northwest of Lake Santa Anna, and 30 meters

[1] See pp. 45-46.

east of a scrubby growth of trees. The station is marked by a U. S. E. standard station mark. There are two U. S. E. standard reference marks, each 30.48 meters from the station, one northwest and the other due east.

Thayer (*U. S. E.*) (Harris County, U. S. E., 1900).—On the south side of the Galveston, Harrisburg & San Antonio Railway, west of Thayer Siding, just outside the fence on the east side of a cultivated field, and 120 meters southeast of an artesian well. The station is marked by a U. S. E. standard station mark. There are two U. S. E. standard reference marks, one 38.009 meters southwest, under a fence, and the other 27.356 meters north.

Tory Hill (*U. S. E.*) (Harris County, U. S. E., 1900).—About one-half mile east of Lynchburg, on what is known as Tory Hill, at an elevation of 28.7 feet. The northeast corner of the fence around the residence of E. Sandow is distant 31.03 meters, the southeast corner of the fence is distant 16.61 meters. The station is marked by a U. S. E. standard station mark. There are two U. S. E. standard reference marks set flush with the ground, one 32.2 meters north 89° 40′ west, in line with a large cedar tree 42.2 meters from the station, and the other 26.1 meters north 0° 50′ west, in line with a large hackberry tree, 10.3 meters from the station.

Battlefield (*U. S. E.*) (Harris County, U. S. E., 1900).—On the sidehill where the battle of San Jacinto was fought, southeast of the burying ground, and southwest of another burying ground in a mott of oak trees. The station has an elevation of 22 feet, and is marked by the U. S. E. standard station mark. There are two U. S. E. standard reference marks, one 30.05 meters from the station toward the tomb of B. R. Bingham, and the other 31.49 meters toward the tomb of Habermahl.

Mort (*U. S. E.*) (Galveston County, U. S. E., 1900; 1911).—Lost.

Case (*U. S. E.*) (Galveston County, U. S. E., 1900; 1911).—Lost.

West Bay Point (Galveston County, I. W., 1912).—On the north shore of Galveston Island, 1¼ miles west of the Southern Pacific elevator, 8 meters inside of a low bluff about 2 feet high, about 1¼ miles north of the railroad tracks, and 100 meters west of some bushes. The station is marked according to note 7.[1] The reference mark is 29.13 meters from the station in azimuth 12° 21′.

W. B. 4 (*U. S. E.*) (Galveston County, 1900; 1912).—On the northwest shore of West Bay, about 1½ miles northeast of the mouth of Green Bayou, on the marsh, 40 meters from the bay shore, 600 meters southwest of a bunch of trees, and 488 meters from the nearest trees. The station is marked by a 2-inch iron pipe driven into the ground and projecting 2 feet, with a 4-inch tile around it. The reference mark, a 4-inch tile, is 14.75 meters from the station, in azimuth 114° 42′.

W. B. 6 (*U. S. E.*) (Galveston County, U. S. E., 1900; 1912).—On the west shore of West Bay, nearly abreast of Karankawa Reef, 120 meters west of the entrance to Karankawa Bayou, 28 meters from the top of a shell ridge that runs along the bay shore and 48 meters from the shore. The bluff along the shore is 3 feet high and the ridge is about 2 feet higher than the ground at the station. The station is marked according to note 7 [1] the reference mark being 15.82 meters from the station in azimuth 125° 46′. An iron rod driven into a portion of a trunk of a tree was set 2 feet in the ground and projects 4 feet above the surface, 2.77 meters from the station in azimuth 85° 14′.

W. B. 3 (*U. S. E.*) (Galveston County, U. S. E., 1900; 1912).—On the west shore of Galveston Island, about the middle of the first point south of Deer Islands, on low marshy ground, usually covered with water. The station is marked by a U. S. E. standard reference mark instead of the station mark. A standard disk reference mark in the top of a 4-inch tile, filled with and set in concrete, is 18.28 meters distant from the station in azimuth 191° 18′.

Reef (Galveston County, I. W., 1912).—On Galveston Island, on the east shore of West Bay, opposite Karankawa Reef, 28 meters from the bay shore and 45 meters from the nearest point of a large pond inshore from the station. The station is marked by a standard disk station mark set in the top of a 4-inch tile, which is filled with and set in concrete. The reference

[1] See pp. 45–46.

mark is a similar tile filled with and set in concrete, 14.92 meters from the station in azimuth 259° 58′.

Y (U. S. E.) (Galveston County, U. S. E., 1900; 1912).—On the northwest shore of West Bay, 5 miles northeast of Alligator Point, 56 meters back from the grass line and 110 meters south of a small pond. The station is marked according to note 7,[1] the reference mark being 14.88 meters from the station in azimuth 112° 04′. The following azimuths are given: Life-saving station, cupola, 11° 55′; life-saving station, boathouse, 18° 52′.

Snake (Galveston County, I. W., 1912).—On the southeast shore of West Bay, on a low shell point, opposite the south end of Snake Island, 31 meters inshore from a shooting box on the end of the point, and 8 meters from the grass line to the north. The station is marked according to note 7,[1] the reference mark being 16.07 meters from the station in azimuth 337° 13′. The following azimuths are given: House, west gable, 242° 28′; house in grove, west gable, 289° 16′; life-saving station, cupola, 40° 28′.

Hall (U. S. E.) (Brazoria County, U. S. E., 1900; 1912).—On the north shore of West Bay, 88 meters back from the shore line, and 675 meters northeast from Alligator Point. The station is marked according to note 7,[1] the reference mark being in azimuth 153° 45′. The following azimuths are given: Life-saving station, cupola, 339° 20′; life-saving station, boathouse, west gable, 341° 50′; oil tank, 34° 37′.

Life (Galveston County, I. W., 1912).—On Galveston Island, on the west shore of West Bay, on a point 360 meters north of San Luis Life-Saving Station boathouse, nearly on a line with the west end of the boathouse and 18 meters from the shore. The station is marked according to note 7,[1] the reference mark being 13.64 meters from the station in azimuth 314° 41′. There is also a pine post 1.95 meters from the station in azimuth 356° 15′.

Mesquite 2 (Brazoria County, I. W., 1912).—On a narrow marsh point submerged at high tide, on the south shore of West Bay, 3 miles north of the entrance to the canal leading to Brazos River. A small bay with a bayou leading out of it is inshore from the station. The station is marked according to note 7,[1] the reference mark being 16.49 meters from the station in azimuth 124° 55′.

Fort Bayou (U. S. E.) (Brazoria County, U. S. E., 1906; 1912).—On the east shore of Mud Island, about 2 miles northwest of San Luis Pass, in front of a small pond and embankment marking a rifle pit used during the Civil War, and 60 meters from the high-water line. A U. S. E. standard station mark set in concrete marks the station. A standard disk reference mark in the top of a 4-inch tile filled with concrete is on top of the remains of the embankment, 13.51 meters from the station in azimuth 139° 28′. The following azimuths are also given: Life-saving station, cupola, 268° 49′; oil tank, 319° 44′.

Mud Island north base (U. S. E.) (Brazoria County, U. S. E., 1906; 1912).—On the north shore of Mud Island, 700 meters southeast of the entrance to the canal leading to the Brazos River and 200 meters back of the grass line at the shore of West Bay. The trunk of a large tree lies 66 meters inshore from the station. The station is marked by two U. S. E. standard station marks, one set in concrete at the surface and the other directly under it. A standard disk reference mark set in the top of a 4-inch tile is 16.48 meters from the station in azimuth 27° 20′.

SUPPLEMENTARY POINTS.

Jackson (U. S. E.) (Galveston County, U. S. E., 1900; 1911).—On the south bank and at the mouth of East Bayou, 46 meters from the south bank of the bayou, and 40 meters from the east bank of the bay. A 1½-inch galvanized-iron pipe projecting 1 foot from the ground marks the station. There is a pine stake 30.48 meters from the station on range with East Bay Bayou.

Flat (Galveston County, F. W. P., 1882).—The station was marked by a bottle in the top of a concrete post, 3 feet long and 6 inches in diameter. The station can be recovered, if at all, by triangulation only.

[1] See pp. 45–46.

Rollover Tide Gauge (*U. S. E.*) (Galveston County, U. S. E., 1900).—A box on piling, standing in the middle of the upper end of East Bay, opposite the narrowest portion of Bolivar Peninsula, called the Rollover.

Frozen Point (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—On Frozen Point, 2 meters from the water line. The station is marked by a 2-inch galvanized-iron pipe, which projects 2 feet above the surface. The reference mark is a post 4 inches square, projecting 6 inches above the surface, 15.24 meters from the station, in azimuth 135° 36′.

G (Galveston County, F. W. P., 1882).—On Bolivar Peninsula, about 60 meters from the beach. The underground mark is an inverted bottle, 3 feet below the surface. The center of the mouth marks the center of the station. The surface mark is a pine stake with a spike in the top to mark the center of the station.

Marsh Point (*U. S. E.*) (Galveston County, U. S. E., 1900; 1911).—On the northeast part of Bolivar Peninsula, on what is known as Marsh Point, 36 meters from the south shore of East Bay. The station is marked by a U. S. E. standard station mark. There is a 1½-inch galvanized-iron pipe 0.427 meter to the west of the station. There are two U. S. E. standard reference marks, each 30.48 meters from the station, one on range with station *Rollover* and the other on range with station *Cox*.

F (Galveston County, F. W. P., 1882).—On the ridge about 40 meters back from the sand beach, 1 mile southwest of Hughes's house. The station is marked by an iron spike in the top of a pine stake, and underground by the figure 7, in the bottom of an inverted square glass bottle, 3 feet below the surface; above this is a flask.

Cox (*U. S. E.*) (Galveston County, U. S. E., 1900; 1911).—On the southeast shore of East Bay, on the point south of the mouth of Yates Bayou, in the marsh, 30 meters back of the shell ridge, along the shore. The station is marked according to note 7,[1] the reference mark being 15.7 meters from the station in azimuth 306° 24′.

Rip (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—On the north shore of East Bay 50.0 meters from the edge of the water, in a marsh which extends 150 meters north to a high ridge, about 2¾ miles east-northeast of Stevenson Point Beacon, 1024 meters from a lone tree on the north shore of East Bay, on land owned by Mr. Jackson of Double Bayou. The station is marked according to note 7,[1] the reference mark being 15.24 meters from the station on line to station *Rollover*.

E (Galveston County, F. W. P., 1882).—On the second row of sand hills from the Gulf, about 10½ miles from Bolivar Point Lighthouse, and 59 meters from high-water mark. Two glass bottles, one square and one round, were buried 3 feet below the surface. The mouth of the square bottle marks the center of the station. The surface mark is a pine stake with a spike in the top to mark the station.

Long Grove (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—On the north shore of East Bay, about 4 miles east of Smiths Point, on a narrow ridge of prairie land, 178 meters from the edge of the water, and 102 meters from the edge of the bluff bank on land owned by Robert White. The station is marked by a U. S. E. standard station mark. There are two U. S. E. standard reference marks, one on range with *Shaw* and the other on range with *Smiths Point*.

D (Galveston County, F. W. P., 1882).—On Bolivar Peninsula, on one of the second row of sand hills from the Gulf, about 8⅓ miles from Bolivar Point Lighthouse, and 70 meters from the high-water mark. The station is marked by a spike in the top of a pine stake, and underground by an inverted pint claret bottle, 3 feet below the surface, with a 4-ounce vial immediately above it.

Hannas Reef Tide Gauge (*U. S. E.*) (Galveston County, U. S. E., 1900; 1911).—This is a box on piles, about ½ mile from the shore of East Bay, just south of the east end of Hannas Reef.

S (*U. S. E.*) (Galveston County, U. S. E., 1900; 1912).—On Bolivar Peninsula near the mouth of School Bayou, and back of the sand hills, about 5¼ miles northeast of Bolivar Point

[1] See pp. 45–46.

Lighthouse. The station is marked by a 2½-inch solid round iron bar. Alongside the station mark are a piece of railroad rail, projecting 3 feet above the surface of the ground, and a 6 by 8 inch pine post. A pointed cedar post, 6 inches in diameter, stands 23.2 meters almost directly south of the station.

C (Galveston County, F. W. P., 1883).—About 5½ miles northwest of Bolivar Point Lighthouse, ¾ mile northeast of a one-story frame church, and 120 meters back from the high-water mark of the Gulf. The underground mark is a pyramid, 6 inches on an edge, with the letters "U. S. C. S." cut on its faces, buried 3 feet below the surface and the surface mark is a spike in the top of a pine stub.

Cren (U. S. E.) (Galveston County, U. S. E., 1901).—On Bolivar Peninsula on a low wet marsh, 30 meters from the high water of East Bay, and about 5¼ miles northeast from Bolivar Point Lighthouse. The station is marked by a U. S. E. standard station mark.

B (Galveston County, F. W. P., 1882).—Marked underground by an earthenware pyramid 6 inches on each edge, with the letters "U. S. C. S." cut on its faces. The surface mark is a spike in the top of a pine stake. This station can be recovered, if at all, by triangulation only.

A (Galveston County, F. W. P., 1882).—The underground mark is an earthenware pyramid, 6 inches on each edge, with the letters "U. S. C. S." cut into its faces, buried 3 feet below the surface. The surface mark is a spike in the top of a pine stake. This station can be recovered, if at all, by triangulation only.

Dollar Point (U. S. E.) (Galveston County, U. S. E., 1900; 1911).—In the north edge of the timber at Dollar Point, about 10 feet above mean low water, 180 meters north of the old unoccupied Bryan house, 40 meters south of the edge of the bank of a small bay on the north side of the Point, and about 150 meters east of a bayou known as Walfe Creek. The land is covered with trees and heavy underbrush except on the north of the station. The station mark is a U. S. E. standard station mark set flush with the surface of the ground. Two U. S. E. standard reference marks are each 30.48 meters from the station, one in azimuth 11° 15′ and the other on range with Half Moon Lighthouse (since destroyed). In 1911, when the station was last visited, the marks were in good condition and a tripod signal was standing.

Galveston Longitude Station (Galveston County, G. R. P., 1895).—Located near the middle of the north side of Ball High School, Galveston. That part of the brick observing pier which was below the ground was left to mark the station.

Miller Point (U. S. E.) (Galveston County, U. S. E., 1900; 1911).—On the extreme point of the bluff at Millers Point between Galveston Bay and Dollar Bay, 17 meters from the Galveston Bay shore. The station is marked by an iron pipe, 1 inch in diameter. The reference mark is the same as described in note 7,[1] and is 30.22 meters from the station in azimuth 323° 51′. The large fence post at the corner of the fence is distant 70 meters in azimuth 321° 24′.

April Fool Point (U. S. E.) (Galveston County, U. S. E., 1900; 1911).—Near the extremity of the marshy peninsula known as April Fool Point, between Galveston and Dickinson Bays, 6 meters from the marsh on the west and 16 meters from the bay shore on the east. The station is marked by a U. S. E. standard station mark set in concrete. The reference mark, the same as described in note 7,[1] is 30.45 meters from the station in azimuth 133° 36′ 20″.

Rock Springs (U. S. E.) (Galveston County, U. S. E., 1900; 1911).—Two and one-half miles northwest of Edwards Point, 37 meters from the top of the bluff bank, 50 meters west of Evans Grove, 600 meters east of the wharf at Clifton, and 2.5 meters from a small oak tree in a row recently planted. The station mark is a U. S. E. standard station mark and the reference mark is described in note 7.[1] The following distances and azimuths are given: Reference mark, 27.70 meters, 20° 52′; cement post on the side of the street leading to the wharf 106° 58′; bodock tree with a blaze on the west side, 57 meters, 300° 32′.

Flanders (Galveston County, R. D. C., 1850; 1911).—One mile south of Clear Creek, about 90 meters southeast of the southeast corner of Bradford's fence and grove, on a head of land with a large gully 25 meters to the north and a small gully 50 meters to the south, 10 meters from the top of the bluff, 22 meters from the shell beach, and 17 meters from the arroyo toward

[1] See pp. 45–46.

Bradford's house. The station is marked by a U. S. E. standard station mark, and the reference mark is the same as is described in note 7.[1] The following distances and azimuths are given: Reference mark, 29.48 meters, 37° 49′; cedar stake, reference mark of 1850, 1.53 meters, 299° 52′.

Morris 2 (Harris County, I. W., 1911).—On the west shore of Galveston Bay, 1 mile north of the mouth of Clear Creek, with summer residences along the shore on either side of the station, about 10 meters north of the fence around John Harris's garden, on a line with the front of his house, and 39 meters from a group of four trees that stand inshore from the station. The station is marked according to note 7.[1] The following distances and azimuths are given: Tree, marked with the letter D, 39.4 meters, 98° 15′; reference mark, 21.30 meters, 98° 25′; corner of yard fence, 14.55 meters, 348° 29′; 6 by 8 inch cypress post, 12.25 meters, 350° 31′.

Fisher (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—The station is 3 meters from a rapidly caving bluff bank and is marked by a U. S. E. standard station mark. The reference mark is the same as described in note 7 [1] and is 55.24 meters from the station in azimuth 136° 00′.

Barrows House (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—On the northwest shore of Galveston Bay, about 6 meters back from the edge of a bluff bank, 70 meters south of a fence corner, and 25 meters southwest of a large cut in the bank. The station is marked by a U. S. E. standard station mark. The reference mark described in note 7[1] is 7.34 meters distant in azimuth 131° 36′. A lone cedar with a triangular blaze is directly in front of the station on the edge of the bank, and a blazed oak is on a fence line 5 meters south of the station.

Browns Beach (*U. S. E.*) (Chambers County, U. S. E., 1900; 1911).—On a low sandy flat, covered with bushes and grass, 2 meters from the edge of the bluff, 2 miles west of the mouth of the bayou leading out of Cotton Lake. The station is marked by a U. S. E. standard station mark. The reference mark, the same as described in note 7,[1] projects 3 inches above the surface and is 33.36 meters from the station in azimuth 149° 05′.

Canal (*U. S. E.*) (Harris County, U. S. E., 1900).—The station is marked by an iron pipe driven in a barrel of cement about 1 foot under the ground. This station can be recovered, if at all, by triangulation only.

Allen (*U S. E.*) (Harris County, U. S. E., 1900; 1911).—On a bluff bank of the upper part of Galveston Bay on the east side of the entrance to San Jacinto Bay, 4 meters from the edge of the bluff near Wm. Knight's front fence, and about 50 meters south of another fence that runs into the bay. The station is marked by a U. S. E. standard station mark.

Atkinson (*U. S. E.*) (Harris County, U. S. E., 1900; 1911).—In the upper part of Galveston Bay, on the point on the west side of the entrance to San Jacinto Bay, on a brush-covered mound about 4 feet high. The station is marked by an iron pipe driven into the ground. A copper tack in the top of a pine stake is 30.48 meters from the station on the line to station *Hog*.

Hog (*U. S. E.*) (Harris County, U. S. E., 1901; 1911).—On the east end of Hog Island, in San Jacinto Bay, on an Indian mound composed of clam shells. The station is marked by a 2-inch iron pipe driven into the ground and projecting 6 inches above the surface. The reference marks are two 3-inch square cedar stakes, 3 feet long, driven 2 feet into the ground, each 30.48 meters from the station, one in range with *Morgan Point* and the other in range with *Atkinson*. There are three hackberry trees each marked with a triangle on the side toward the station. They are 3.66 meters north 27° 30′ west, 6.40 meters north 27° 30′ east, and north 79° 00′ east.

Spillman 1 (*U. S. E.*) (Harris County, U. S. E., 1900).—On swampy ground at the eastern extremity of Jennings or Spillmans Island, where San Jacinto Bay and River meet, just east of a small channel separating the island from a long sand bar which follows the river toward Morgan Point and shows above the water at low tide. The station is marked by an iron pipe driven into the ground. There are two pine stakes, with a copper tack in the top of each, for reference marks, one in azimuth 109° 56′, distant 26.5 meters, and the other on the line to *Spillman II*, distant 21.3 meters.

[1] See pp. 45–46.

Spillman II (U. S. E.) (Harris County, U. S. E., 1900).—On the eastern end of the peninsula on the south side of Jennings or Spillman Island, across San Jacinto Bay from the Texas Military Institute. A large sand flat extends from the point into the bay and there is a small grass island just in front of the station. The station is marked by an iron pipe driven into the ground. For reference marks there are two pine stakes, with a copper tack in the top of each, one distant 28.35 meters, in azimuth 119° 29′, and the other 31.09 meters to the northwest.

Tabb (U. S. E.) (Harris County, U. S. E., 1900).—On Hog Island on the eastern extremity of the marshy projection south of the mouth of Goose Creek, 1.4 feet above low tide. The station is marked by a 1½-inch iron pipe projecting 0.8 of a foot above the surface. There are two pine stakes, each 2 feet long, projecting 6 inches above the surface, with a copper tack in the top of each, 30.48 meters from the station, in azimuths 279° 36′ and 344° 57′.

Duck (U. S. E.) (Harris County, U. S. E., 1900).—On marsh ground 1.4 feet above sea level a short distance east of the mouth of a bayou, on a point of land which extends out from the southern shore of Black Duck Bay. The station is marked by a 1½-inch pipe, projecting 0.8 of a foot above the surface. For reference marks there are two pine stakes, with a copper tack in the top of each, one 28.35 meters from the station in azimuth 327° and the other 32.00 meters from the station, in azimuth 57° 20′.

Midway (U. S. E.) (Galveston County, U. S. E., 1900; 1911).—On the north side of the entrance to San Jacinto Bay, on a small hill, 60 meters from the shore line, between the residence on the Smith estate to the west and R. Hoskin's residence to the east and 60 meters east of an old fence line. The station is marked by a solid iron rod, 1 inch in diameter, projecting 1 foot from the ground. There is a cedar stake 3 feet long, driven 2 feet into the ground, 30.48 meters from the station on range with *Morgans Point.*

Daragon (U. S. E.) (Harris County, U. S. E., 1900).—On the south shore of San Jacinto Bay, on a berm, or ledge, at the mouth of a small gully running back into the bank, 1200 meters west of the Texas Military Institute, on land owned by the La Porte Improvement Co., 20 meters south from the edge of the water, 80 meters from the mouth of Small Bayou, and 110 meters from the bridge. The station is marked by an iron pipe driven into the ground. There are two pine stakes with a copper tack in the top of each, one 31.70 meters from the station in azimuth 250° and the other 33.83 meters, in azimuth 192° 04′.

McKee (U. S. E.) (Harris County, U. S. E., 1900).—On the narrow strip of land between the main channel of the San Jacinto River and Black Duck Bay, 30 meters east of the bank of the river, 230 meters west of the bay shore, and 110 meters southwest of the corner of a cultivated field. The station is marked by a 1½-inch pipe projecting 6 inches above the surface. For reference marks there are two cedar stakes with a copper tack in the top of each, one 36.58 meters distant in azimuth 155° 34′ and the other 30.48 meters distant to the westward, on the line to station *Thompson.*

Grassy Point (U. S. E.) (Harris County, U. S. E., 1900).—At the north end of Spillman or Jennings Island on one of a bunch of marshy islands, surrounded by sand flats which are bare at low tide, and form a part of Jennings Island. Just west of the station, and on the same island with it, there are six willow trees. The station is marked by an iron pipe. For reference marks there are two pine stakes, one on the line to station *Thompson,* distant 21.3 meters, the other in azimuth 340° 04′, distant 24.3 meters.

Small (U. S. E.) (Harris County, U. S. E., 1900).—On the west shore of San Jacinto Bay, on low marshy ground at the foot of a sloping bank wooded with elm and oak, and near a house owned by W. Small. The station is marked by an iron pipe driven into the ground. For reference marks there are two pine stakes, one distant 22.65 meters in azimuth 54° 58′, the other on the line to station *McKee,* distant 57.61 meters.

Strang (U. S. E.) (Harris County, U. S. E., 1900).—On the northwest slope of the hill just below the Dixon place, in the edge of woods composed of white oak and slow gum, and 75 meters north of an artesian well. The station is marked by an iron pipe driven into the ground. Two pine stakes, with a copper tack in the top of each, are 30.48 meters from the station, one in azimuth 91° 30′ and the other to the west on the line to station *McKee.*

Badger (*U. S. E.*) (Harris County, U. S. E., 1900).—On the north side of Alexander Island, surrounded by oak, gum, and youpon trees; the ground is covered with Johnson grass, and back of the station is a marsh. The station is marked by an iron pipe. There are two pine stakes with a copper tack in the top of each, one 5.2 meters east and the other 8.5 meters in azimuth 205° 38′.

Marsh (*U. S. E.*) (Harris County, U. S. E., 1900).—On the end of the marshy peninsula, between Crystal Bay and San Jacinto River, on land owned by Q. A. Wooster. The entire peninsula is covered with marsh and high cane, except the small ridge west of the station, which is covered with small locust bushes. The station is marked by a 1½-inch iron pipe, projecting 0.8 of a foot above the surface. For reference marks there are two cedar stakes, 2 inches in diameter, both to the east-southeast on line to station *Badger*, one distant 15 meters and the other distant 26 meters.

Thompson (*U. S. E.*) (Harris County, U. S. E., 1900).—On the south shore of San Jacinto Bay, on marshy ground, 45 meters north of a long fence, and near the foot of a small gulch. There is a heavy growth of timber to the west of the station. The station is probably marked by an iron pipe. There are two pine stakes for reference marks, one in azimuth 36° 46′, distant 30.48 meters, the other in azimuth 95° 39′, distant 22.86 meters.

Goat (*U. S. E.*) (Harris County, U. S. E., 1900).—On low marshy land on the southern shore of an island, the extreme land between Scotts Bay and Crystal Bay. A ridge about 5 feet high and covered with elm trees extends westward from the station along the shore. The station is marked by a 1-inch iron pipe driven into the ground, projecting 0.8 of a foot above the surface. For reference marks there are two cedar stakes, one distant 32.31 meters in azimuth 282° 08′, the other is on the line to station *Wooster* and is distant 30.48 meters. There is a pronged elm tree, 107 meters from the station, north 36° 30′ west.

Barnes (*U. S. E.*) (Harris County, U. S. E., 1900).—On the north side of Barnes Island, on low marshy ground, 120 meters north from a small lake surrounded by high cane, 300 meters west of a small house. The station is marked by a 2-inch iron pipe driven into the ground. There are two pine stakes with copper tacks in the tops, 30.48 meters from the station, one in azimuth 130° 05′ and the other in azimuth 40° 05′.

Upper Crack (*U. S. E.*) (Harris County, U. S. E., 1900).—On a marshy peninsula, owned by Q. A. Wooster, 18 meters from the east bank of the San Jacinto River, due north of the small island at the mouth of Upper Crack, on a small ridge covered with small willow and elm trees. The station is marked by a 1½-inch pipe, projecting 0.6 of a foot above the surface. Two cedar stakes each 3 feet long, driven 2 feet into the ground, are on the line to the northwest toward station *Peggy*, the nearer being 7.62 meters from the station. There is a large willow tree and a cluster of small trees 8 meters from the station south 1° 15′ east, with three blazes on each tree. The same distance from the station south 66° 00′ west is a cluster of willow trees blazed in the same manner.

Wooster (*U. S. E.*) (Harris County, U. S. E., 1900).—On the west side of Scotts Bay, 45 meters back from the shore line, on the eastern edge of a heavy marsh and south 12° west of Q. A. Wooster's residence. The station is marked by a 2-inch iron pipe, projecting 0.6 of a foot above the ground. For a reference mark there is a cedar stake, 2 inches in diameter, 3 feet long, driven 2 feet into the ground, distant 6.10 meters on the line to the station *Goat*.

Peggy (*U. S. E.*) (Harris County, U. S. E., 1900).—On the peninsula between Peggys Lake and San Jacinto River, on the bank of the river, 30 meters north of the fence leading across the peninsula and on a bed of sharp sand. The station is marked by an iron pipe driven into the ground. There are two pine stakes, with a copper tack in the top of each, 30.48 meters from the station, one to the northward on the line to station *Crystal* and the other in azimuth 127° 37′.

Crystal (*U. S. E.*) (Harris County, U. S. E., 1900).—On a small peninsula between San Jacinto River and Crystal Bay, on land owned by J. A. Wooster, 24 meters from the bank of the river and 85 meters from the shore of Crystal Bay. The small neck where the station is

located is known as the "cut-off." The station is marked by a 2-inch iron pipe driven into the ground and projecting 0.8 foot. In azimuth 99° 06′ and 30.48 meters from the station is a 3-inch white oak stake, 3 feet long, driven 2 feet into the ground.

Burnett (*U. S. E.*) (Harris County, U. S. E., 1900).—On the south shore of Burnett Bay, 27 meters from the water's edge at mean low tide and 228 meters northeast of the end of an old dike which runs north and south. The elevation of the station is 4.1 feet. The station center is marked by a 1½-inch pipe, projecting 0.8 foot above the surface. Two 3-inch cedar stakes, driven 2 feet into the ground, with a copper tack in the center, are each 30.48 meters from the station, one in azimuth 61° 22′ and the other in azimuth 109° 23′.

Bluff (*U. S. E.*) (Harris County, U. S. E., 1900).—On the east bank of Burnett Bay, 5.5 meters from the bluff bank, in the extremity of a large clearing, 44 meters due north of a small point, 62.8 meters northeast of the ruins of an old brick kiln and 60 meters northeast of the beginning of the heavy timber line. The station is marked by a 2-inch iron pipe, projecting 6 inches above the surface. A 5-inch cedar stake, 3 feet long, driven 2 feet into the ground, is 30.48 meters from the station in azimuth 87° 33′, and a similar stake but 2 inches in diameter is the same distance from the station in azimuth 62° 23′.

Hog Island (*U. S. E.*) (Harris County, U. S. E., 1900).—Just north of Lynchburg, on the southern extremity of the large island in the San Jacinto River locally known as Hog Island. The station is probably marked with an iron pipe. Two cedar stakes projecting 1 foot above the ground are distant 26.97 meters and 24.38 meters, respectively, in azimuth 205° 50′ and 179° 39′.

Lost (*U. S. E.*) (Harris County, U. S. E., 1900).—On the eastern slope of a hill, on the north side of Old or Lost River, 91 meters from the water's edge, in a field owned by J. B. McGee; the land to the north is heavily timbered. The station is marked by a 2-inch iron pipe driven flush with the surface of the ground. For reference marks there are two cedar stakes, 3 inches in diameter and 3 feet long, driven 2 feet into the ground, with a copper tack in the top of each, one distant 30.48 meters in azimuth 176° 19′, the other distant 45.72 meters in azimuth 143° 48′.

Fuller (*U. S. E.*) (Harris County, U. S. E., 1900).—On the east side of Buffalo Bayou, opposite the mouth of Carpenters Bayou, 150 meters from the water's edge and 45 meters inshore from a clump of large gum trees. The station is elevated 7.3 feet. It is marked by an iron pipe driven into the ground. For reference marks there are two pine stakes, one 30.48 meters from the station, on the line to station *Tory Hill*, the other 22.86 meters in azimuth 352° 18′.

Shoal Point (*U. S. E.*) (Galveston County, U. S. E., 1900).—The station is marked by a 1½-inch pipe driven into the ground and projecting 6 or 8 inches above the surface. The station is probably lost.

M (*U. S. E.*) (Galveston County, U. S. E., 1900; 1912).—On Pelican Island, about 1 mile due west of the eastern extremity of the island, on the north end of a low ridge of hard ground. The station is marked by a U. S. E. standard station mark set 2 feet below the surface, and at the surface by a standard disk station mark set in the top of a 4-inch tile filled with and surrounded by concrete. A standard disk reference mark set in a 4-inch tile is 10.97 meters from the station. The following round of directions is given: Bolivar Point Lighthouse 0° 00′; wireless telegraph mast, 91° 04′; reference mark, 294° 58′. In 1912, when last visited, a 35-foot tripod was standing over the station.

Middle Deer Island (Galveston County, R. D. C., 1850).—On the southwest end of Middle Deer Island, on the highest part of a shell bank. The station is marked by an earthen cone placed 3 feet below the surface. There are three cedar stakes, each 1.83 meters from the station north, south, and east.

Spillman (Galveston County, R. D. C., 1850).—On the west side of West Bay, about 1 mile south of the mouth of Highland Bayou. The station is marked by an earthen cone 3 feet below the surface. The station can be recovered, if at all, by triangulation only.

Caronkaway Island (Galveston County, R. D. C., 1850).—On the northwest side of Karankawa Island, 6 meters back from the high-water mark. The station is marked by an earthen cone placed 3 feet below the surface, and can be recovered, if at all, by triangulation only.

Caronkaway Point (Galveston County, R. D. C., 1850).—On the west side of West Bay, 79 meters from the high-water mark. The station is marked by an earthen cone buried 3 feet below the surface. The station can be recovered, if at all, by triangulation only.

Alligator Head (Brazoria County, R. D. C., 1850).—Located 25 meters from the shore of West Bay and 60 meters east of the bayou leading to Halls Lake. The station is marked by an earthen cone buried 3 feet below the surface.

MATAGORDA BAY TO ESPIRITU SANTO BAY.

PRINCIPAL POINTS.

Bastrop (Brazoria County, R. D. C., 1850).—On the north side of the mouth of Bastrop Bayou, on the shore of Bastrop Bay, 8 meters from high water. The station is marked by an earthen cone buried 3 feet below the surface.

Peninsula (Brazoria County, R. D. C., 1850).—The station is marked by an earthen cone placed 3 feet below the surface. The station can be recovered, if at all, by triangulation only.

Cottonwood (Brazoria County, J. S. W., 1853).—Near Bastrop Bayou, about 6 miles from the mouth, on a ridge near two cottonwood trees. The station is marked by a stone cone buried 3 feet below the surface. Three feet north, east, and west from the station are stone posts.

Rattlesnake (Brazoria County, J. S. W., 1852).—The station is marked underground by a stone cone and at the surface with three stone blocks set 3 feet distant to the north, south, and east. The station can be recovered, if at all, by triangulation only.

Oyster Creek (Brazoria County, J. S. W., 1852; 1912).—Eighty-six meters from the east bank of Oyster Creek, about 2½ miles from the Gulf, 220 meters downstream from the first grove of trees on the right, going upstream. The underground mark is an earthen crock set 3 feet below the surface, and over this is a 4-inch square post. Two 4-inch stone posts are each 0.9 meter from the station, to the north and east, respectively.

Velasco (Brazoria County, J. S. W., 1853).—On the eastern side of the mouth of the Brazos River. The station is marked underground by a stone cone. Three stone blocks are each 3 feet from the station to the north, south, and east.

Brazos (Brazoria County, J. S. W., 1852; 1912).—In the prairie, 250 meters from the north bank of the Brazos River, 170 meters from the Houston & Brazos Valley Railroad track, and a short distance north of the round house at Velasco. The third telephone pole stump east of the railroad is 18.08 meters south of the station. The station is marked by an earthenware cone buried 3 feet below the surface of the ground, above which is a 4 by 4 inch scantling, 1 foot long. There are three stone blocks, projecting 4 inches above the ground, each 3 feet distant to the north, south, and east of the station.

Jupiter (Brazoria County, J. S. W., 1852; 1897).—Lost.

Bryan (Brazoria County, J. S. W., 1853).—In the prairie 4 miles from the Gulf and about 5 meters from the bank of Jones Creek. The station is marked by an earthen cone buried 3 feet below the surface. Three feet north, south, and east of the station granite blocks project 4 inches above the surface.

Bernard (Brazoria County, J. S. W., 1853).—This station is marked by an earthen cone buried 3 feet underground. It can be recovered, if at all, by triangulation only.

Cedar Lake (Matagorda County, J. S. W., 1852).—The station is marked by an iron cone buried 3 feet below the surface, with a granite block to the north, south, and east. The station can be recovered, if at all, by triangulation only.

McNeel (Brazoria County, J. S. W., 1852).—Five and one-half miles from the coast and about one-half mile west of the San Bernard River, in the corner of a pasture owned by Law-

rence Decroze, 6 meters from the north side of the pasture, and 110 meters from the house. The station is marked by an earthen cone buried 3 feet below the surface, with a granite block to the north, south, and east, each 3 feet from the station, and projecting 4 inches above the surface.

Rhodes (Matagorda County, J. S. W., 1853).—The station is marked by a cast-iron cone buried 3 feet below the surface. Three feet north, south, and east of the station are granite blocks projecting about 4 inches above the surface.

Cany (Matagorda County, J. S. W., 1852).—The station is marked by an iron cone buried 3 feet below the surface and surrounded by three granite blocks to the north, south, and east. The station can be recovered, if at all, by triangulation only.

Kenner (Matagorda County, J. S. W., 1853; 1883).—On the Kenner sugar plantation 150 meters north of the bend in Cany Creek, and 300 meters south 36° east of the sugar house. The station is marked by a cast-iron cone buried 3½ feet below the surface, and 3 feet to the north, south, and east are marble blocks, projecting 4 inches above the surface.

Mud Island south base (*U. S. E.*) (Brazoria County, U. S. E., 1906; 1912).—On the east side of Mud Island, 267 meters from the shore, nearly opposite the north end of a marsh island, which lies close inshore in Mud Pass, and on the second from the north of a row of five mounds. The station is marked by two U. S. E. standard station marks, one set in concrete at the surface and the other directly under it. A standard disk reference mark in the top of a 4-inch tile is on range with an oil tank just north of the mouth of the Brazos Canal, 9.91 meters from the station in azimuth 143° 33′.

San Luis (*U. S. E.*) (Brazoria County, U. S. E., 1912).—On San Luis Island, midway between the southwest point of the island and the Gulf of Mexico, 17 meters from the south shore, and 82 meters west of a small low island. There is a large grove of small trees across the water to the south. The station is marked by a U. S. E. standard station mark set in concrete. A standard disk reference mark set in the top of a 4-inch tile filled with cement, is 11.88 meters from the station in range with the oil tank near the mouth of the Brazos Canal.

Hartrick (*U. S. E.*) (Brazoria County, U. S. E., 1906; 1912).—On the mud flat on the northwest shore of Oyster Bay, 1,070 meters west of Christmas Point, 275 meters west of the end of a line of salt cedars, growing along the bluff from the bay shore to a point north of the station. This bluff is 150 meters from the station at the nearest point. The station is marked by a U. S. E. standard station mark set in concrete. In the top of a 4-inch tile, filled with concrete, is a standard disk reference mark, 15.64 meters from the station in azimuth 139° 12′.

Pass (Brazoria County, I. W., 1912).—Between the Gulf of Mexico and Oyster Bay, 3 miles southwest of San Luis Pass, at the center of a lone sand hill on the west side of a broad sand flat, one-half mile from the Gulf beach and 460 meters from Oyster Bay. A 3-inch iron pipe 4 feet long, driven 3½ feet into the ground, marks the station. A U. S. E. standard reference mark, projecting 2 inches above the ground, is 4.51 meters from the station in azimuth 140° 25′. One of the wings of the arrow points to the station.

Red Bluff (*U. S. E.*) (Brazoria County, U. S. E., 1901; 1912).—About 100 meters northwest of the extremity of the point at Red Bluff, and about 50 meters north of the corner of G. M. Harris's fence, 16 meters from a 6-foot bluff on the bay shore, and 8 meters from the line of a row of salt cedars extending inland from the bay shore. The station is marked by an iron rod, 1 inch in diameter, at the center of a length of stove pipe, filled with and set in concrete. The rod projects 3 inches above the top of the concrete. A standard disk reference mark in the top of a length of stove pipe which is set in and filled with concrete, is 14.92 meters from the station in azimuth 139° 04′.

Shell (Brazoria County, I. W., 1912).—On a shell ridge between the Gulf of Mexico and Oyster Bay, nearly opposite Rattlesnake Point, about one-half mile from the Gulf shore, and one-fourth mile south of a point where the Gulf washes over into the bay. The ridge is covered with mesquite bushes and cactus, and is about 15 feet above sea level. The station is marked according to note 7,[1] the reference mark being 14.77 meters from the station in azimuth 101° 28′.

[1] See pp. 45–46.

Rattlesnake 2 (Brazoria County, I. W., 1912).—On the Gulf shore 2 miles north of the Brazos Life Saving Station, on top of a sand and shell ridge, 14 meters from the inshore edge of the driftwood and 95 meters from a small bayou in the marsh back of the station. The station is marked according to note 7,[1] the reference mark being 13.31 meters from the station in azimuth 133° 56′. The following azimuths and distances are given: Life-saving patrol, key post, 39 meters, 52° 07′; lone house, west shore of Oyster Bay, 203° 34′; east gable of fish house, Rattlesnake Point, 217° 19′; guide post, Life-Saving Service, 42 meters, 33° 52′.

Well (*U. S. E.*) (Brazoria County, U. S. E., 1912).—One and one-fourth miles northeast of the mouth of the Brazos River, and about three-fourths mile southwest of the life-saving station, just west of the site of the Surfside Hotel, and near a large artesian well which has formed two small ponds south of the station. The station is marked by a standard disk station mark, set in a piece of stovepipe, which is filled with and set in concrete. The following distances and azimuths are given: Artesian well, 26.2 meters, 45° 35′; railroad water tank at Velasco, 94° 12′; Hudgins' house, chimney, 132° 57′.

Velasco Hotel Dome (Brazoria County, H. G. O., 1891; 1912).—Lost.

East (Brazoria County, H. G. O., 1891; 1912).—Lost..

West 2 (*U. S. E.*) (Brazoria County, U. S. E., 1897; 1912).—On the west side of the Brazos River, about 1 mile from the mouth, 315 meters south of the last house on the south side of Quintana. The station is marked by a U. S. E. standard reference mark, used as a station mark.

SUPLEMENTARY POINTS.

Christmas Point (*U. S. E.*) (Brazoria County, U. S. E., 1906; 1912).—On Christmas Point, between Oyster and Bastrop Bays, at the junction of the Brazos River and the Bastrop Canal, on hard ground, 250 meters from the point, 19 meters from the bluff bank on the bay shore, and 19 meters from the grass line toward the point. The station is marked by a U. S. E. standard station mark set in concrete. The reference mark is a 4-inch tile filled with concrete, with a standard disk reference mark set in the top, 13.18 meters distant in azimuth 114° 36′. A 2-inch iron pipe projects 4 inches from the ground 14.51 meters from the station in azimuth 100° 31′, and a second pipe projects 3 inches above the ground 14.08 meters from the station in azimuth 103° 17′.

Rattlesnake Point (*U. S. E.*) (Brazoria County, U. S. E., 1906; 1912).—On the northwest shore of Oyster Bay near the end of Rattlesnake Point, 35 meters north of a fish house with a large pile of oyster shells on the side toward the station. The station is 3 meters from the west bank of the Brazos Canal and 7 meters from the marsh on the bay shore. It is marked by a U. S. E. standard station mark. Three meters from the station toward the fish house a 1-inch iron pipe projects 4 inches above the ground.

Tom (Brazoria County, J. S. W., 1852).—On the west shore of the mouth of Oyster Creek. The station is marked by a black bottle buried 3 feet below the surface.

ESPIRITU SANTO BAY TO ARANSAS PASS AND CORPUS CHRISTI BAY.

PRINCIPAL POINTS.

Prairie (Matagorda County, J. S. W., 1852; 1883).—In the open prairie, and 4650 meters north 77° west of the largest house at the canal connecting Cany Creek and Matagorda Bay. The station is marked by a cast-iron cone buried 3 feet below the surface, and 3 feet to the north, south, and east are marble blocks projecting 4 inches above the surface.

Kenner Eccentric (Matagorda County, R. E. H., 1883).—Located 111 meters from station *Kenner*, and almost in prolongation of the line from station *Sanborn* through station *Kenner*. The station is marked by a cedar stub, with a copper tack which has crosslines in the top.

Sanborn (Matagorda County, R. E. H., 1883).—About 1 mile northwest of three houses near the mouth of Cany Creek, on a sand hill, about 75 meters from the high-water mark of the

[1] See pp. 45–46.

Gulf, and 365 meters south from a bayou that runs back of the station. The station is marked by a bottle buried 2½ feet below the surface. A drill hole in a block of porphyry weighing about 75 pounds marks the station at the surface.

Brown (Matagorda County, R. E. H., 1883).—On a sand hill near the Gulf beach, about 3 miles east of Smith's grove of cedars, about 1 mile west of Brown's grove, and 55 meters west of a wide flat which extends inland through the line of hills along the coast. The station is marked underground by an inverted beer bottle, 2½ feet below the surface, and at the surface by a cross in a bolt of lead in the top of a barrel of cement.

Sargent (Matagorda County, J. S. W., 1852).—Located 50 meters back from the water's edge. The station is marked by an iron cone buried 3 feet below the surface. Three feet north, south, and east of the station are granite blocks projecting about 4 inches above the surface.

Live Oak (Matagorda County, S. A. G., 1852; 1883).—On a shell bank on the west side of Live Oak Bayou, one fourth mile from the mouth. The station is marked by a wine bottle buried 3 feet below the surface, and three cedar stakes are each 0.91 meter to the north, south, and east.

East Point (Matagorda County, R. E. H., 1883; 1906).—About 8 miles below the upper end of Matagorda Peninsula, on a ridge of moderately high ground which extends almost from the sand hills on the Gulf shore to the marshes along Matagorda Bay. The station is marked by a cross in a bolt of lead, in the top of a marble post, 6½ inches square, 30 inches long, with the letters U. S. on the top and C. G. S. on the sides. The post rests on the subsurface mark, which is a cross in a bolt of lead in the top of one of a layer of bricks set in concrete. Around the post to the level of the ground is a pier of brick, 2 feet square, and over the monument is a cairn of loose stone.

Bath (Matagorda County, J. S. W., 1852; 1855).—The station is marked by a wine bottle buried 3 feet below the surface. It can be recovered, if at all, by triangulation only.

Seven Mile (Matagorda County, S. A. G., 1856; 1906).—On the north side of Matagorda Bay, on the highest part of what is locally known as Hog Island Mott, about 1 mile northeast of Chris. Shipprian's house, 300 yards back from the bay shore. The station is marked according to note 5,[1] with the exception that the reference marks are the vertical iron troughs described in note 6,[1] set one to the north 1.82 meters, one to the east 2.75 meters, and one to the west 1.80 meters from the station.

West Point (Matagorda County, R. E. H., 1883; 1906.)—About 12 miles below the upper end of Matagorda Peninsula, on a small hill, 400 meters from the shore of Matagorda Bay, and on the highest ground in this locality. The station is marked by a cross in a bolt of lead in the top of a marble post 6½ inches square and 30 inches long, with the letters U. S. on the top and C. G. S. on the sides. The post rests on the subsurface mark, which is a cross in a bolt of lead in the top of one of a layer of bricks set in concrete. Around the post to the level of the ground is a pier of brick 2 feet square.

Matagorda Peninsula north base (Matagorda County, R. E. H., 1883; 1906).—On Matagorda Peninsula, on a small rise of ground in the marsh, 320 meters from Matagorda Bay, and about 1 mile north of the house of P. Kain. The station is marked by a cross in a bolt of lead in the top of a marble post, inscribed "U. S. C. G. S.", and surrounded by a brick pier 1 foot square, both post and pier resting directly upon the underground mark, which is a cross in a bolt of lead in the top of a layer of brick, 3 feet square, set in cement mortar, 20 inches below the surface. Over the station is a conspicuous cairn of loose stones.

Matagorda Peninsula south base (Matagorda County, R. E. H., 1883).—Lost.

Duncan (Matagorda County, S. A. G., 1856; 1906).—On the south shore of Matagorda Bay, about one-third mile southwest of Cleveland Bayou and 70 meters from the bay shore, on land owned by Chris Shipprian. The station is marked according to note 5,[1] with the exception that the reference marks are described in note 6,[1] and are each 1.83 meters, to the north, east, south, and west, respectively.

[1] See pp. 45–46.

Matagorda (Matagorda County, S. A. G., 1855; 1906).—Lost. The station was marked according to note 6.[1]

Gulf Shore (Matagorda County, S. A. G., 1855).—The station is marked according to note 6.[1]

Mad Island (Matagorda County, S. A. G., 1855).—The station is marked according to note 6.[1]

Shell Island (Matagorda County, S. A. G., 1855; 1911).—Lost.

Three Mounds (Matagorda County, S. A. G., 1856).—This station is marked according to note 6.[1]

Lake (Matagorda County, S. A. G., 1856).—This station is marked according to note 6.[1]

High Mound (Matagorda County, S. A. G., 1857).—This station is marked according to note 6.[1]

Palacios (Matagorda County, S. A. G., 1857).—This station is marked according to note 6.[1]

Well Point (Matagorda County, S. A. G., 1856; 1906).—About 2 kilometers west of the extremity of Well Point. The station is marked by a bottle buried 3 feet below the surface, and at the surface by a spike in a mass of concrete, the top of which is inscribed "C. G. S., 1855–1906." There is an iron reference mark 1.82 meters from the station, and a concrete post, 10 inches square and 2 feet long, 13.39 meters from the station.

Shell Reef Point (Matagorda County, S. A. G., 1859).—The station is marked according to note 6.[1]

Turtle Bay (Matagorda County, S. A. G., 1856).—This station is marked according to note 6.[1]

Osgood (Matagorda County, S. A. G., 1856).—This station is marked according to note 6.[1]

La Salle (Calhoun County, S. A. G., 1857).—This station is marked according to note 6.[1]

Sand Point 1857 (Calhoun County, S. A. G., 1857).—This station is marked according to note 6.[1]

Indianola (Calhoun County, S. A. G., 1857).—This station is marked according to note 6.[1]

Sheldon House (Calhoun County, S. A. G., 1857).—This station is probably marked according to note 6.[1]

Gallinipper (Calhoun County, S. A. G., 1857).—This station is marked according to note 6.[1]

Lavaca (Calhoun County, S. A. G., 1857; 1868).—On the west side of Lavaca Bay, about 1 mile north of Port Lavaca, and about 15 feet above mean sea level. The station is marked according to note 6.[1]

Garcitas (Jackson County, S. A. G., 1857; 1868).—The station is marked according to note 6.[1]

Bay View (Matagorda County, W. B. F., 1906).—The station is the center of the cupola of the Bay View Hotel in Matagorda. This building was the courthouse until the county seat was moved to Bay City.

Spring (Matagorda County, W. B. F., 1906).—On the bay shore of Matagorda Peninsula about 1¼ miles to the eastward of Tiger Island, abreast of the head of Spring Lake Bayou, 10 meters back from the shore line, and 200 meters east of the wire fence dividing the Breman and Culver properties. The station is marked according to note 5,[1] one reference mark being 10.14 meters from the station in azimuth 287° 57′, and the other 10.06 meters in azimuth 26° 07′.

Mad Island 2 (Matagorda County, W. B. F., 1906).—On the north shore of Matagorda Bay, on what is known as Shell Island Mott, on the prolongation of a line running longitudinally through Shell Island Reef. The mott at this point is a shell bank with an elevation of some 12 feet and is covered with bushes and small trees. The station is about 25 meters back from the high-water line and 75 meters from the north end of the mott, on the highest ground. It is marked according to note 5,[1] one reference mark being 9.935 meters from the station in azimuth 81° 44′, and the other 8.995 meters in azimuth 175° 50′.

Three Mounds 2 (Matagorda County, W. B. F., 1906).—On the south side of Matagorda Peninsula, on the highest of a group of three sand hills, about one-half mile east of the old Duffy

[1] See pp. 45–46.

house, 1 mile west of Philips Mott, and 300 meters from the Gulf high water line. A small bayou makes in from the Bay shore about opposite to or north from the station. The station is marked according to note 5,[1] with the exception that there are no reference marks.

Lake 2 (Matagorda County, W. B. F., 1906).—On the north shore of Matagorda Bay, about 2½ miles northeast of Palacios Point, 500 meters northeast of a little sand point, 700 meters southwest of a small wooded mott, on hard shell ground, 27 meters from the high-water line, and close to a path that runs along the shore. The station is marked according to note 5,[1] one reference mark being 13.750 meters from the station in azimuth 93° 23′, and the other 15.825 meters in azimuth 177° 07′.

High Mound 2 (Matagorda County, W. B. F., 1906).—On the Gulf Shore of Matagorda Peninsula, about 6 miles below Philips Mott, on a round, grass-covered, sand hill, the highest in the vicinity and locally known as High Mound. The station is marked according to note 5,[1] with the exception that there are no reference marks.

Well Point 2 (Matagorda County, W. B. F., 1906).—On Well Point, on the northern shore of Matagorda Bay, 150 meters west of the extremity of the point, 75 meters from the north bluff, and 45 meters from the south bluff. The station is marked according to note 5,[1] one reference mark being 12.989 meters from the station in azimuth 176° 22′, and the other 13.635 meters in azimuth 84° 38′.

Osgood 2 (Matagorda County, W. B. F., 1906).—On the Bay Shore of Matagorda Peninsula, on what is known as Morgans Point, 300 meters southwest of Cherry Bayou, 400 meters from Cherry's house, back about 120 meters from the shore line. Between the station and the shore and distant from the station 67 meters are the gravestones of the Morgan family. The station is marked according to note 5,[1] one reference mark being 14.037 meters from the station in azimuth 354° 26′, and the other 13.127 meters in azimuth 84° 37′.

Sand Point 1906 (Calhoun County, W. B. F., 1906).—On Sand Point on the north side of the entrance of Lavaca Bay from Matagorda Bay, 1 mile from the western extremity of the point, 60 meters back from the shore line, 75 meters north of a clump of bushes, and 100 meters from the clump close to the water's edge. The station is 2½ feet above ordinary high water, but at times it is entirely submerged. It is marked according to note 5,[1] with the exception that there are no reference marks.

La Salle 2 (Calhoun County, W. B. F., 1906).—On the southwest shore of Matagorda Bay, about 1¼ miles southeast of Powderhorn Bayou sometimes called Indianola Bayou, 175 meters east of the first row of cedars east of the bayou and 58 meters back from the 10-foot bluff at the shore line. The station is on a slight rise of ground about 13 feet above high water, and is marked according to note 5,[1] one reference mark being 14.296 meters from the station in azimuth 359° 53′, and the other 15.328 meters in azimuth 90° 39′.

Big Bayou (Calhoun County, W. B. F., 1906; 1911).—On the northern end of Bayucos Island, on the point of marsh on the east side of the entrance to Big Bayou, about 2 miles west of Saluria Bayou, 60 meters from the shore line, and 12 meters north from the only clump of bushes on the point. The station is marked according to note 5,[1] with the exception that there are three reference marks instead of two, the first 14.900 meters distant in azimuth 182° 23′, the second 12.281 meters in azimuth 272° 23′, and the third 11.600 meters in azimuth 92° 23′.

Espiritu Santo 2 (Calhoun County, W. B. F., 1906).—On Dewberry Island, 1 mile southwest of the northeast end of the island, 50 meters northwest from the high-water mark, 15 meters east of a clump of bushes, on ground about 2 feet higher than the surrounding marsh. The station is marked according to note 5,[1] one reference mark being 11.805 meters from the station in azimuth 135° 29′, and the other 14.205 meters in azimuth 225° 29′.

Hill (Calhoun County, W. B. F., 1906).—On one of the highest sand hills on the Gulf shore of Matagorda Island, about 1½ miles west of Matagorda Lighthouse. The station is marked according to note 5,[1] with the exception that there are no reference marks.

Eleven Mile Point (Matagorda County, S. A. G., 1856).—This station is marked according to note 6.[1]

[1] See pp. 45–46.

Three Mile Point (Matagorda County, S. A. G., 1855).—This station is marked according to note 6.[1]

Espiritu Santo (Calhoun County, S. A. G., 1857; 1911).—The station is 1.34 meters from the station *Espiritu Santo Eccentric* in azimuth 0° 53′, and is marked by a bottle embedded in a core of concrete, set 3 feet below the surface.

Rahal (Calhoun County, S. A. G., 1857; 1859).—This station is marked according to note 6.[1]

Grass Island (Calhoun County, S. A. G., 1859; 1911).—Lost. The station was marked according to note 6.[1]

Panther Point (Calhoun County, S. A. G., 1859).· Lost. The station was marked according to note 6.[1]

Shell Island (Calhoun County, S. A. G., 1859).—This station is marked according to note 6.[1]

Mosquito Point (Calhoun County, S. A. G., 1859; 1911).—This station is 25.51 meters from *Mosquito Point 2* in azimuth 302° 46′. The subsurface mark is a bottle embedded in a concrete core 3 feet below the surface. The surface mark is an iron spike in the center of a cast-iron ring lettered U. S. Coast Survey, embedded in a core of concrete and projecting about 2 inches above the general level of the ground.

Sand Mounds (Aransas County, S. A. G., 1859; 1911).—Lost. This station was marked according to note 6.[1]

Cedar Bayou (Calhoun County, S. A. G., 1859; 1911).—Lost.

St. Charles (Aransas County, S. A. G., 1859).—This station is marked according to note 6.[2]

Littles (Aransas County, S. A. G., 1859; 1911).—Lost. This station was marked according to note 6.[1]

Big Mound (Aransas County, S. A. G., 1859; 1911).—Lost.

Ballou House 1859 (Aransas County, S. A. G., 1859).—This station is on the same tower as the station *Ballou House 1911*, but the exact point is not known.

Copano House (Refugio County, S. A. G., 1859; 1911).—Lost.

Shell Bank (Aransas County, S. A. G., 1859; 1911).—Lost.

Espiritu Santo Eccentric (Calhoun County, J. C. G., 1911).—One-half mile northeast from the southwest end of Dewberry Island, on the northwesterly portion of the highest knoll and 4 feet above high water. The station is marked according to note 1.[1] Reference mark number one is the same as the mark described in note 6.[1] It is set in a core of concrete projecting 4 inches above the general level of the ground, 9.18 meters from the station in azimuth 348° 36′. Two other reference marks similar to the first are each 1.22 meters from the station in azimuths 91° 07′ and 271° 23′, respectively. There is also a standard disk reference mark embedded in a concrete core 1½ feet in diameter set flush with the surface on the highest part of the knoll, 15.55 meters from the station in azimuth 294° 21′.

Long (Calhoun County, J. C. G., 1911).—On the highest point of ground on Long Island, 2¼ miles northeast of Steamboat Pass, and 10 meters back from the edge of the embankment. The station is marked according to note 2.[1] Reference mark number one is distant 6.32 meters from the station in azimuth 171° 46′ and number two is distant 14.99 meters in azimuth 71° 50′.

Cactus (Calhoun County, J. C. G., 1911).—On the north shore of Matagorda Island, opposite the eastern shore of Pringes Lake, about 10 meters west of the scrub bushes growing near the shore. These bushes are the first to be found growing near the shore line west of Matagorda Light. The station is 15 meters back from high water of Espiritu Santo Bay and 11 meters from the high water of Pringes Lake. The station is marked according to note 2,[1] the reference marks being distant 7.88 meters and 13.42 meters in azimuths 306° 11′ and 98° 00′, respectively.

Contee (Calhoun County, J. C. G., 1911).—On a low bank, 7 meters back from high water, on the north shore of Matagorda Island, one-half mile west of the west entrance of Pringes Lake, at a point where the shore line changes from a general northeast and southwest trend to an east and west direction. The station is marked according to note 2,[1] the reference marks being distant 4.32 meters and 11.38 meters in azimuth 6° 32′ and 98° 28′, respectively.

[1] See pp. 45–46.

Steam (Calhoun County, J. C. G., 1911).—At the western end of Espiritu Santo Bay, on the northeastern portion of the island on the southeast side of Steamboat Pass, 75 meters south of the lone and conspicuous group of salt cedars growing on the northeast shore of the island and 24 meters back from the edge of the embankment. The station is marked according to note 2.[1] Reference mark number one is 9.79 meters distant in azimuth 127° 25′ and number two is 19.09 meters in azimuth 35° 34′.

Nest (Calhoun County, J. C. G., 1911).—On the highest knoll near the east end of the second islet, counting from the westward, lying west of the main portion of Grass Island. The knoll is covered with brush and cactus, is 6 feet above high water, and is the highest ground within a radius of 2 miles. The station is marked according to note 2.[1] Reference mark number one is 5.09 meters distant in azimuth 244° 36′ and number two 5.19 meters in azimuth 175° 02′.

Greek (Calhoun County, J. C. G., 1911).—On the northern shore of Matagorda Island 5½ miles northeast of Panther Point. The station is on the south shore of the southernmost cove in the locality, on raised ground 12 meters back from high water, on a range determined by the little marsh islet near the mouth of the cove and the end of the low marshy point northwest of the islet. The station is marked according to note 2.[1] Reference mark number one is 7.59 meters distant in azimuth 353° 14′ and number two 18.325 meters in azimuth 242° 51′.

Heron (Calhoun County, J. C. G., 1911).—On Shell Island locally known as Big Bird Island, lying in San Antonio Bay about midway between Grass Island and False Live Oak Point. The station is on the highest part of the island, about 2 meters north of the prickly pear growth, and is marked according to note 2.[1] Reference mark number one is about 2 meters east of the prickly pear growth, 9.06 meters from the station in azimuth 317° 27′, and number two is at the approximate center of the prickly pear growth, 6.13 meters from the station in azimuth 18° 29′.

Pan (Calhoun County, J. C. G., 1911).—On the extremity of Panther Point, on the south side of San Antonio Bay, 4 meters back from high water. The station is marked according to note 2.[1] Reference mark number one is distant 4.31 meters in azimuth 323° 47′ and number two is distant 7.665 meters in azimuth 28° 53′.

Mosquito Point 2 (Calhoun County, J. C. G., 1911).—On Mosquito Point on the east shore of San Antonio Bay, 75 meters back from the extremity of the point, and approximately at the center of the peninsula. The station is marked according to note 2,[1] reference mark number one being 16.365 meters distant in azimuth 351° 53′ and number two 19.40 meters in azimuth 235° 52′. In addition there are, a cast-iron mark, the same as is described in note 6,[1] 28.00 meters from the station in azimuth 304° 55′, and a one-half inch square rod, projecting 6 inches above the surface, 0.53 meters from the station in azimuth 342° 39′.

Dagger (Aransas County, J. C. G., 1911).—On the western side of San Antonio Bay, 2 miles south of Webb Point, on the low point known locally as Dagger Point by reason of the cluster of "Spanish dagger" growing there, on the highest part of the shell ridge at the extremity of the point and 7 meters back from high water. The station is marked according to note 2,[1] the reference marks being distant, respectively, 8.55 meters in azimuth 15° 07′ and 5.73 meters in azimuth 167° 26′.

Webb (Aransas County, J. C. G., 1911).—On the western shore of San Antonio Bay on the easternmost portion of Webbs Point, on top of a grassy sand knoll, 5 meters back from high water. A grassy mound with an elevation of 15 feet, entirely free of all shrubbery, lies directly back of the station. The station is marked according to note 2,[1] with the exception that reference mark number one is omitted. The reference mark corresponding to number two is distant 12.45 meters in azimuth 175° 19′ and is 1 meter west of a lone group of prickly ash growing about 6 meters back from the high-water mark.

Swan (Calhoun County, J. C. G., 1911).—On the point locally known as Swan Point, on the eastern shore of San Antonio Bay, 1½ miles south from Seadrift, 56 meters back from the outer extremity of the high ground on the point, and 10 meters from the edge of the south bank. The

[1] See pp. 45–46.

station is marked according to note 2.[1] Reference mark number one is on a slightly raised knoll, 125 meters back from the end of the point, distant 66.325 meters in azimuth 266° 05′, and number two is distant 29.47 meters in azimuth 264° 14′.

Sharp (Refugio County, J. C. G., 1911).—On the point locally known as Sharps Point, on the west side of the entrance to Hynes Bay, on the top of the bank about 5 meters south of a lone prominent group of five hackberry trees, growing about 20 meters back from the edge of the bank. The station is marked according to note 2,[1] reference mark number one being distant 22.06 meters in azimuth 55° 30′ and number two approximately equidistant from the three northernmost hackberry trees, distant 10.555 meters in azimuth 147° 31′.

Terry (Calhoun County, J. C. G., 1911).—On the rounding point 1 mile west from Seadrift and 2 miles south of the village of Long Mott, on the top of the bank 15 meters back from the edge of the slope and 120 meters northwest of the first line fence north of the cemetery. It is marked according to note 1.[1] The reference mark is a bottle embedded in a concrete core 40 inches below the surface, and as a surface mark a standard disk reference mark is set in a 20-inch core of concrete projecting 4 inches above the ground.

Marsh (Refugio County, J. C. G., 1911).—On the southwest point of the low marshy peninsula on the eastern side of Hynes Bay and 5 meters back from high water. The station is marked by a standard disk station mark set in a core of concrete 18 inches in diameter and 2 feet deep. A standard disk reference mark embedded in a core of concrete 18 inches in diameter and 2 feet deep, set with the top projecting 4 inches above the marsh, is 8.79 meters from the station in azimuth 195° 26′. The other reference mark, a 4 by 4 inch post at the center of a conical mound of dirt, 2½ feet high and 3 feet in diameter at the base, is 11.40 meters from the station in azimuth 288° 31′.

Nipper (Refugio County, J. C. G., 1911).—On the east shore of Hynes Bay, 1½ miles northward of the entrance and 14 meters back from the shore line. The station is marked by a standard disk station mark embedded in a concrete core 15 inches in diameter and 2 feet deep, set flush with the surface. A standard disk reference mark embedded in a core of concrete 18 inches in diameter, 2 feet deep, projecting 4 inches above the surface, is 14.055 meters distant in azimuth 188° 21′. The other reference mark is a 4 by 4 inch post at the center of a conical dirt mound, 2½ feet high and 3 feet in diameter at the base, distant 27.29 meters from the station in azimuth 259° 46′.

Austin (Refugio County, J. C. G., 1911).—On the west shore of Hynes Bay, 2¼ miles from Sharps Point and about 500 meters northward from Mr. Austin's ranch house, the first and most conspicuous house on the west shore of the bay when approaching from the south. The station is on the top of the bank, 5 meters from the edge of the slope, and about 15 meters from high-water mark. It is marked by a standard disk station mark embedded in a core of concrete 1½ feet in diameter and 2½ feet long. The reference mark, a standard disk embedded in a core of concrete, with a bottle, also embedded in concrete about 30 inches below the surface, as an underground mark, is 27.08 meters from the station in azimuth 47° 23′. It is directly under the telephone line that parallels the shore and about 45 meters from high-water mark.

Duck.—(Refugio County, J. C. G., 1911).—On the eastern shore and about three-fourths of a mile from the head of Hynes Bay. A small marshy point projecting about 120 meters into the bay interrupts the general northwest trend of the shore line in this locality. The station is on low marshy ground directly back of the point, 60 meters north from the shore line, and practically on the range determined by the general trend of the shore line to the southward. The station is marked by a standard disk station mark set in a core of concrete 1½ feet in diameter and 2½ feet deep, buried flush with the ground. A standard disk reference mark set in a core of concrete 2 feet in diameter and projecting 3 inches above the general surface of the ground is distant 21.6 meters from the station in azimuth 202° 19′. A second reference mark is a 4 by 4 inch post at the center of a conical dirt mound 2½ feet high and 3½ feet in diameter at the base, distant 20.275 meters in azimuth 299° 53′.

[1] See pp. 45–46.

Crescent (Refugio County, J. C. G., 1911).—One and one-fourth miles south of the head of Hynes Bay, on the west shore, 10 meters back from the edge of the slope at the point where the nearest windmill is in azimuth 24° 14′. The station is marked according to note 1.[1] The reference mark, a bottle embedded in a core of concrete buried 2½ feet below the surface, and a standard disk reference mark also embedded in concrete for the surface mark is 24.88 meters distant from the station in azimuth 45° 10′.

Oil (Refugio County, J. C. G., 1911).—On the western shore of the channel leading to the Guadalupe River, 1½ miles southwest of Long Mott village, 15 meters back from the shore line. The station is marked by a standard disk station mark embedded in a core of concrete 15 inches in diameter, 2 feet deep, and set flush with the surface. A standard disk reference mark embedded in a core of concrete 18 inches in diameter, projecting 3 inches above the surface of the ground, is distant 19.07 meters in azimuth 353° 09′. The other reference mark, a 4 by 4 inch post at the center of a conical dirt mound, 3 feet high and 4 feet in diameter at the base, is distant 12.66 meters in azimuth 281° 03′.

Range Beacon (Calhoun County, J. C. G., 1911).—The station is on the east shore of the channel leading to the Guadalupe River and is the front beacon of the range for the dredged channel between beacons Nos. 1 and 6. The beacon is a tripod built of 6 by 6 inch beams and is anchored to cedar posts, surmounted by a triangular lattice cage, about 30 feet above the ground and the whole structure painted white. The position of the beacon was originally marked by a 2-inch iron pipe driven into the marsh. This was left undisturbed, but the ground was removed from the top, and a concrete core encasing it and bearing a standard disk station mark now marks the station.

False (Aransas County, J. C. G., 1911).—On the southern extremity of False Live Oak Point, about 10 meters back from high water. The station is marked according to note 2,[1] reference mark number one being 15.14 meters distant in azimuth 59° 41′ and number two 8.41 meters in azimuth 122° 09′.

Snake (Calhoun County, J. C. G., 1911).—On the north side of Matagorda Island, 4½ miles southwest of Panther Point, five-eighths mile back from the shore line, on a grassy sand ridge free from shrubbery, 125 meters west of a small tortuous bayou leading from San Antonio Bay and in range with Panther Point and a lone clump of shrubbery about a mile to the east of the bayou. On the southeast side of the ridge is a thick growth of mesquite brush and on the west side a scattered growth. The station is marked according to note 2.[1] Reference mark number one is 21.11 meters distant in azimuth 216° 30′ and number two is distant 23.88 meters in azimuth 81° 46′.

Ayres (Aransas County, J. C. G., 1911).—On the southeastern end of Ayres Island, on that point nearest to the dredged channel, on the top of the highest part of the shell bank directly adjacent to the point and about 7 feet above high water. The station is marked according to note 2,[1] the reference marks being distant 3.16 meters and 18.82 meters in azimuth 145° 44′ and 213° 04′, respectively.

Bray (Calhoun County, J. C. G., 1911).—The station is on the southern shore of Brays Cove, Mesquite Bay, on the northern arm of the slightly raised ridge of ground that runs northeastward from the southeast corner of the cove, and 10 meters back from high-water mark. The station is marked according to note 2,[1] the reference marks being distant 19.81 meters and 12.75 meters in azimuths 227° 37′ and 175° 08′, respectively.

Gaston (Aransas County, J. C. G., 1911).—On the point of the mainland 1 mile westward from the third chain of islands, on the highest part of the shell bank and about 20 meters from high water. It is marked according to note 2,[1] reference mark number one being 7.75 meter distant in azimuth 277° 16′ and number two 10.73 meters in azimuth 48° 06′.

Cedar (Calhoun County, J. C. G., 1911).—On the western end of Matagorda Island 1 mile south from the northern entrance to Cedar Bayou. It is on a sand dune about 240 meters back from the bayou, abreast of a lone and conspicuous row of salt cedars about 37 meters long and running approximately east and west. There is no other shrubbery on Matagorda

[1] See pp. 45–46.

Island within one-fourth mile on either side and no other group of similar cedcrs on the bayou. The station is marked by a standard disk station mark embedded in a core of concrete 1½ feet in diameter and 3 feet deep buried flush with the surface. A standard disk reference mark is set in a core of concrete 2 feet in diameter projecting 6 inches above the general level of the ground; the underground mark is a bottle embedded in concrete 3 feet below the surface. The reference mark is 193 meters from the station in azimuth 70° 49′, in the north edge of the cedars about 10 meters west of the east end of the row.

Dun (Aransas County, J. C. G., 1911).—On the southeastern extremity of the low point of mainland lying one-half mile west by north off Dunhams Island, and 8 meters back from high water. The station is marked according to note 2,[1] reference mark number one being 59.18 meters distant from the station in azimuth 192° 06′ and number two 18.27 meters in azimuth 187° 44′.

Joe (Aransas County, J. C. G., 1911).—On the northern side of St. Josephs Island, 1½ miles back from the beach, on a small tract of high firm ground, 75 meters from the eastern end of the island and 40 meters back from the northern side. The station is marked according to note 2,[1] reference mark number one being distant 15.29 meters from the station in azimuth 257° 17′ and number two 14.67 meters in azimuth 353° 25′.

Center (Aransas County, J. C. G., 1911).—The station is a 4 by 4 inch post secured to the small tripod beacon, marking the southeast end of Half Moon Reef, Aransas Bay. The tripod is surmounted by a cylindrical slatted daymark, about 20 feet above high water. The legs of the structure are anchored in three 2-inch iron pipes driven into the reef. The beacon is painted red.

Car (Aransas County, J. C. G., 1911).—On the northern side of St. Josephs Island, 0.9 mile back from the beach, on the most northwestern point of firm ground in this locality that is continuous with the mainland and is never submerged by extreme high water. The station is marked according to note 1.[1] The reference mark is on the northern side of a lone mesquite bush, the only bush within a one-fourth mile radius. The underground mark is a bottle embedded in concrete buried 3 feet below the surface. A standard disk reference mark is set in a core of concrete 2 feet in diameter and projecting 3 inches above the ground. It is 7.525 meters from the station in azimuth 341° 14′.

Mile (Aransas County, J. C. G., 1911).—On the top of the shell ridge, on the western shore of Aransas Bay, 150 meters from the extremity of the point, 25 meters north of the end of the ridge. The station is marked according to note 2.[1] Reference mark number one is on the center of the main shell ridge, 11.87 meters from the station in azimuth 193° 53′, and number two is on the spur making out toward Rockport, 23.35 meters from the station in azimuth 58° 43′.

Ballou House (Aransas County, J. C. G., 1911).—This is the first house southeast from Lamar Church. It is a two-story masonry building with a lookout on top of the main roof. The station is the center of the lookout as determined by the intersection of the diagonals drawn through the centers of the four corner posts. The house is at present owned and occupied by Mr. Taylor.

Oak (Aransas County, J. C. G., 1911).—The station is on the highest point of the highest sand hill 1¼ miles north of Fulton, on the west shore of Aransas Bay, locally known as "Lookout Hill." The station is marked according to note 2.[1] Reference mark number one is approximately 8 feet lower than the station mark, on the southeast slope of the hill, 2 meters northwest from a small live oak, distant 14.11 meters from the station in azimuth 319° 52′. Reference mark number two is on the west slope of the hill, 10 feet below the crest, projecting 3 inches above the sand, distant 21.97 meters in azimuth 80° 59′.

Decker (Aransas County, J. C. G., 1911).—On the lookout of the old lone frame building on the northwest side of Fish Point. The station is marked by a spike, surrounded by smaller nails driven into the floor of the lookout. The reference marks are the same as are described in note 2,[1] number one being 0.6 meter east of the east corner of the chicken house and 20.75 meters, horizontal distance, from the station in azimuth 140° 31′. Number two is 1 meter

[1] See pp. 45–46.

east of a large live oak tree, 9.4 meters south of the west corner of the house, and 21.98 meters, horizontal distance, from the station in azimuth 64° 34′. The distance between the reference marks is 26.31 meters. The angle at reference mark number one between number two and the station is 54° 08′ 00″ and the angle at number two between number one and the station is 49° 55′ 12″.

Rat (Refugio County, J. C. G., 1911).—On the north shore of Copano Bay, 4¼ miles northeast from the Copano Village Ruins, on top of the bank 9 meters back from the edge of the slope. The station is marked according to note 2.[1] Reference mark number one is 15 meters back from the edge of the embankment, distant 20.725 meters in azimuth 233° 15′, and number two is distant 23.29 meters in azimuth 152° 08′.

End (Refugio County, J. C. G., 1911).—On the north shore of Copano Bay on the west side of the entrance to Rattlesnake Creek. The station is about 100 meters westward from the extremity of the high ground and 20 meters back from the bank of the bay side. The station is marked according to note 2.[1] Reference mark number one is 19.36 meters from the station in azimuth 162° 30′, and number two 31.33 meters in azimuth 90° 36′.

Cop (Refugio County, J. C. G., 1911).—On the north shore of Copano Bay about 70 meters westward from the westernmost ruins of the village of Copano and about 120 meters from the shell spit that makes out from the shore line one-eighth mile west of the ruins, 4 meters back from the shore line. The station is marked according to note 2.[1] Reference mark number one is 7 meters back from the edge of the embankment and 4 meters south of the east edge of a cluster of salt cedars, the only visible ones west of the ruins. The mark is 32.365 meters distant from the station in azimuth 215° 29′. Number two projects 3 inches above the general surface of the ground and is distant 27.60 meters from the station in azimuth 145° 46′.

Hans (Aransas County, J. C. G., 1911).—On the southern shore of Copano Bay, 4 miles southwest of Fish Point. There are three distinct shell ridges paralleling the shore line, with strips of marsh intervening. The station is on the lowest ridge directly adjacent to the shore line and is 6 meters back from high water. The station is marked according to note 2.[1] Reference mark number one is on the shell ridge about 7 meters from high water, 21.61 meters from the station in azimuth 65° 30′, and number two is on the northern slope of the second shell ridge, 27.99 meters from the station in azimuth 344° 29′.

Miss (Refugio County, J. C. G., 1911).—On the north shore of Copano Bay, three-fourths mile southwest of the entrance to Mission Bay and about 80 meters north of a low shell point, 12 meters back from high water, and about 2 meters north of the northern wheel rut of the shell road paralleling the beach. The station is marked according to note 2,[1] the reference marks being 10.395 meters and 19.195 meters distant in azimuths 129° 05′ and 160° 28′, respectively. The arrow on the disk of the second reference mark points about halfway between the first reference mark and the station.

Port (Aransas County, J. C. G., 1911).—On the southern shore of Copano Bay, 85 meters back from the western extremity of the point on the east side of the entrance to Puerto Bay, 10 meters south from the shore line on a slightly raised shell ridge. The station is marked according to note 2.[1] Reference mark number one is distant 48.54 meters in azimuth 275° 33′ and number two 83.91 meters in azimuth 268° 40′.

Mary (Refugio County, J. C. G., 1911).—On the north shore of Copano Bay, one-fourth mile south of the large and conspicuous Bayside Hotel, on top of a 12-foot bank, 14 meters back from the edge of the slope. The station is marked according to note 2.[1] Reference mark number one is 3 meters east of the southeast corner of the white picket fence that surrounds the eastern one of two graves, and 34.625 meters from the station in azimuth 55° 30′, while number two is 27.71 meters from the station in azimuth 122° 08′.

Star (San Patrico County, J. C. G., 1911).—On the southwest shore of Copano Bay, on the high ground on the point at the west side of the entrance to Puerto Bay, 50 meters west of the extremity of the point, and 20 meters back from the edge of the bank on the Copano Bay side.

[1] See pp. 45–46.

The station is marked according to note 2.[1] Reference mark number one is 19.60 meters distant in azimuth 94° 19′, and number two 43.33 meters in azimuth 96° 18′.

Rock (Aransas County, J. C. G., 1911).—On the shell bank on the north shore of Copano Bay, about 230 meters northeast of the cove that is 1½ miles southwest of Rockport. The station is 11 meters back from the road that parallels the beach and is marked according to note 2,[1] with the exception that the subsurface mark is 40 inches below the surface instead of 30 inches. Reference mark number one is distant 7.66 meters in azimuth 208° 02′, and number two 8.55 meters in azimuth 143° 01′.

Mud (Aransas County, J. C. G., 1911).—On the north shore of Mud Island, ½ mile from the east end, on the top of a shell bank and 27 meters back from high water. The station is marked according to note 2.[1] Reference mark number one is 23.29 meters from the station in azimuth 3° 08′ and number two is 36.31 meters in azimuth 73° 21′.

Ridge (Nueces County, P. A. W., 1899; 1912).—On the northeast side of Harbor Island, on an embankment 6 feet high which was built for a proposed railroad, 6 meters from the south end of the embankment, and 22 meters from the bay shore. The station is marked by a 3-inch iron pipe, 7 feet long, with a flange at the bottom 7 inches in diameter. The top and bottom are set in cement and the pipe is filled with the same material. The reference mark described in note 7 is 12.18 meters from the station in azimuth 268° 26′.

Blind (Aransas County, I. W., 1912).—On St. Josephs Island, 34 meters from the shore of Aransas Bay, 3¼ miles from Aransas Pass, opposite the day beacon on the south end of the middle ground, which marks the beginning of Blind Passage. The station is marked according to note 7.[1]

Lone Tree Knoll (Aransas County, P. A. W., 1899).—The station is marked by a 3-inch iron pipe 7 feet long, with a flange 7 inches in diameter at the bottom, filled with cement and set in the same material at both the top and bottom, the top projecting 8 inches above the surface. This station can be recovered, if at all, by triangulation only.

Entrance (Nueces County, P. A. W., 1899).—At the northeastern end of Mustang Island on the low sandy point at the entrance to Aransas Pass. The station is marked by a 3-inch iron pipe projecting 4 feet above the ground. In 1909 the United States Engineers re-marked the station, probably preserving it exactly.

Lost (Nueces County, P. A. W., 1899).—On a shifting sand dune, on Mustang Island, 3¼ miles west of Aransas Pass. The station was marked by a piece of 3-inch iron pipe 7 feet long, filled with concrete and set vertically in the sand, with a mixture of concrete at the top and bottom. The locality was visited in 1912, at different times by two officers of the Survey, and the station was searched for without the use of instruments and was not found. If the station still exists, it is probably covered with sand and can only be recovered by triangulation.

Cant Island (Calhoun County, S. A. G., 1857).—The station is marked according to note 6.[1]

Bar (Calhoun County, J. C. G., 1911).—The station is 130 meters (paced) southwest from the low marshy northeast end of the main portion of Long Island. The station is marked by a standard disk station mark set in a mass of cement 15 inches in diameter and 2 feet deep. The reference mark, a 4 by 4 inch post in the center of a conical dirt mound 2½ feet high and 3 feet in diameter at the base, is 24.45 meters north 54° 45′ west (magnetic).

Steamboat Pass (Calhoun County, S. A. G., 1857).—This station is marked according to note 6.[1]

Rogers (Nueces County, H. D. K., 1905).—Located one-fourth mile south of Rogers railway station on the Texas Mexican Railway; 15.79 meters east of the board fence which is on the east line of the Driscoll ranch; 8.3 meters east of the center of the road leading south from Rogers; 3 miles by wagon road or railroad east of Robstown, the junction point of the Mexican National and the St. Louis, Brownsville & Mexico Railways. The station was marked according to note 3[1], the reference mark being 8.3 meters east of the center of the road, 15.67 meters east of the Driscoll ranch line fence, and 25.76 meters from the station in azimuth

[1] See pp. 45-46.

179° 21′ 21″. The following azimuths are from the triangulation station: Southwest corner of section house, distant one-fourth mile, 130° 40′ 32″; Rogers stock pens, north post of chute, 175° 33′ 25″; windmill at railway crossing, distant 2½ miles, 264° 21′ 21″; windmill, distant 1½ miles, 275° 34′ 20″; windmill, distant ¼ mile, 329° 59′ 20″.

Kaleta (San Patricio County, H. D. K., 1905).—About 2 miles east of Kaleta post office, about 5 miles east of Sharpsburg, and 4 miles east of Angelita, a station on the St. Louis, Brownsville & Mexico Railway; in the middle of a small cleared space on a prominent brush-covered ridge in a pasture owned by Turner Bros. It is one-half mile northeast of the Kaleta and Portland wagon road, one-half mile east of Turner Bros.' windmill, and 200 yards northeast of an old road leading from windmill to eastward along the top of the ridge. C. V. Turner can direct one to the station, which was marked according to note 3,[1] the reference mark being 27.34 meters from the station in azimuth 175° 11′ 09″. The following azimuths are from the triangulation station: Sharpsburg schoolhouse belfry, distant 5 miles, 99° 51′ 10″; Angelita railway station, east gable, distant 4 miles, 103° 02′ 10″; chimney of Turner Bros.' house, distant three-fourths mile, 144° 48′ 03″; chimney of R. E. Turner's house, distant one-half mile, 169° 27′ 46″; "Ratana" windmill, distant 3 miles, 225° 51′ 45″.

Portland (San Patricio County, H. D. K., 1905).—About 1 mile northwest of Portland in a cultivated field belonging to Robert Arnold, who lives in Portland. The station is 100 paces east-northeast from the edge of the bluff above Nueces Bay, 7.11 meters west of fence on west side of Portland and Kaleta wagon road, and 49.83 meters southeast from the southwest corner of a small blue house with a red roof, owned by Mr. Arnold and occupied by a Mexican tenant. The station was marked according to note 3,[1] the reference mark being just inside the fence corner, where the fence between the house lot and cultivated field joins the road fence and 39.97 meters from the station in azimuth 190° 32′ 23.″ The following azimuths are from the triangulation station: East gable of farmhouse, distant one-fourth mile, 127° 43′ 06″; southwest corner of R. Arnold's tenant house, distant 49.83 meters, 157° 36′ 01″; chimney of San Antonio & Aransas Pass Railway station at Portland, 299° 39′ 51″.

Corpus (Nueces County, H. D. K., 1905; 1911).—On lot 1, block 33, of the central wharf and warehouse addition to Corpus Christi, about seven-eighths mile southwest of the post office, one-half mile west of the Mexican National Railway Station, 88.5 meters north of the northwest corner fence post of the Hebrew burying ground, and 43.02 meters south of the south rail of the Texas Mexican Railway main track, measured at right angles to the track. This lot is surrounded by a fence and the station is 10.87 meters west of the east fence of the lot, 26.12 meters south of the north fence, and 12.97 meters north of the south fence. The station is marked according to note 3,[1] the reference mark being 20.32 meters from the station in azimuth 2° 31′ 37″. Since this station was established many new houses, oil tanks, and large buildings have been erected, making it impracticable to use the station without building an observing tower.

McGloins Bluff (San Patricio County, S. A. G., 1860; 1912).—About 4 miles south of Ingleside, on McGloins Bluff, on the northeast shore of Corpus Christi Bay, on a small sandhill near the extreme western end of the bluff, overlooking Ingleside Cove, on land owned by J. G. Hatch estate, and about one-half mile south of the old Hatch residence. It is well protected by a dense growth of live oak brush. The station is marked by a standard disk station mark set in a cylinder of concrete 8 inches in diameter and 2 feet deep, buried so that the top is 2½ feet beneath the surface. Over the top of this is a 6-inch layer of sand, above which is a second standard disk station mark, embedded in a mass of concrete 2 feet deep and 2 feet in diameter, set flush with the surface of the ground. The reference marks are two iron posts, triangular in shape, their tops marked U. S. C. S., set one north and one west, 1.84 meters from the station. There is also a reference mark 19.20 meters distant from the station, supposed to be a standard disk reference mark. The following azimuths are given from the triangulation station: Watch tower at Gregory, 147° 45′ 14″; southwest gable of farmhouse, distant 1 mile, 171° 11′ 00″; chimney on ell of a large 2½-story house near Ingleside Hotel, 178° 02′ 06″; chimney on James Stearn's house, distant one-half mile, 179° 46′ 21″.

[1] See pp. 45–46.

Flour Bluff (Nueces County, S. A. G., 1860; 1876).—On Flour Bluff on the southern side of Corpus Christi Bay. The recovery of this station in 1876 was certain but in 1905 the station was searched for and no trace of it could be found.

Thompsons (Nueces County, R. E. H., 1876).—On Mustang Island. In 1905 this station was searched for and it was determined that the sand hill on which it was located had been blown away.

Grants (Nueces County, R. E. H., 1877; 1905).—On a prominent sand hill about 2 miles from the south end of Mustang Island, about 150 yards from the outside beach of the island and about 1½ miles northwest from Mr. Grant's house. In 1877 the station was reported as being marked according to note 9,[1] the reference stubs being 5 feet from the station. In 1905 the station was apparently recovered, but the subsurface mark was a bottle and the stubs were gone. The station was not reoccupied and the recovery is uncertain.

Chappa (Nueces County, R. E. H., 1877; 1905).—Near the outside beach of Padre Island, about 2½ miles east-southeast from Chappa's house, on the shore of Laguna Madre. The station was marked according to note 9,[1] the reference stubs being 4 feet from the center. In 1905 no trace of this station could be found, and it can be recovered, if at all, only by triangulation.

Peat Island (Nueces County, R. E. H., 1877; 1882).—On the main land, about 150 yards from the shore of the Laguna Madre and about 1½ miles below Peat Island. The station was marked according to note 9,[1] the reference stubs being 6 feet from the center.

Dagger Island (San Patricio County, S. A. G., 1860).—This station is marked according to note 6.[1]

Mustang Island (Nueces County, S. A. G., 1860).—This station is marked according to note 6.[1]

Shamrock (Nueces County, P. M. T., 1912).—On the western shore of the peninsula at the southern end of Shamrock Island, on the east side of Corpus Christi Bay, about 430 meters from the high water mark at the south end of the point, 475 meters from F. Oppikofer's barn on Shamrock Point, on a ridge of shells about 5 feet above high water and 18 meters from the high-water line of Corpus Christi Bay. The station is marked according to note 4.[1] The reference mark is 14.55 meters from the station in azimuth 164° 59′ 04″. There is a small mulberry tree 19.82 meters distant in azimuth 236° 49′, and a "Spanish dagger," 6 feet high, is 35.25 meters in azimuth 15° 27.′

Mustang (Nueces County, H. D. K., 1905; 1912).—On the inside shore of Mustang Island, about 6 miles north of the south end of the island, and 2 miles northwest of Grant's ranch house; 1¼ miles north of anchorage behind the "bulkhead," and about 2 miles from the south end of a long narrow tongue separated from the main body of Mustang Island by a shallow slough about 3 miles long. The station is 15 meters from the high-water mark of the bay shore, 40 meters from the high-water mark of the shore of the slough, and 330 meters north of an old fence. The station was marked according to note 3,[1] the reference mark being 12 meters from the high-water mark of the bay shore, 18 meters from the high-water mark of the shore of the slough, and 29.213 meters from the station, in azimuth 196° 07′ 05″. The following azimuths are from the triangulation station: Northeast gable of sheep barn of Grant's ranch, distant 2 miles, 11° 47′ 43″; north gable of Grant's ranch house, 12° 09′ 27″; middle ground stake, Bulkhead Anchorage, 49° 30′ 55″; chimney of farmhouse three-fourths mile south of north base, 65° 57′ 31″. When last visited in 1912 the station and reference marks were found to be in good condition.

Oso (Nueces County, P. M. T., 1912).—At the edge of the Corpus Christi-Flour Bluff road, on the south side of Corpus Christi Bay, about 4.4 miles west of Flour Bluff, 350 meters west of the bridge over the Oso Creek, and 153 paces east-northeast of a lone Spanish dagger. The station is 19.3 meters from the 10-foot loam and clay bank at the storm water line, and is about the middle of this strip of high ground, which is about 250 meters long, and is unoccupied and bare except for a few low bushes. The station is marked according to note 4,[1] with the exception that the underground station mark is a 16-penny spike set in the cylinder of concrete in place

[1] See pp. 45–46.

of the standard disk station mark, and the top of the concrete for the reference mark has a "bell" on it about 12 inches in diameter. The reference mark is about 15 meters from the bank and 48.58 meters from the station, in azimuth 112° 21′ 22″. The arrow on the reference mark points about 15° or 20° south of the station.

Laguna Madre north base (Nueces County, R. E. H., 1882; 1912).—About 2½ miles south of Flour Bluff and about 250 meters back from the west shore of the Laguna Madre, in a cleared field, formerly in cultivation but now in pasture belonging to William Hoffman (or to William Turcotte), living in Corpus Christi. The station was marked in 1883 as follows: A pit 7 feet square was excavated to a depth of 2 feet; in the center of the pit an irregular stone about 14 inches square and 10 inches thick was set. A hole was drilled in the top of this stone and filled with lead, and the point marked thereon with crosslines. Resting on this stone stands a piece of white marble, 2½ feet long and 6 inches square, with the letters U. S. on its south face, C. & G. on its east face, and SUR and VEY on its north and west faces, respectively, the letters being near the top and deeply cut. In the top of the marble post was drilled a hole 1 inch in diameter and 3 inches deep; this hole was filled with lead and the center marked thereon by crosslines, which in 1905 had become erased. The post stands 1 inch above the surface of the ground. Around this post were laid symmetrically, first two layers of brick each 5 feet square, then two layers each 3 feet square, then one layer 2 feet square, and finally one layer 1½ feet square. Sand and loose rock was then filled in, the whole forming a compact mass. The bricks used were a concrete of lime and shells, and were 12 by 6 by 4 inches in size. The stone used for the underground mark and for filling in around the station was a conglomerate of small shells found in the vicinity of Baffins Bay. A reference mark, similar to that described in note 3,[1] was set 13.99 meters from the station, in azimuth 135° 21′. It bears the letters U. S. R. M., 1905. The following azimuths are from the triangulation station: North gable of Grant's ranch house on Mustang Island, 272° 14′ 40″; east end of ridge of two-story farmhouse, distant 2 miles, 35° 32′ 09″; windmill, distant 1½ miles, 206° 07′ 38″. Observations were made on a pier constructed of wooden posts, situated 10.03 meters due east of the triangulation station.

Demit (Nueces County, P. M. T., 1912).—On Demit Island, just abreast of Flour Bluff Point, about one-fourth mile east of Welburn's house, on the highest mound in the vicinity, 156 paces from the west shore, 215 paces from the north, and 218 paces from the south shore. The station is marked according to note 4.[1] The reference mark is 11 meters from a small inlet, on ground covered with grass and prickly pear, 31.95 meters from the station, in azimuth 283° 11′ 22′. The following azimuths are also given: East gable Welburn's house, 96° 50′ 52″; most northerly windmill, Flour Bluff, 101° 19′ 52″.

Grants 2 (Nueces County, P. M. T., 1912).—About 2 miles northeast of Corpus Christi Pass and 100 meters back from the Gulf beach, on the most conspicuous hill in the locality, 2 meters from the highest point. For a subsurface mark there is a 40-penny nail set in a cylinder of concrete 7 inches in diameter and 2 feet deep, 2 feet below the surface. Above this is another 40-penny nail in a second cylinder of concrete, 20 inches in diameter and 18 inches deep, 6 inches below the surface. The reference mark is a nail set in a cylinder of concrete 7 inches in diameter and 2½ feet deep, with the top 3 feet below the surface, 12.86 meters from the station. There is a small frame house on the inner beach of Mustang Island, about 500 meters south 37° east.

Padre (Nueces County, H. D. K., 1905).—On Padre Island, about 1 mile south of Corpus Christi Pass and about 250 meters from the western or inside shore of the island, on the top of the highest sand hill in the vicinity. This part of the island is covered with shifting sand, and the station site being but little protected by brush the station will not be long recoverable. One month after the station mark had been set, it was found covered with 8 inches of sand. The station was marked according to note 3,[1] the reference mark being 8 inches in diameter (instead of 12) and 97.19 meters from the station, in azimuth 141° 06′ 05″. The reference mark is fairly well protected by brush. The following azimuths are from the triangulation station: Chimney of old Thompson house near south base, 97° 18′ 08″; windmill, 2 miles north of north base, 160° 34′ 44″; north gable of Grant's ranch house, on Mustang Island, 216° 39′ 36″.

[1] See pp. 45–46.

Laguna Madre south base (Nueces County, R. E. H., 1882; 1912).—About 5½ miles south-southwest from Flour Bluff and one-half mile north-northeast from Brighton post office; about 100 meters back from the shore line in an opening in a live-oak motte; about 100 meters north-northeast from the old Thompson house, and 5.2 meters north of a fence which is the north line of the Thompson property. The land on which the station stands is owned by the Texas Land & Cattle Co., and is now leased to William Code for pasture; it is called in the Nueces County records "Flour Bluff and Encinal Farm and Garden Tracts," and has public roads 40 feet wide projected every mile from north to south; the station is located on the road (projected) along the north side of the Thompson place. In 1882 the station was marked as follows: A pit 7 feet square was excavated to a depth of 2 feet; in the center of this, with its upper surface flush with the bottom of the pit, an irregular stone about 14 inches square and 10 inches thick was set; a hole was drilled in the top of this stone and filled with lead, and the center of the station marked thereon by crosslines. Resting on this stone stands a piece of white marble 2½ feet in length and 6 inches square, with the letters U. S.—C. & G.—SUR—VEY, deeply cut thereon near the top, one group on each face. Around this post were laid symmetrically first two layers of brick, each 5 feet square, then one layer 4 feet square, then one layer 2½ feet square, and finally two layers, each 1½ feet square. Over this were placed sand and layers of loose rock, making a compact mass of the whole. The marble block has a hole about 1 inch in diameter and 3 inches deep, drilled in its top; this hole was filled with lead and the center of the station marked thereon by crosslines. The bricks used were concrete of lime and shells, and were 12 by 6 by 4 inches in size. The stone used for the subsurface mark and for filling in around the station was a conglomerate of small shells found in the vicinity of Baffins Bay. In 1912 the dirt was removed from the post until the top layer of bricks was uncovered. The bricks were found broken and considerably disintegrated. Concrete was filled among them and up even to the letters on the post. The date, January 30, 1912, was inscribed in the cement. A reference mark, such as is described in note 3,[1] was set 31.8 meters from the station, in azimuth 309° 06′ 25″. The reference mark bears the letters U. S. R. M., 1905, and an arrow pointing to the station. The following azimuths are from the triangulation station: Chimney of old Thompson house, distant 100 meters, 29° 33′ 42″; south gable of William Code's house, distant three-fourths of a mile, 185° 09′ 33″.

Island (Nueces County, P. M. T., 1912).—On Peat Island, about 4 miles south of Flour Bluff, on a lone ridge about 1 foot above the general level, and between the second and third clumps of cactus from the east end of the island. The station is 75 meters from the shore to the east, 105 meters from the shore to the north, and 35 meters northwest of a pond. The station was marked according to note 4,[1] with the exception that there is no reference mark. Leading from the station to the north, south, east, and west are trenches about 10 feet long, 1½ feet deep, and 2 feet wide.

Sandhill (Nueces County, P. M. T., 1912).—On the east side of Padre Island, 5.7 miles south of Corpus Christi Pass, about 1 mile above the north end of North Bird Island, and about 300 meters from the Gulf beach, on the northern and smaller of the two largest and most conspicuous sand hills in this locality. A shoal from North Bird Island runs over close to the Padre Island shore at a point directly opposite from the station. The station is marked according to note 4,[1] with the exception that the underground station mark and the reference mark are 20-penny nails instead of standard disk marks, and the top of the concrete at the reference mark bears the inscription "U. S. C. &. G. S., Feb. 13, 1912." The reference mark is 26.45 meters from the station in azimuth 36° 11′ 37″. The following azimuths are given: Windmill, Barnes' house, 127° 32′ 17″; southwest corner of corral, about 1 mile distant, 173° 10′ 11″; Spanish dagger on the Laguna beach, about 1½ miles distant, 46° 22′ 21″.

Pass (Nueces County, P. M. T., 1912).—On Padre Island, about one-half mile south of the entrance to Corpus Christi Pass, about 60 meters from high water of the Gulf, and on the second high sand hill south of the Pass. The station is marked according to note 4,[1] with the exception that there is no reference mark and the center marks at the station are 40-penny nails set in the

See pp. 45–46.

place of the standard station mark, and inscribed in the concrete surface are the letters "U. S. C. & G. S., Feb. 14, 1912." There are four stakes to which the guy wires were fastened, each about 10 meters from the station to the northeast, northwest, southeast, and southwest, respectively. The following azimuths are from the station: Corner of the old wire fence distant 66.9 meters, 108° 11′; Brighton schoolhouse, east gable, 137° 43′; south gable of house at Corpus Christi Pass, 187° 36′.

Hardpan (Nueces County, P. M. T., 1912).—On the western shore of Laguna Madre about 65 meters from the beach, 3¼ miles below Peat Island, about 1 mile from the old Barnes house, and about 600 meters north of a pond just back of a rounding point, which is marked by a fence coming out on it. The station is on black sandy ground about 10 feet above sea level and about 350 meters north of a prominent live-oak mott. The station is marked according to note 4,[1] with the exception that the center of the reference mark is a 40-penny nail instead of a standard disk reference mark. The reference mark is 20.84 meters from the station in azimuth 211° 54′ 17″. Four pits 1½ feet deep, 2½ feet wide, and 10 feet long were dug, two in line parallel to the beach and two in line normal to it, the station being at the intersection of the two lines. About 4 feet beyond these, sawed stakes 2½ feet long project 6 inches from the ground. The following azimuths are given: Windmill at Barnes' house, 177° 36′ 39″; gable, Barnes' house, 177° 40′ 32″.

Puzzle (Nueces County, P. M. T., 1912).—On the mainland 2.2 miles southwest of Peat Island, about 1 mile northeast of the abandoned Barnes' house with the windmill alongside, about 300 meters southerly from the first opening in the beach below the Peat Island channel, 28 paces back from the beach and 3 feet above the ordinary stage of the Laguna. Parallel to the beach and about 7 meters from the station is a salty pool 8 meters or 10 meters long, and south of it are two other similar pools. Beginning 6 feet from the station four trenches were dug, 2 feet wide, 1½ feet deep, and 12 feet long, two in line parallel, and two in line normal to the beach. At the outer end of each trench is a mound of shells 2½ feet high and 4 feet in diameter at the base, and beyond each of these a hard pine stake 3 feet long set 2½ feet into the ground. The station is marked underground by a 20-penny nail projecting from a cylinder of shell concrete, 18 inches in diameter and 2½ feet deep, set 1½ feet below the surface. The surface mark is a nail in a similar cylinder of concrete. Between the two marks is a 3-inch layer of shells.

SUPPLEMENTARY POINTS.

Matagorda longitude station (Matagorda County, C. V. H., 1911).—The station is situated about 80 meters N. 60° E. (magnetic) from the old Bay View Hotel, on which is the triangulation station called *Bay View*. It is about 200 meters S. 20° W. (magnetic) from the railroad station, in a vacant square belonging to the town. A concrete pier 18 inches by 24 inches, with a foundation 2 feet below the ground, has a brass disk similar to the standard disk triangulation station mark, but inscribed astronomic station, set in the center of the notch in the pier. The observatory which was built around the pier was left standing.

Station A (*U. S. Fish Com.*) (Matagorda County, W. B. F., 1906).—On the bay shore of Matagorda Peninsula just south of Raymond Landing Shoals, 10 meters back from the shore. The station is marked according to note 5,[1] with the exception that there are no reference marks.

Dog Island (Matagorda County, S. A. G., 1855).—This station is marked according to note 6.[1]

Station B (*U. S. Fish Com.*) (Matagorda County, W. B. F., 1906).—On the south side of Greek Island at Tiger Island Pass, on the shell ridge just back from the cedars. The station is marked by a bottle buried 30 inches below the surface, and at the surface by a spike in a cylinder of concrete 2 feet deep and 30 inches in diameter, inscribed "C. G. S., 1906."

Station D (*U. S. Fish Com.*) (Matagorda County, W. B. F., 1906).—On the mainland shore of Matagorda Bay, 50 meters south of Mad Island Bayou, and 40 meters back from the shore line. Thirty meters to the south of the station a mesquite mott begins and extends down the shore. The station is marked underground by a bottle 30 inches below the surface,

[1] See pp. 45–46.

and at the surface by a spike in a cylinder of concrete 2 feet deep and 30 inches in diameter, inscribed "C. G. S., 1906."

Mad Island West (Matagorda County, S. A. G., 1856).—The station is marked according to note 6.[1]

Station C (*U. S. Fish Com.*) (Matagorda County, W. B. F., 1906).—On the bay shore of Matagorda Peninsula, about one-third mile below the mouth of Philips Bayou on the point to the north of the next small bayou. The station is 12 meters from the west shore, 10 meters from the north shore, and 15 inches above high-water mark, and is marked according to note 5,[1] with the exception that there are no reference marks.

Greens Line (Matagorda County, S. A. G., 1856).—This station is marked according to note 6.[1]

Four Mile Mott (*U. S. Fish Com.*) (Matagorda County, W. B. F., 1906).—On the mainland shore of Matagorda Bay, about 4 miles east of Palacios Point, 6 meters back from the shore line, and 3 meters northeast of the southern end of the first row of cedars above Palacios Point. The station is marked according to note 5,[1] with the exception that there are no reference marks.

Halfmoon Reef (Matagorda County, S. A. G., 1857).—This station is marked according to note 6.[1]

Palacios Point (*U. S. Fish Com.*) (Matagorda County, W. B. F., 1906).—Near the end of Palacios Point on the southeast side, 25 meters back from the Matagorda Bay shore and 50 meters northeast of the shore of a small bight. Six meters north of the station is the only clump of bushes within one-half mile. The station is marked according to note 5,[1] with the exception that there are no reference marks.

Tarantula (Matagorda County, S. A. G., 1856).—This station is marked according to note 6.[1]

Mott (Matagorda County, S. A. G., 1856).—This station is marked according to note 6.[1]

Wolf Point (Calhoun County, S. A. G., 1857).—This station is marked according to note 6.[1]

Alligator Head Mott (Calhoun County, S. A. G., 1857).—The station was marked according to note 6.[1]

Alligator Point (Calhoun County, S. A. G., 1857).—The station was marked according to note 6.[1]

Decros Point (Matagorda County, W. B. F., 1906).—One and one-half miles from the extremity of Decros Point, on the highest sand hill near the Gulf shore, and abreast of the point that is half way between the two rows of cedars that extend from the Bay shore one-third of the way across to the Gulf shore. The station is marked according to note 5,[1] with the exception that there are no reference marks.

Saluria (Calhoun County, S. A. G., 1857).—This station is marked according to note 6.[1]

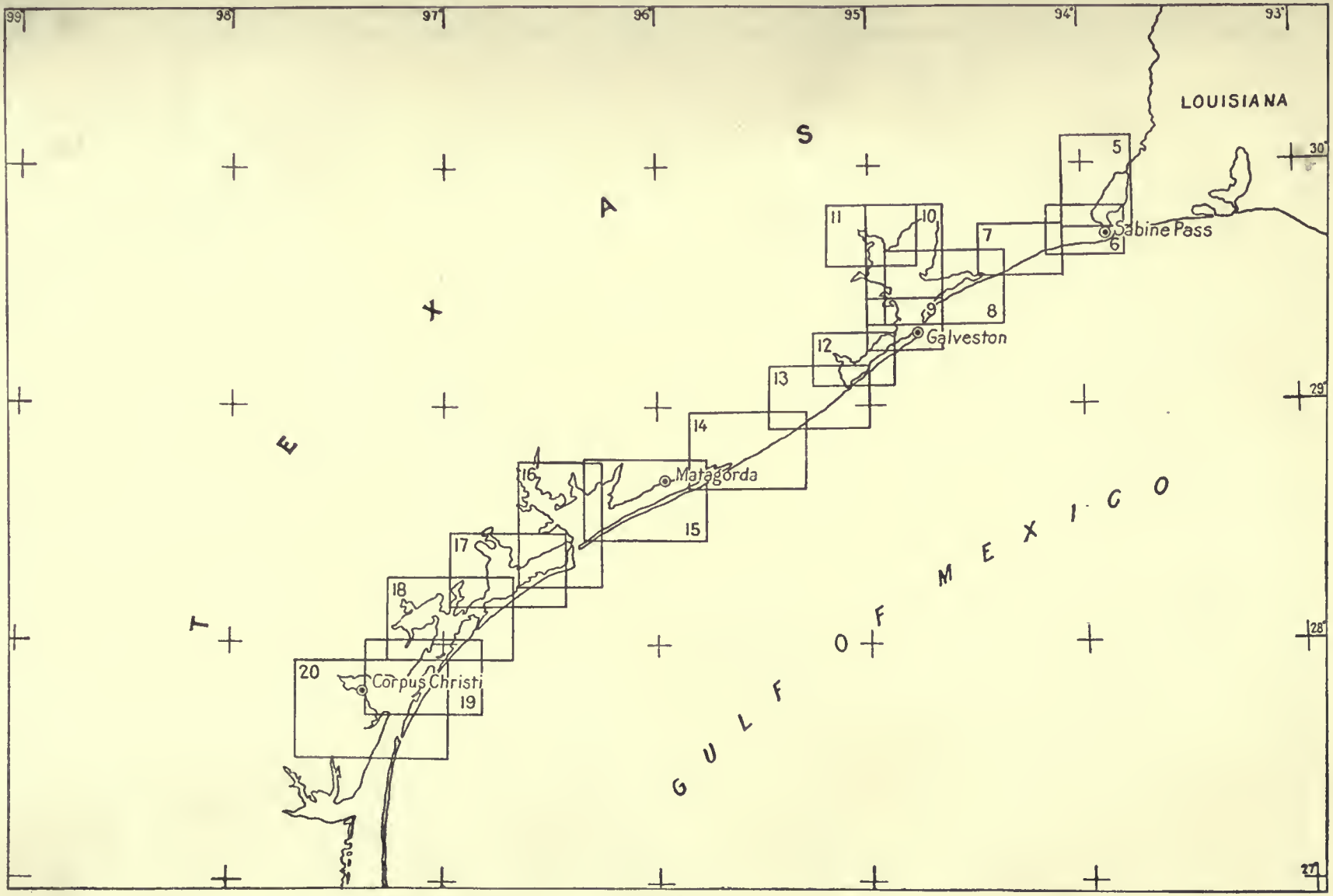
NOTES REGARDING THE SKETCHES.

On the following sketches are shown the location of all the points whose positions are given in this publication, so that the names of all the stations in any locality may be secured simply by the inspection of a sketch, and then from the index their positions may be readily found in the table of positions. A line of the main scheme is shown as a full line when observed over in both directions, and is broken at one end when it was not observed over from the station at that end of the line. The stations which were occupied are shown by a triangle and the unoccupied stations by a circle. The measured bases are indicated by a heavy line. In several localities the new scheme of triangulation covers the same ground as the old work. On sketches in such areas the old work is shown in red and the new in black in order to avoid any confusion that might otherwise have arisen. In case an old and new station plot at the same point, a black triangle or circle is shown with both names, and when an old and new line coincide on the sketch, the black line only is shown.

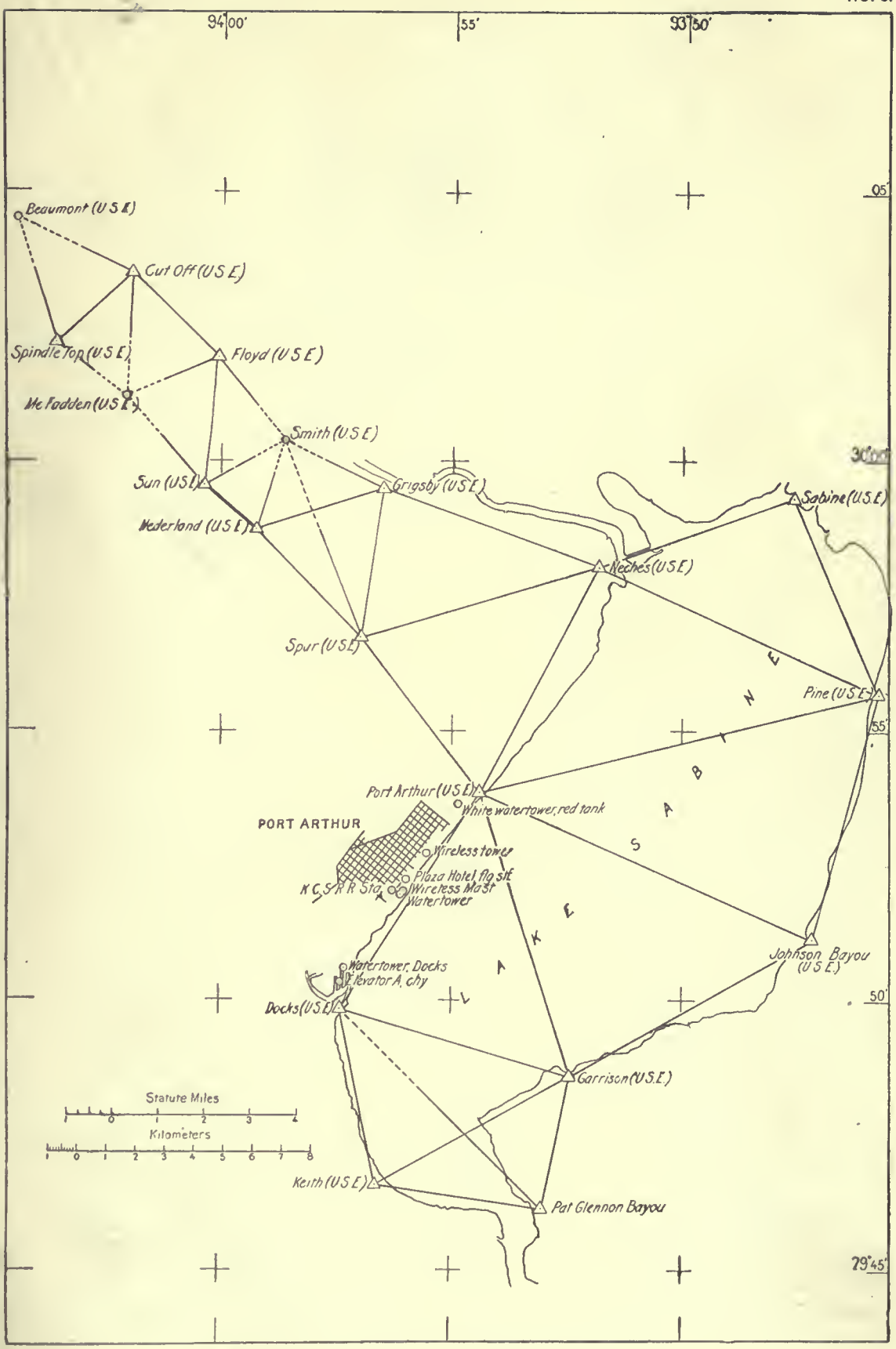
On the first of the sketches is shown the general location in the United States of the whole triangulation. The second is an index map for the sketches which show the triangulation in detail.

[1] See pp. 45–46.

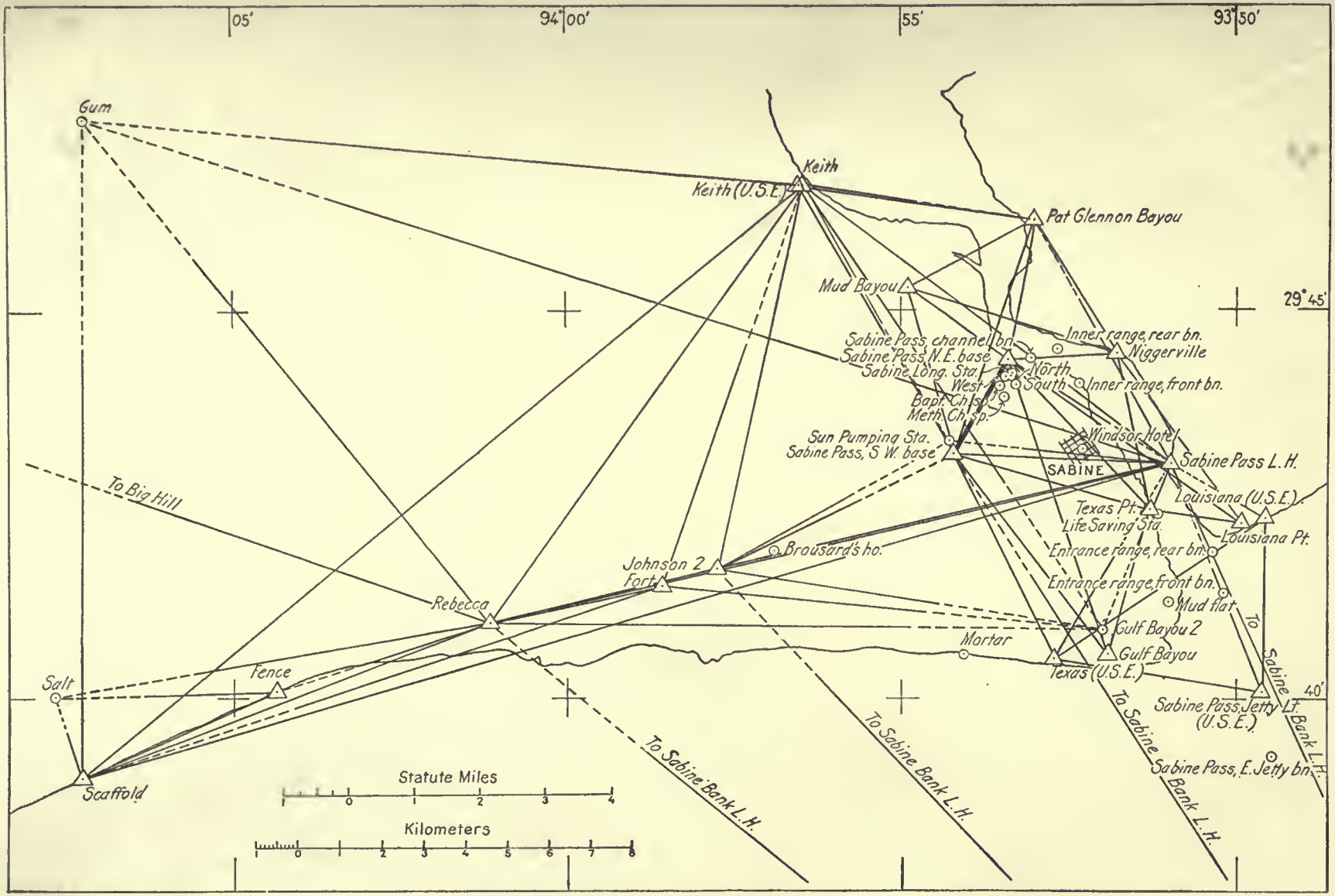
INDEX MAP SHOWING GENERAL LOCATION OF THE TRIANGULATION.



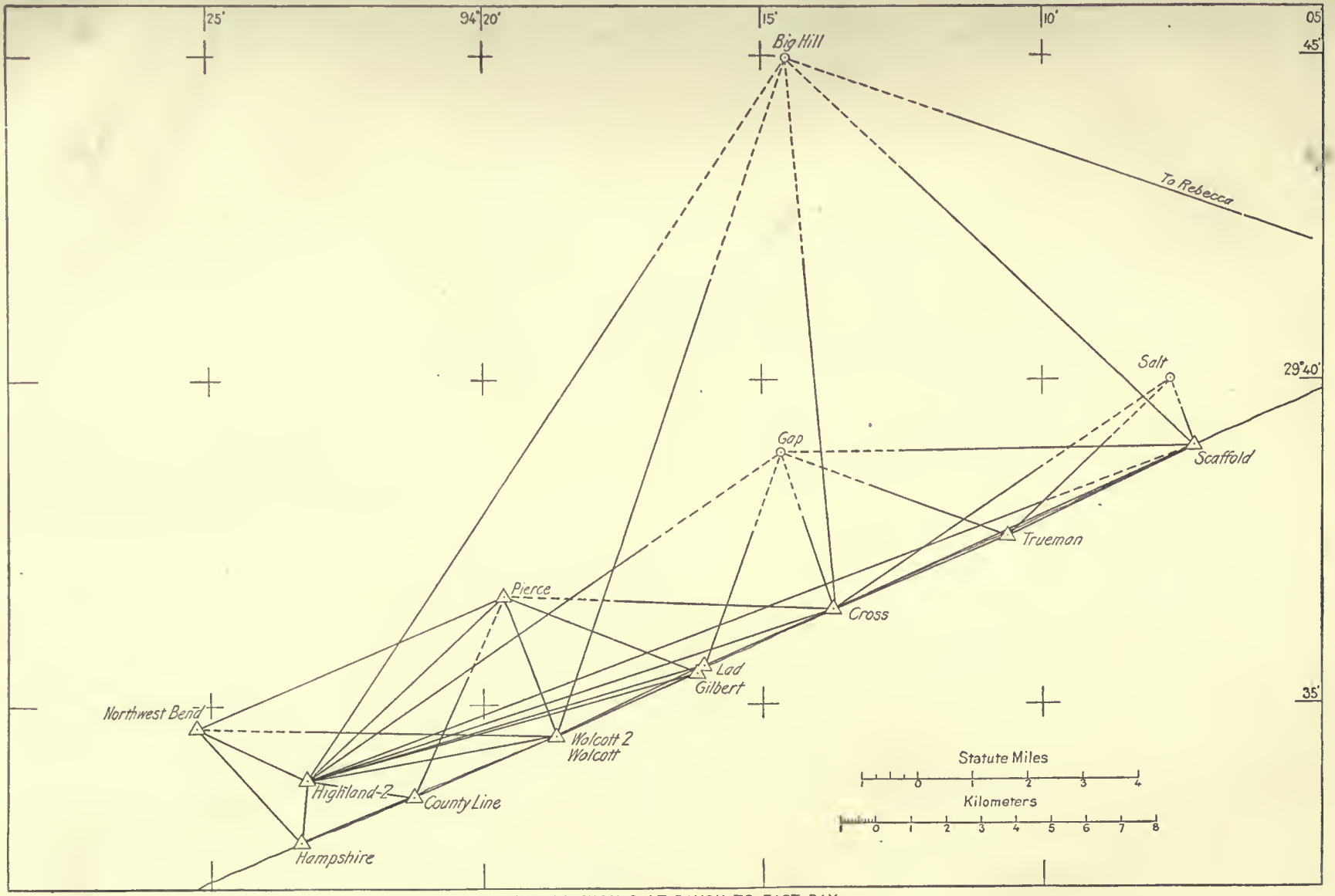
INDEX MAP SHOWING THE LIMITS OF EACH OF THE FOLLOWING SKETCHES.



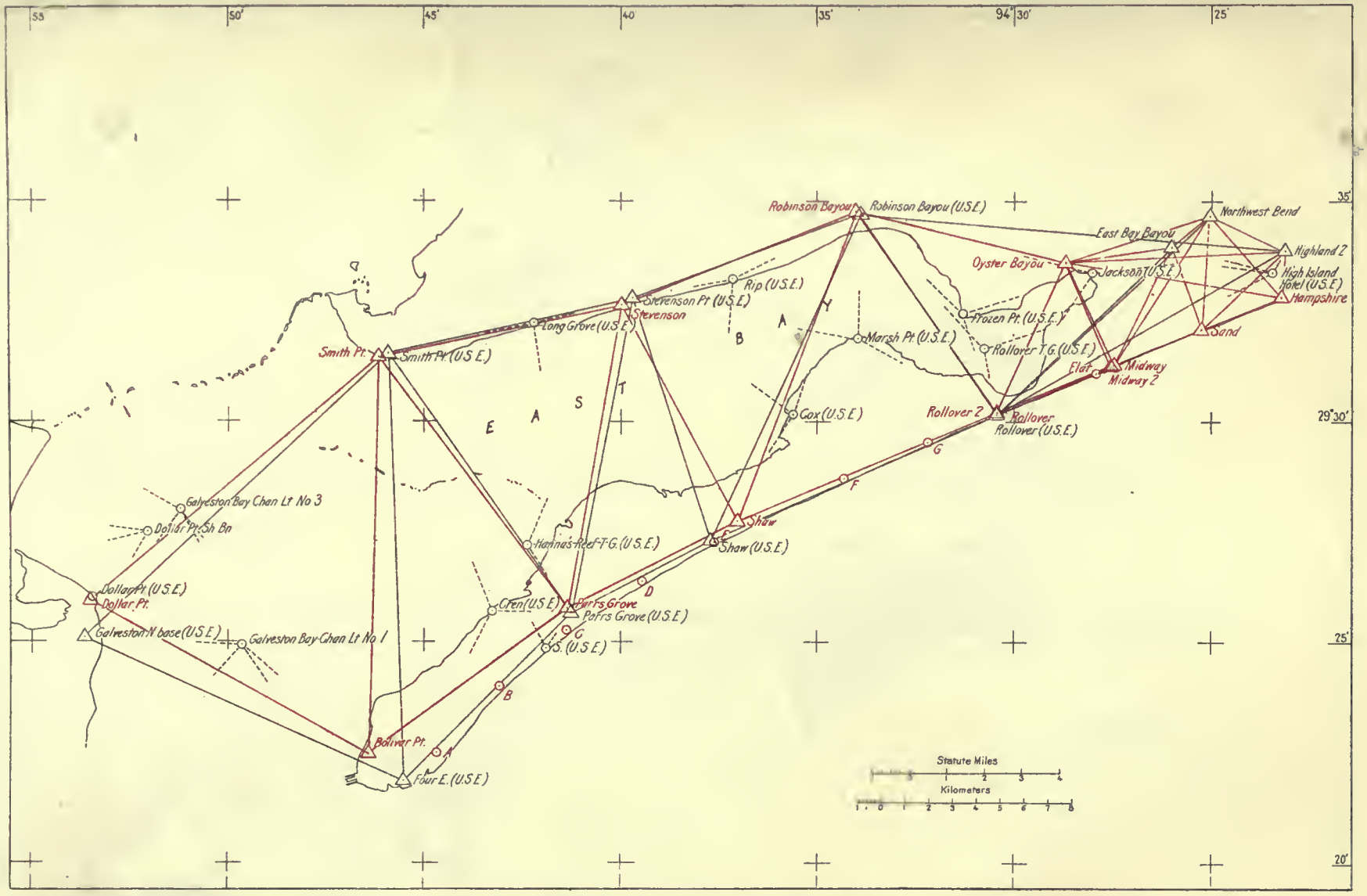
TRIANGULATION, LAKE SABINE AND NECHES RIVER.



TRIANGULATION, SABINE PASS TO SALT BAYOU.



TRIANGULATION, SALT BAYOU TO EAST BAY.



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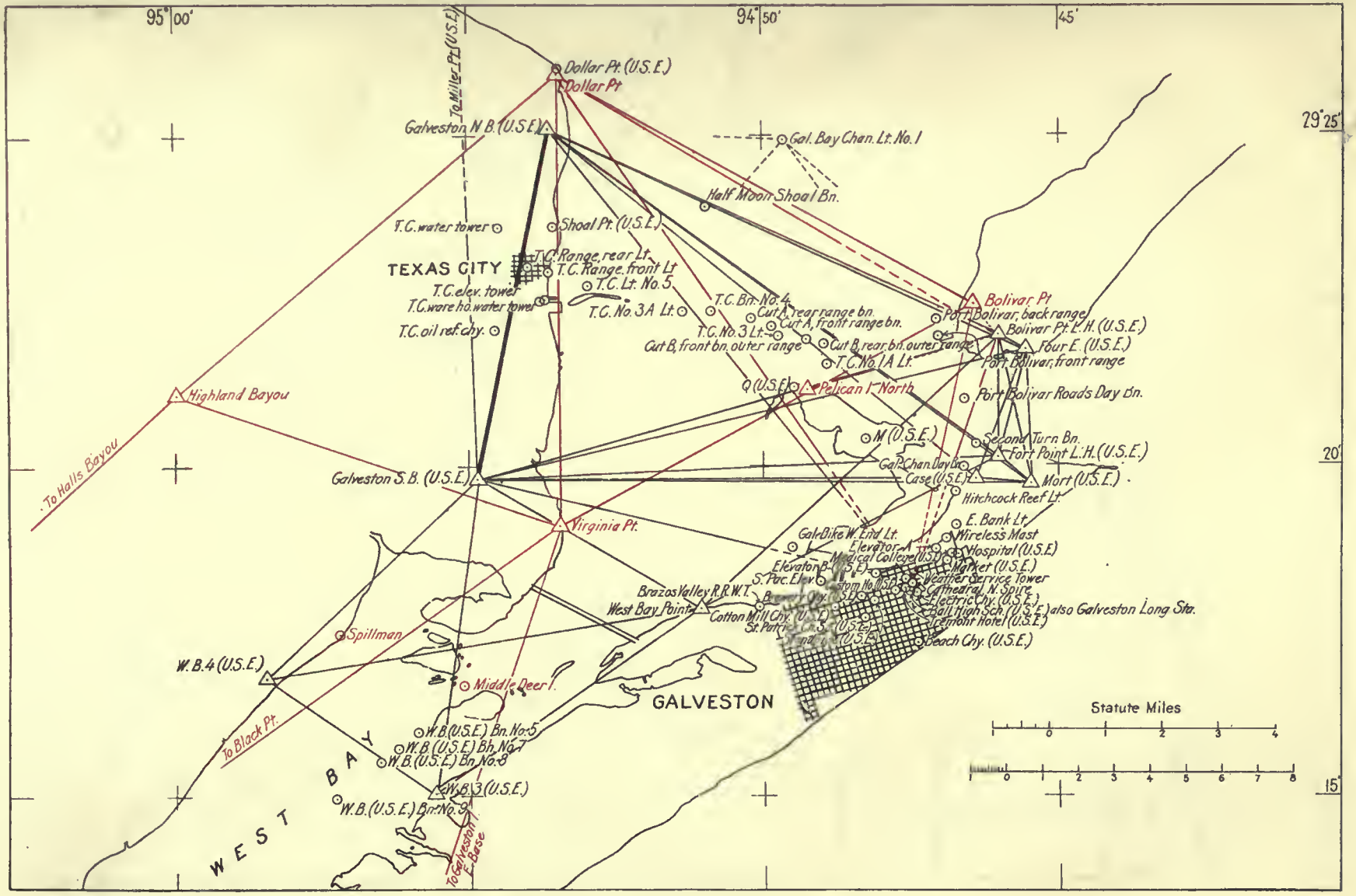
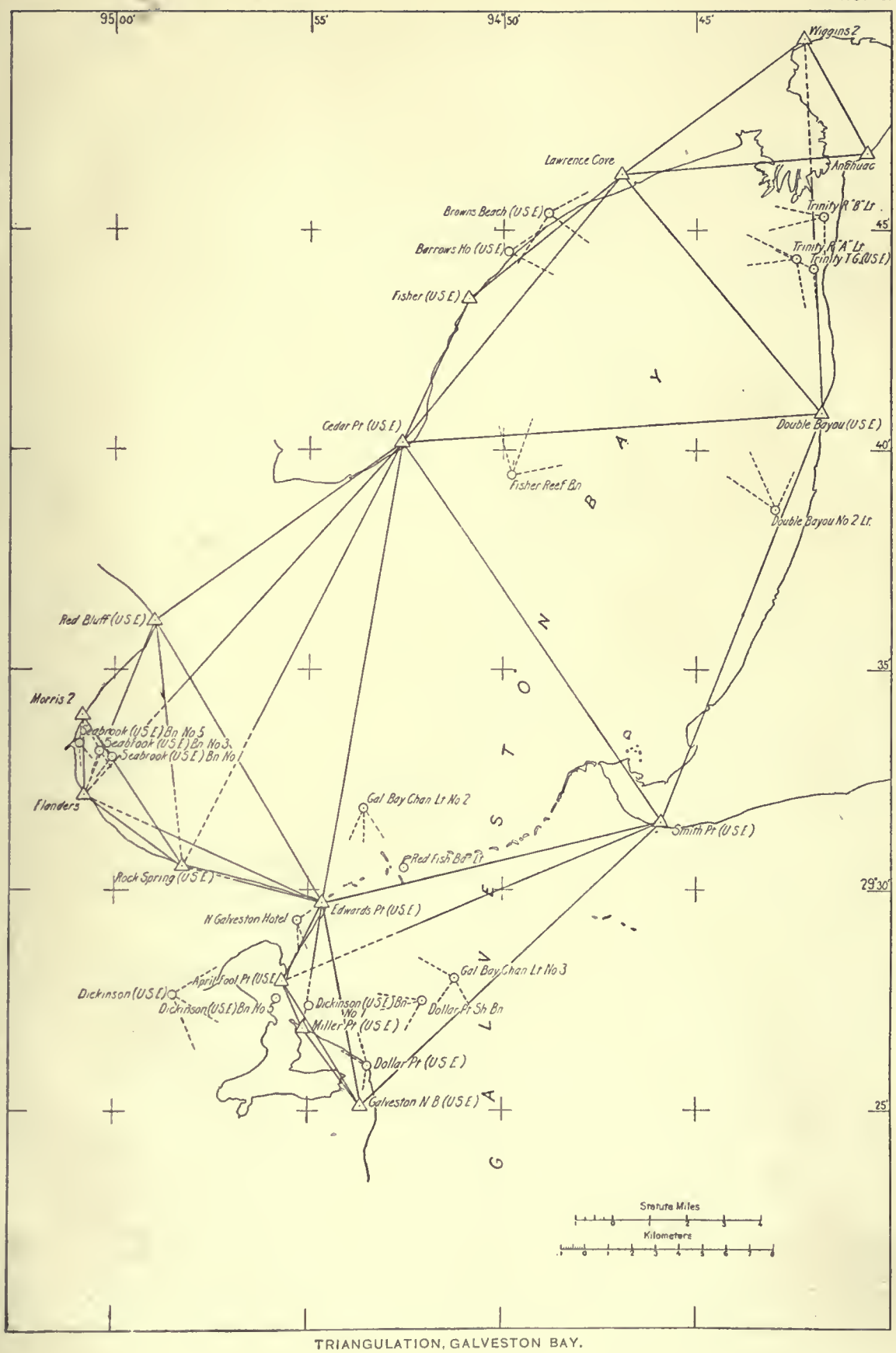
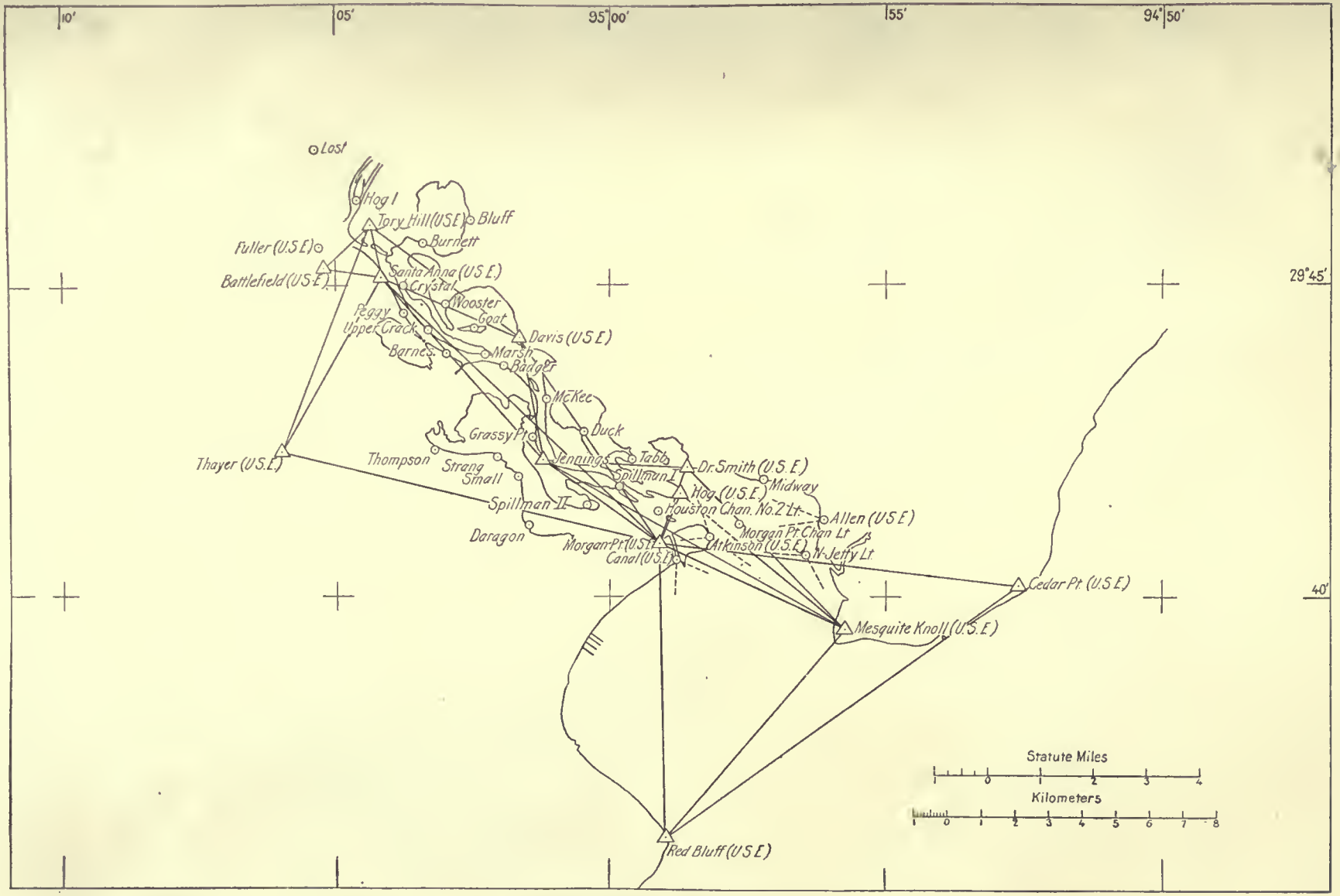
TRIANGULATION, EAST BAY TO GALVESTON BAY.



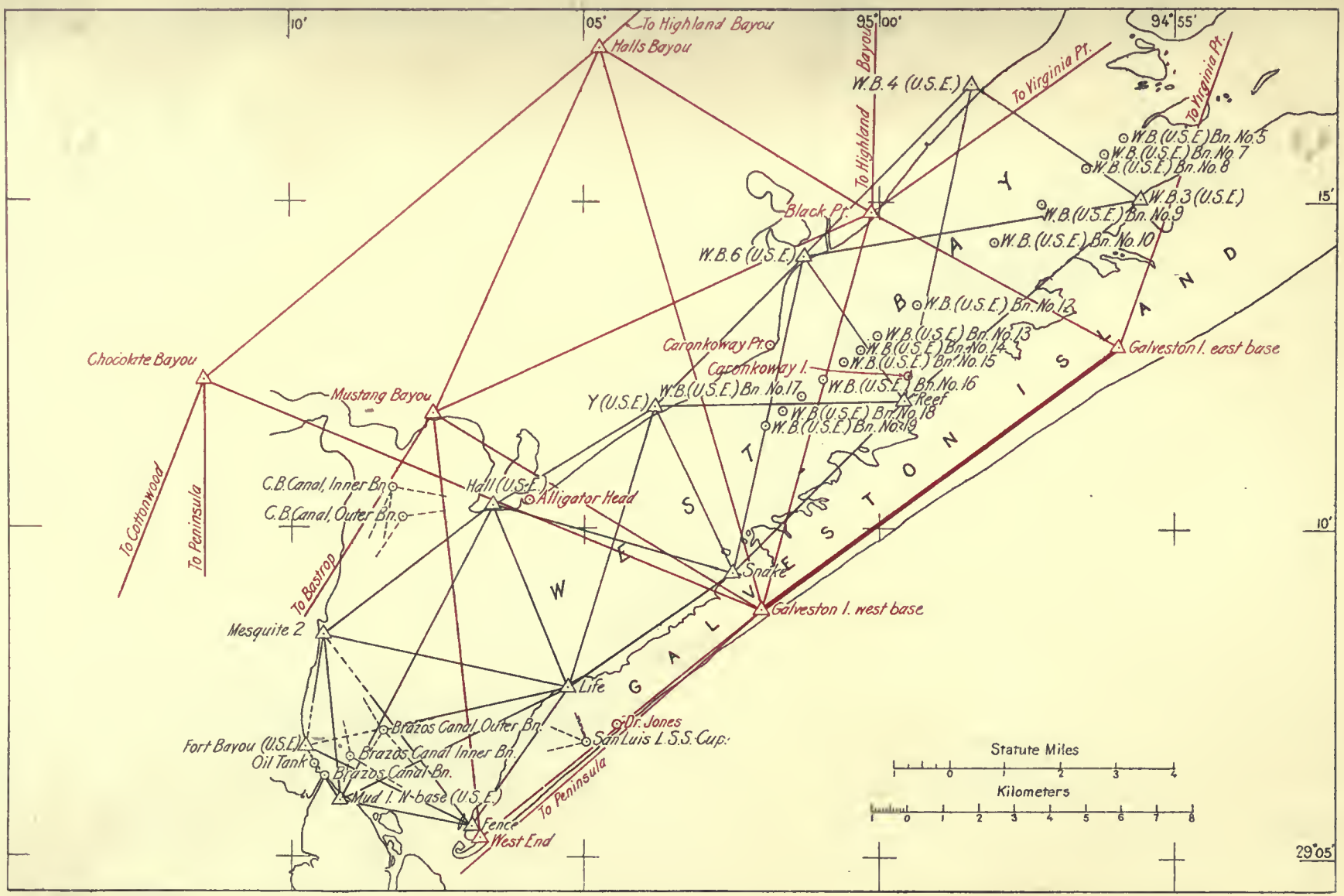
TRIANGULATION, GALVESTON ENTRANCE TO WEST BAY.



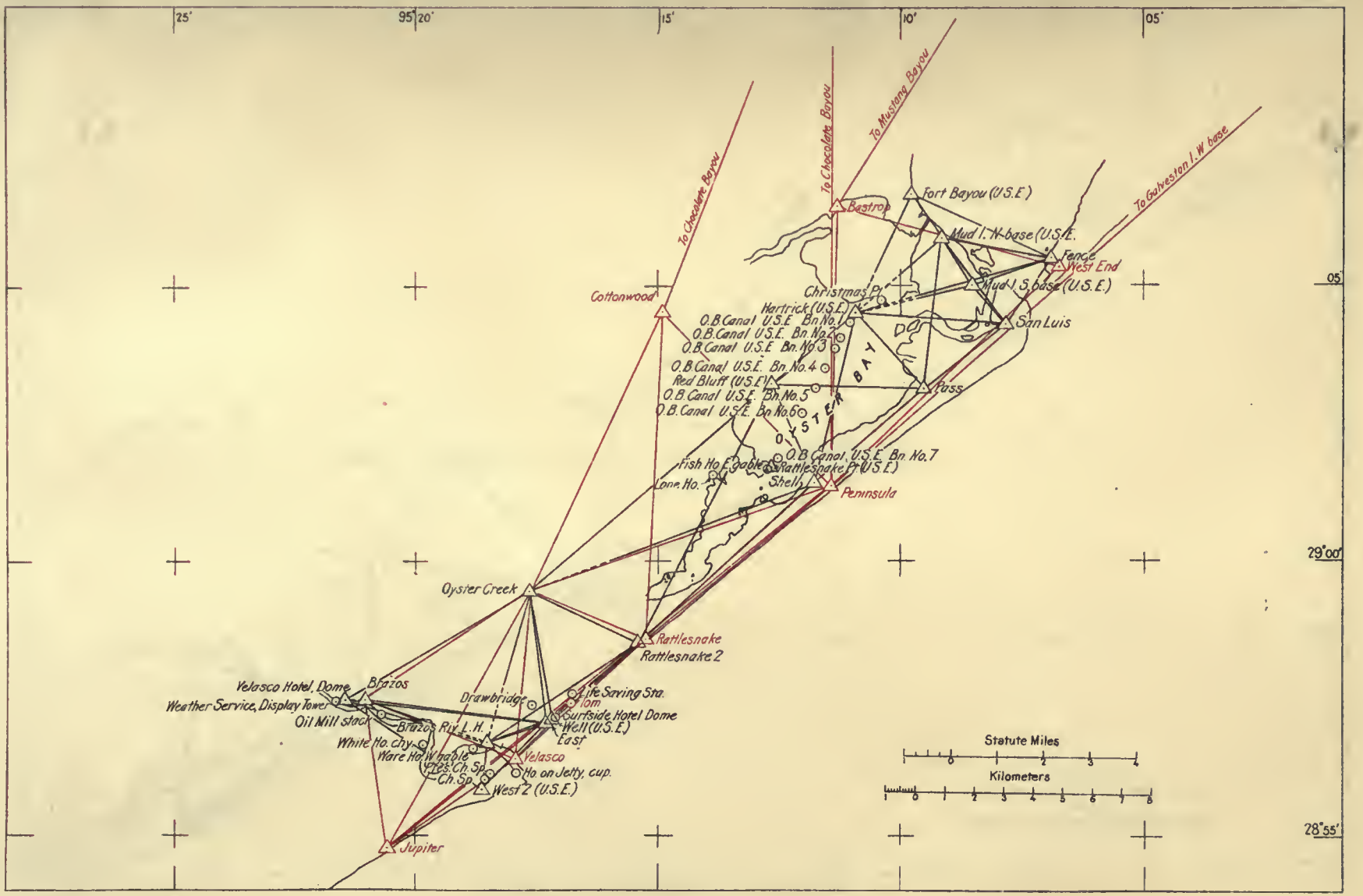
TRIANGULATION, GALVESTON BAY.



TRIANGULATION, SAN JACINTO RIVER.



TRIANGULATION, WEST BAY.



TRIANGULATION, WEST BAY TO BRAZOS RIVER.

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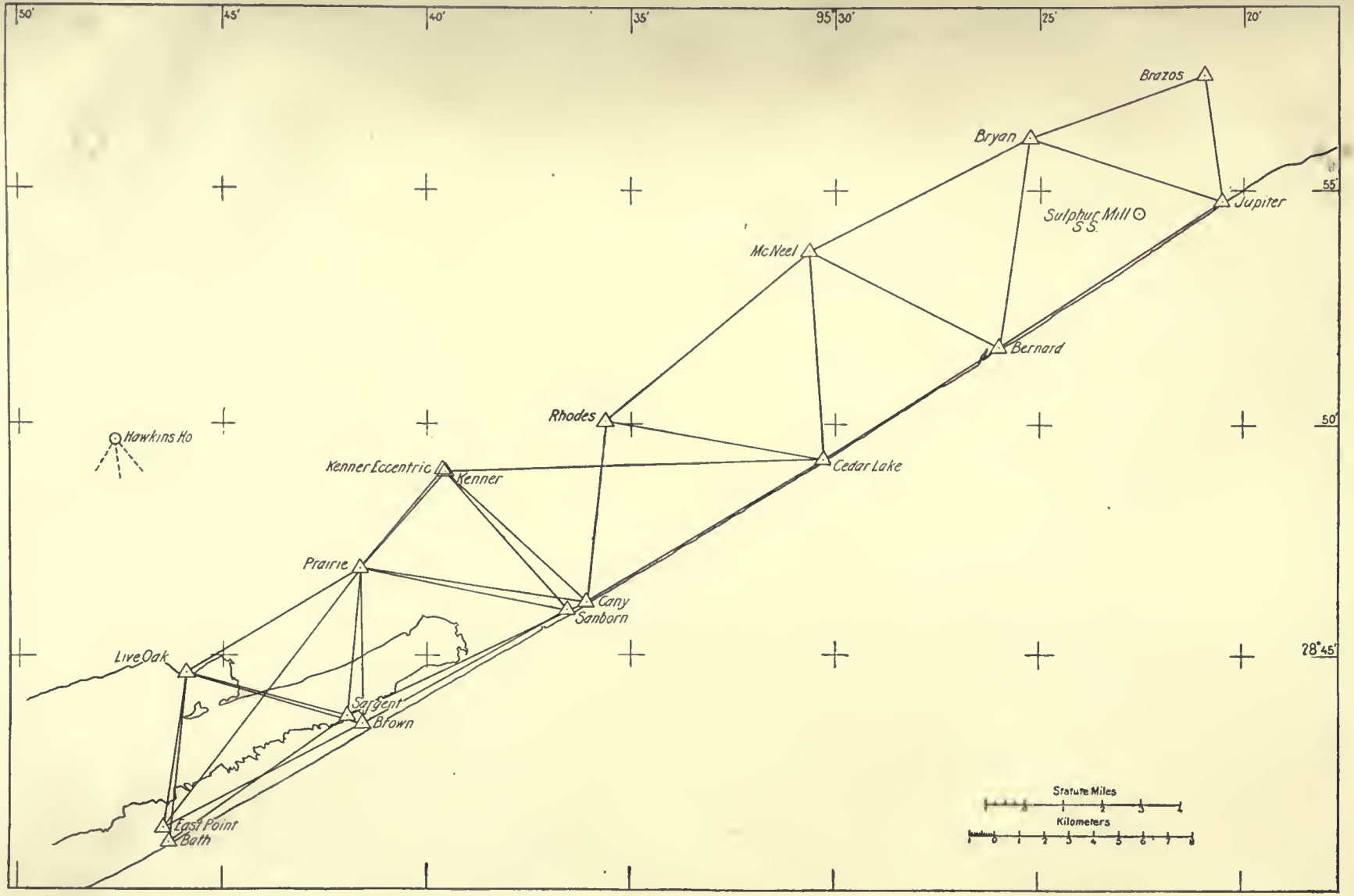
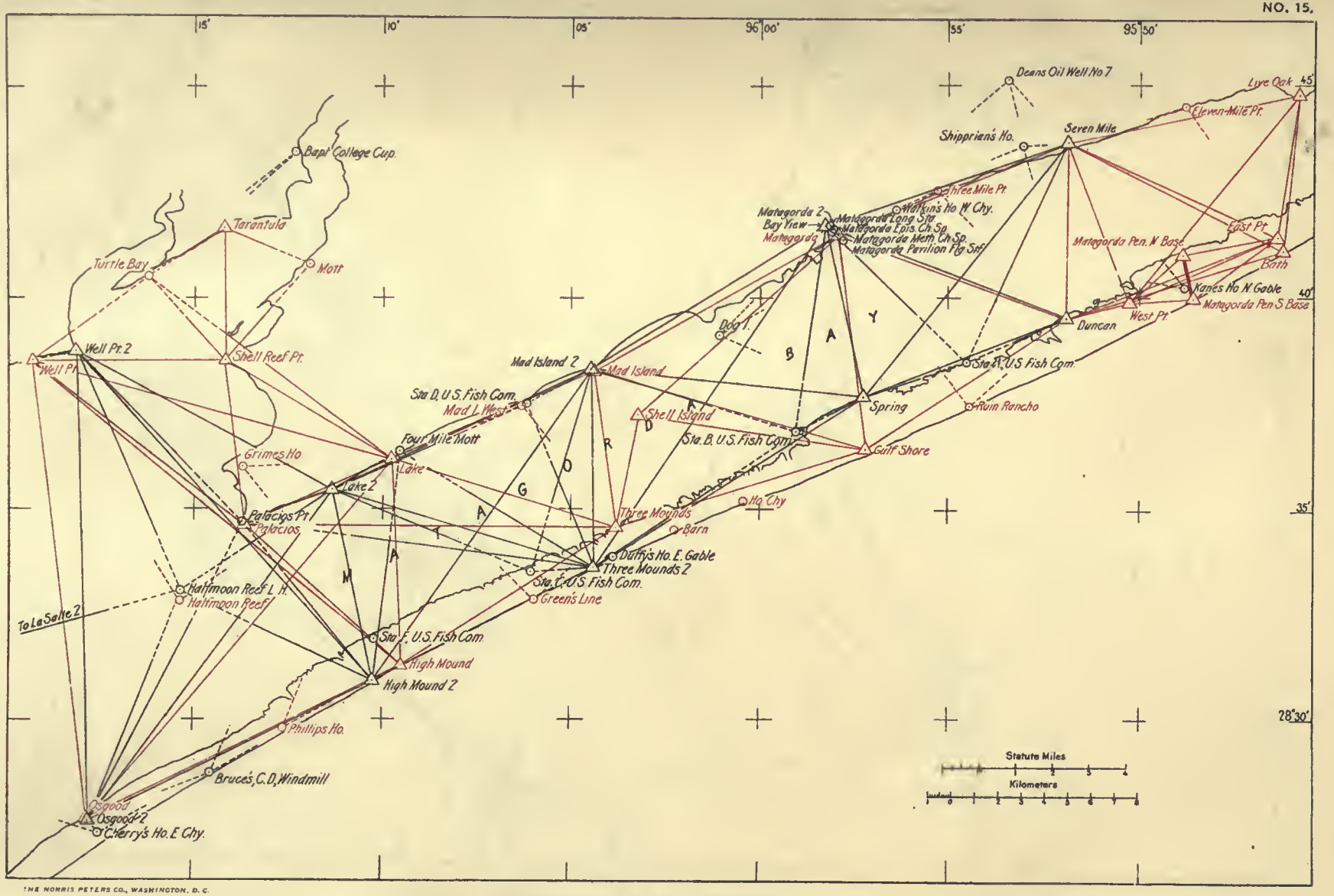
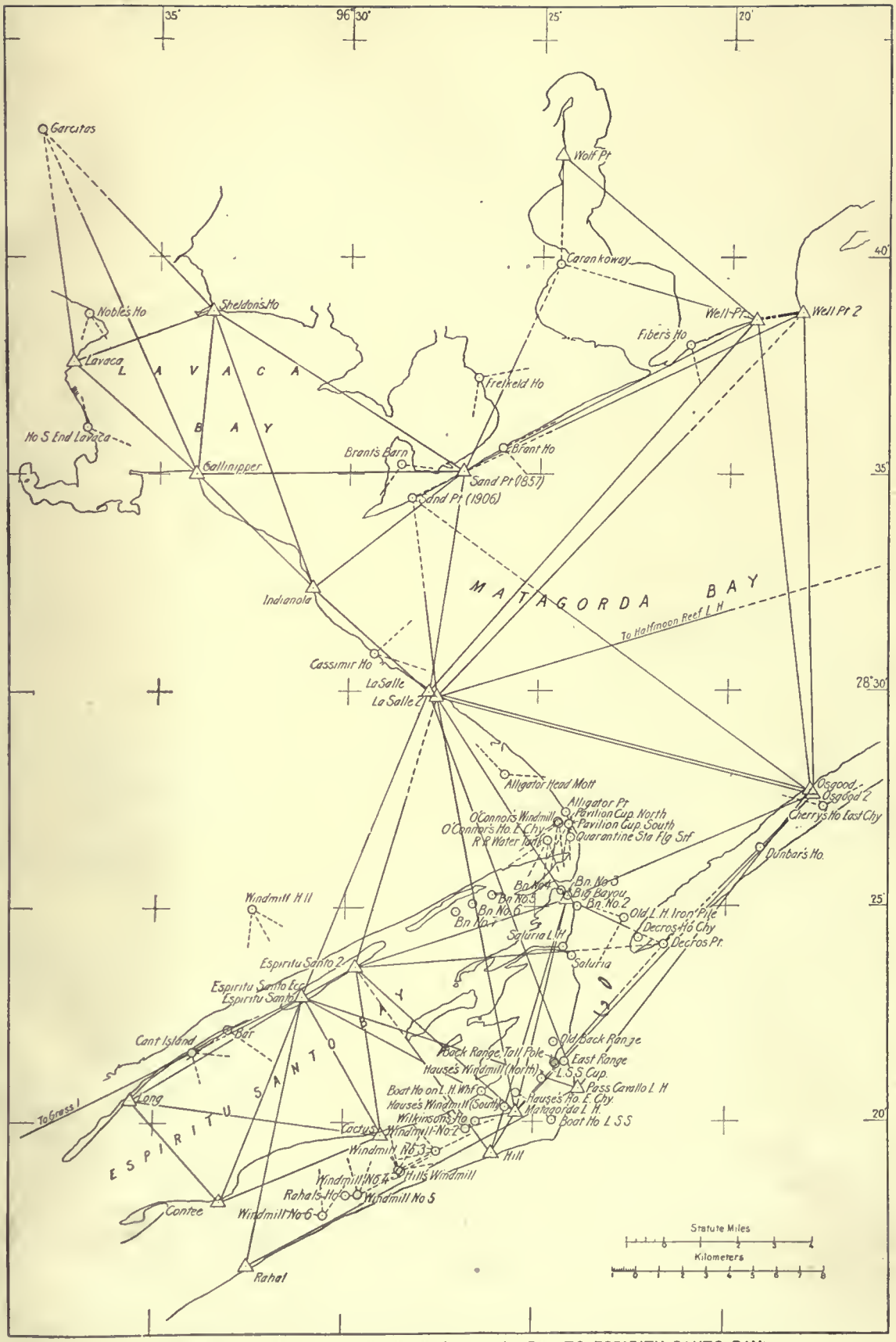
4689°—13——7



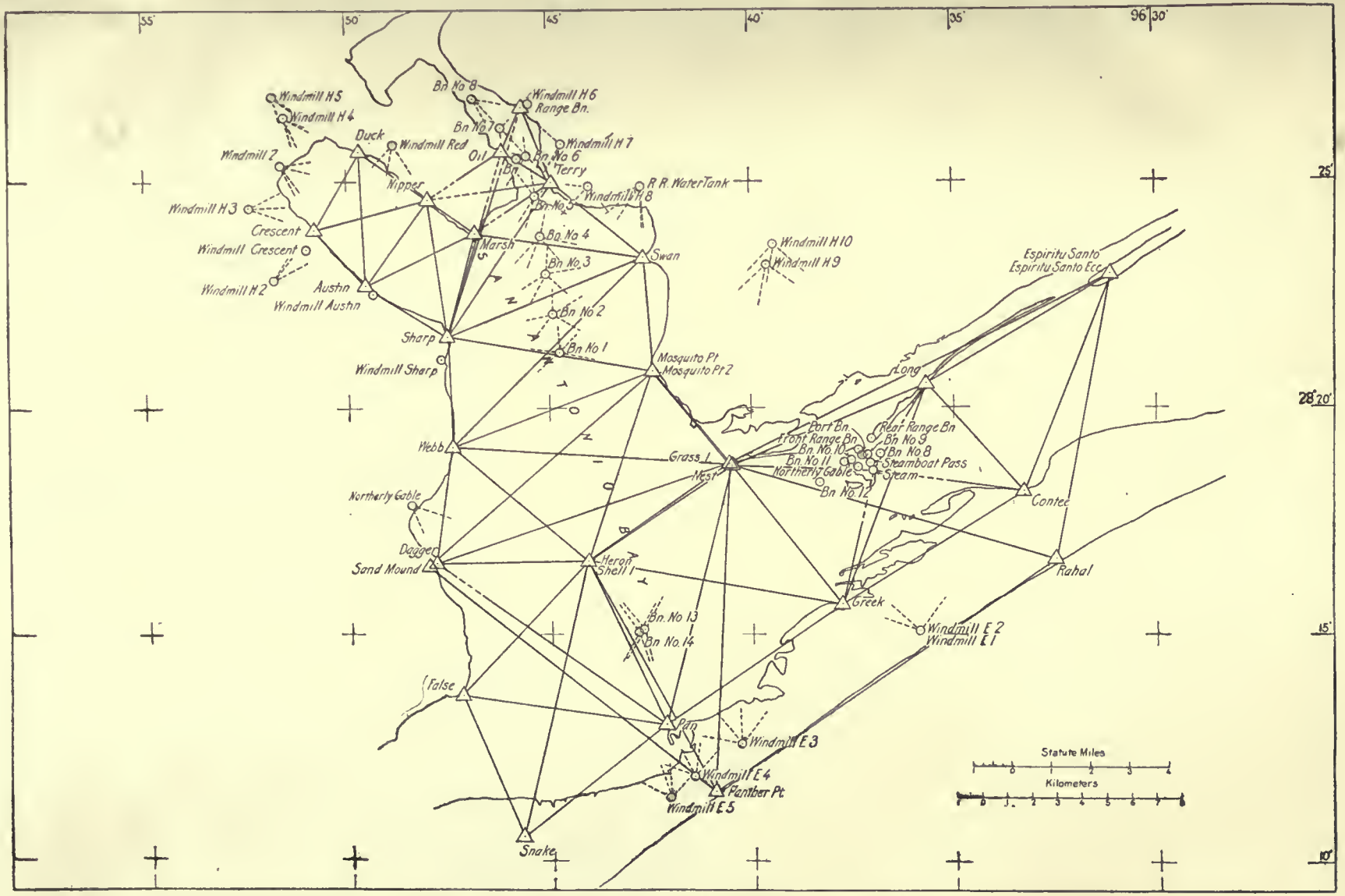
TRIANGULATION, BRAZOS RIVER TO MATAGORDA BAY.



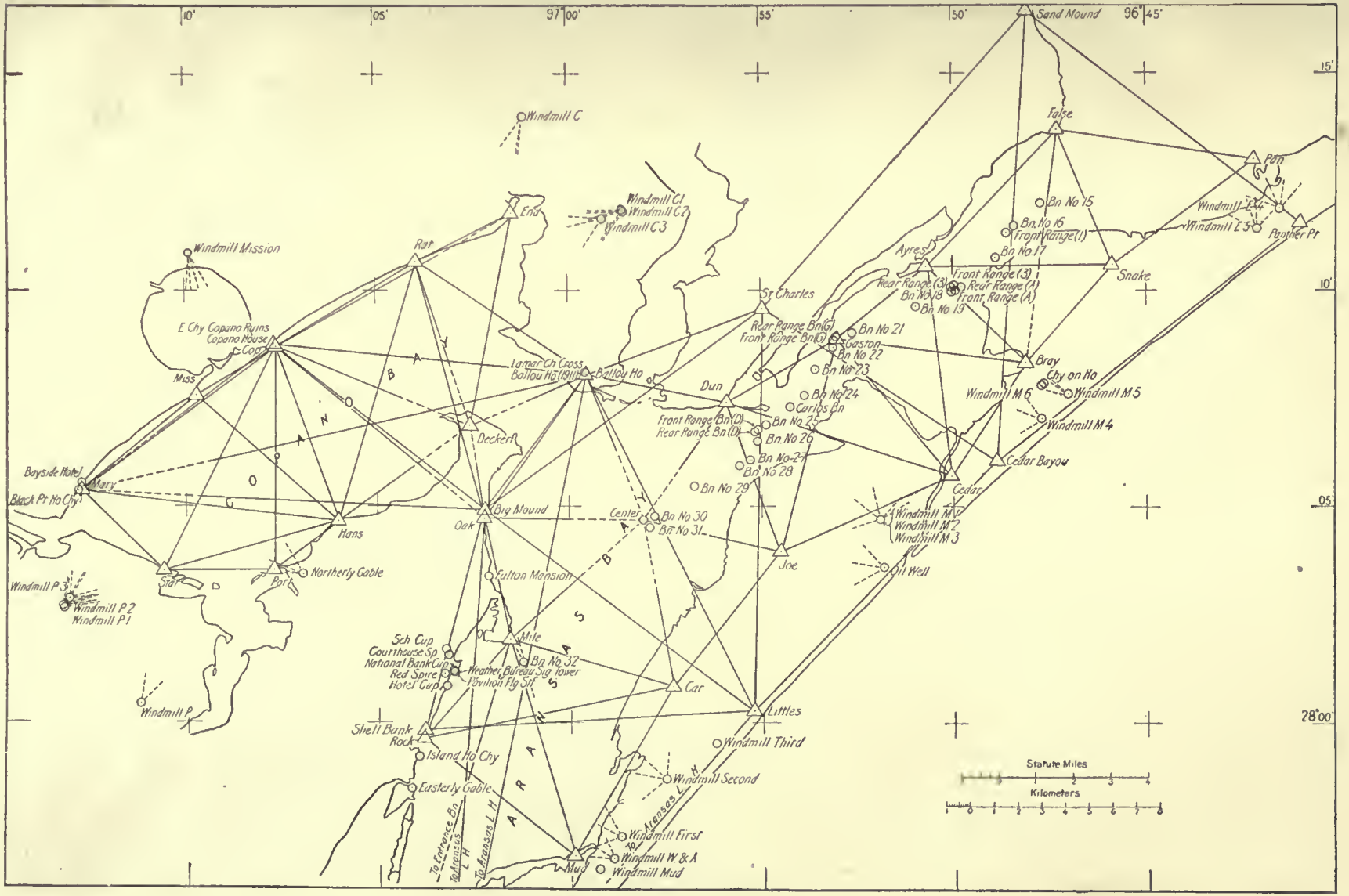
TRIANGULATION, MATAGORDA BAY.



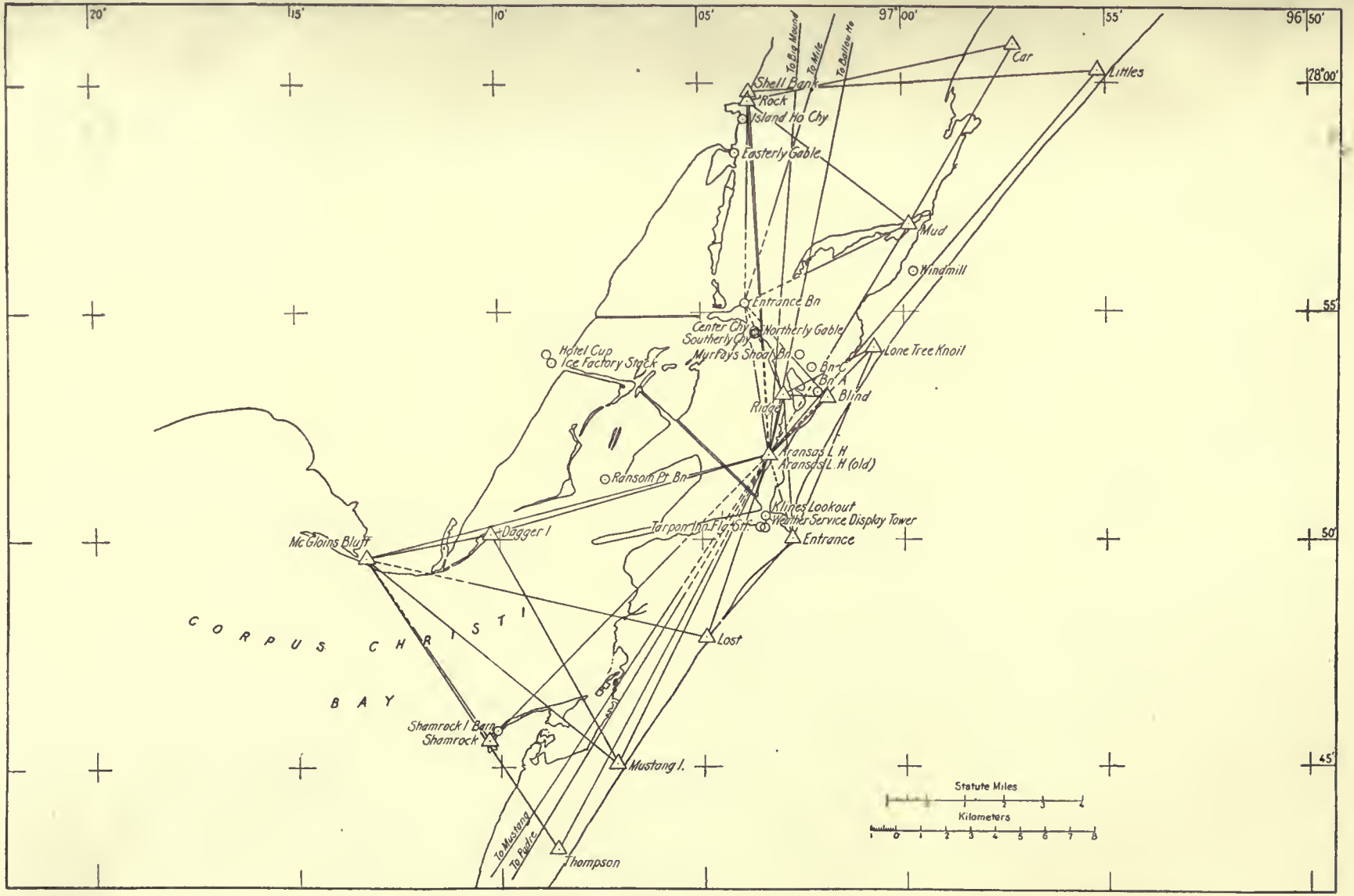
TRIANGULATION, MATAGORDA BAY AND LAVACA BAY TO ESPIRITU SANTO BAY.



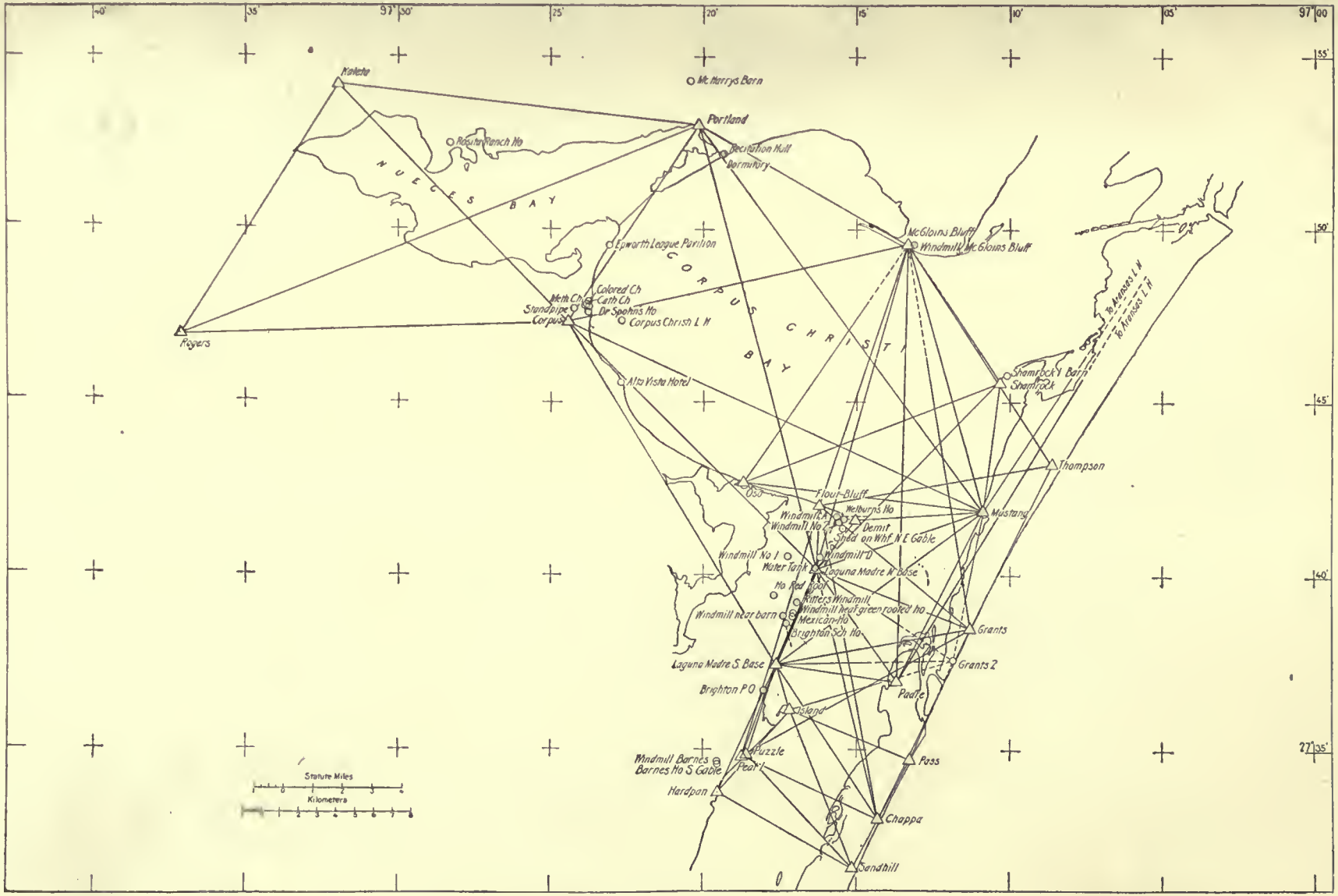
TRIANGULATION, ESPIRITU SANTO BAY AND SAN ANTONIO BAY.



TRIANGULATION, ARANSAS BAY AND COPANO BAY.



TRIANGULATION, ARANSAS BAY TO CORPUS CHRISTI BAY.



TRIANGULATION, CORPUS CHRISTI BAY.

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