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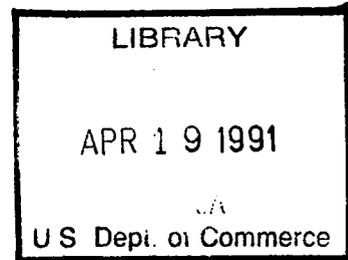
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TRIANGULATION IN ALABAMA AND MISSISSIPPI

BY

WALTER F. REYNOLDS
Computer, U. S. Coast and Geodetic Survey



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TRIANGULATION IN ALABAMA AND MISSISSIPPI.

By WALTER F. REYNOLDS,

Computer, United States Coast and Geodetic Survey.

GENERAL STATEMENT.

The main purpose of this publication is to give the geographic positions on the North American Datum,¹ also the descriptions and elevations of all triangulation stations of the United States Coast and Geodetic Survey in Alabama, on the Gulf coast in Mississippi, and on the Eastern Oblique Arc in Louisiana.

In 1901 the results of the entire Eastern Oblique Arc triangulation appeared in Special Publication No. 7. The extent of that triangulation is shown by the following statement quoted from that publication:

The triangulation upon which it is based begins at Calais, Me., on the St. Croix River, opposite the Canadian boundary, in latitude $45^{\circ} 11' 09.4''$, and in longitude $67^{\circ} 16' 57.9''$ west of Greenwich, and following the trend of the Appalachian chain of mountains, reaches the Gulf coast at Dauphin Island near Mobile Bay, and terminates at New Orleans, La., in latitude $29^{\circ} 57' 24.4''$ and in longitude $90^{\circ} 04' 24.4''$ west of Greenwich. The geodetic line covers $23^{\circ} 30' 57''$, and its total length is 2612.3 kilometers, or 1623.2 statute miles, with an azimuth of $57^{\circ} 30.7'$ at Calais and of $223^{\circ} 22.5'$ at New Orleans, as counted from south around by west. Its extremes differ $15^{\circ} 13' 45.0''$ in latitude and $22^{\circ} 47' 26.5''$ in longitude, and in its course it traverses 16 states.

The field work began in 1833, and the last measurements were made in 1898, but during that time there were many years during which no work was done upon the arc. The publication dealt primarily with the purely scientific problem of the determination of the figure of the earth, and only the positions of those points included in the main scheme of triangulation were published. As the triangulation was prepared for publication before the adoption of the United States Standard Datum, now called the North American Datum,¹ the positions in Special Publication No. 7 are not on that datum, but are on the same one that was used for the Transcontinental Triangulation, the results of which appeared in Special Publication No. 4. The datum on which the Transcontinental and Oblique Arcs were originally based is no longer used.¹

The field work of the triangulation included in this publication was done between the years 1846 and 1911. From time to time tertiary triangulation has been done along the coast to supplement the triangulation of the Oblique Arc. Many of the original stations could not be recovered. When an old station was found it was re-marked, if it was necessary to do so in order to preserve the station. Although many of them are lost, all of those stations which formed a part of the Eastern Oblique Arc are included in this publication, as it is necessary to make use of the old stations in carrying ahead the North American Datum.

The adjustment of the elevations from the vertical measures was made by H. R. Tolley.

The engineer intent only upon securing the necessary information to enable him to extend his triangulation or to base other surveys upon it will find the information he desires on pages 11 to 66, commencing with the explanation of the table of positions, lengths, and azimuths. The index printed on pages 67 to 71, used in connection with the sketches at the end of the publication, will enable him to find quickly the data for any given locality.

¹ See p. 8.

STATEMENT OF ADJUSTMENTS.

A full discussion of the adjustment of the triangulation appears on pages 187 to 226, Special Publication No. 7, and in this volume it is necessary to give only a brief summary concerning it. The lengths and directions of the lines Gulf Point-Brandon and Brandon-Indian had been fixed by a previous adjustment, the lengths of the lines in that adjustment depending upon the Atlanta base. From these two lines to the junction with the Dauphin Island base the adjustment was made in four sections, and the length of that base, as measured in 1847, was held fixed. The first section extended from the lines Gulf Point-Brandon and Brandon-Indian to the line Cahaba-Cheehahaw and required 18 angle and side equations; the second section extended from the line Cahaba-Cheehahaw to the line Jamison-Weogufka and had 14 angle and side equations; the third section began with the line Jamison-Weogufka and ended with the line Creagh-Pollard and had 30 angle and side equations; the fourth section extended from the line Creagh-Pollard to the Dauphin Island base and required 28 angle and side equations.

The Dauphin Island base net was adjusted by itself and required 5 angle and side equations.

The triangulation from the Dauphin Island base net westward is contracted in dimensions and is not of as high a degree of accuracy as the triangulation north of the base. The width of the triangulation was limited by the width of Mississippi Sound, along which it extends. In the section from the Dauphin Island base to the line Deer Island 1-Ship Island 1855, a single adjustment was made requiring 18 equations.

The section from the line Deer Island 1-Ship Island 1855 westward to New Orleans, La., is of secondary accuracy and is somewhat irregular in the shape and size of its component parts. In a number of cases the main scheme consists of single triangles, and in two cases these single triangles had one angle concluded. In this section four adjustments were first made which included all the figures except the single triangles. Finally an adjustment was made bringing the lengths of the sides Deer Island 1-Ship Island 1855 and Battery Bienvenue-Martello Tower into accord. The latter line had its length fixed by the Magnolia base. This adjustment, which considered as fixed the results of the four previous adjustments, involved 6 angle equations and 1 length equation.

ACCURACY AS INDICATED BY CORRECTIONS TO OBSERVED DIRECTIONS.

The maximum correction to an observed direction resulting from the figure adjustment in each of the sections of the Eastern Oblique Arc triangulation in Alabama and Mississippi is shown in the following table:

Maximum correction to an observed direction by sections.

Section	Between stations	Correc- tion
Gulf Point-Brandon to Cahaba-Cheehahaw	Indian and Aurora	1.84
Cahaba-Cheehahaw to Jamison-Weogufka	Horn and Laurel84
Jamison-Weogufka to Creagh-Pollard	Lowdosboro and Wilder93
Creagh-Pollard to Dauphin Island base net	Daphne and Dauphin Island east base	1.12
Dauphin Island base net	Dauphin Island west base and Cedar Point49
Dauphin Island base net to Deer Island 1-Ship Island 1855	East Pascagoula and Petit Bols	1.31
Deer Island 1-Ship Island 1855 to St. Patrick's Church	East Rigoules unused lighthouse and Grand Island 1855	2.65

The probable error of an observed direction is

$$d = 0.674 \sqrt{\frac{\sum v^2}{c}}$$

in which $\sum v^2$ is the sum of the squares of the corrections to directions and c is the number of conditions.

The average values of d for the entire Eastern Oblique Arc and the sections included in this publication are as follows:

Entire arc.....	±0.51
Gulf Point-Brandon to Cahaba-Cheehahaw.....	± .67
Cahaba-Cheehahaw to Jamison-Weogufka.....	± .36
Jamison-Weogufka to Creagh-Pollard.....	± .34
Creagh-Pollard to Dauphin Island base net.....	± .35
Dauphin Island base net.....	± .26
Dauphin Island base net to Deer Island 1-Ship Island 1855.....	± .53
Deer Island 1-Ship Island 1855 to St. Patrick's Church.....	± .78

The average value for d for the entire section of the Oblique Arc of primary triangulation included in this publication is ±0''.47. The triangulation from Deer Island 1 and Ship Island 1855 to St. Patrick's Church is not primary in character and should not be considered when computing mean values to show the accuracy of the primary work. With that short section omitted the average value of d for the remaining triangulation is ±0''.42.

ACCURACY AS INDICATED BY CORRECTIONS TO ANGLES AND CLOSURES OF TRIANGLES.

The correction to each angle is the algebraic difference of the corrections to two directions. The mean error of an angle i

$$\alpha = \sqrt{\frac{\sum d^2}{3n}}$$

in which $\sum d^2$ is the sum of the squares of the closing errors of the triangles and n is the number of triangles. A comparison of the maximum correction to an angle, the maximum closure of a triangle, the average closing error of a triangle, and the mean error of an angle in the entire Eastern Oblique Arc and the various sections included in this publication is given in the following table:

Section	Maximum correction to an angle	Maximum closure of a triangle	Average closure of a triangle	Mean error of an angle
Entire arc.....	2.24	2.88	1.10	0.82
Gulf Point-Brandon to Cahaba-Cheehahaw.....	2.24	2.88	1.03	.78
Cahaba-Cheehahaw to Jamison-Weogufka.....	1.44	2.09	1.10	.77
Jamison-Weogufka to Creagh-Pollard.....	1.21	2.19	.85	.63
Creagh-Pollard to Dauphin Island base net.....	1.51	2.87	.97	.68
Dauphin Island base net.....	.63	1.25	.83	.51
Dauphin Island base net to Deer Island 1-Ship Island 1855.....	1.57	2.80	1.12	.78

The average closure of a triangle for the six sections included in this publication is 0''.95, while the mean error of an angle for the six sections is 0''.69. The last section from Deer Island 1 and Ship Island 1855 to St. Patrick's Church is not considered in the above table.

ACCORD OF BASES.

There are three bases which serve to fix the length in the triangulation discussed in this publication. The Atlanta base of the Eastern Oblique Arc triangulation fixed the length of the lines Gulf Point-Brandon and Brandon-Indian. The Dauphin Island base furnishes a valuable test of the accuracy of the triangulation. The length of the line Martello Tower-Battery Bienvenue is fixed by the Magnolia base, which is about 60 kilometers (37½ statute miles) down the Mississippi River from that line.

The adjustment of the triangulation between the Atlanta and Dauphin Island bases was made in parts, and when the Dauphin Island base was reached there was found to be a difference of only 1.6 in the seventh place of decimals in the logarithm of the computed length. This difference corresponds to 1 part in about 2 700 000. No extra adjustment was therefore needed to bring the Atlanta and Dauphin Island bases into accord.

The length of the line Martello Tower-Battery Bienvenue,¹ as computed and adjusted from Dauphin Island base, differed by 1 part in 13 000 from its length as derived from the Magnolia base. This difference corresponds to 32.5 in the sixth decimal place in the logarithm of the line. The discussion of the adjustment to distribute this discrepancy is found on page 231 of Special Publication No. 7.

THE NORTH AMERICAN DATUM.

Early in the year 1913 the Superintendent of the United States Coast and Geodetic Survey was notified by the director of the Comisión Geodésica Mexicana and by the chief astronomer of the Dominion of Canada Astronomical Observatory that the United States Standard Datum had been adopted as the datum for the triangulation of those organizations. They also reported that the Clarke spheroid of 1866, now used in the United States, would be used by them.

Owing to the international character of the datum now adopted by the three countries, the Superintendent of the United States Coast and Geodetic Survey has changed its designation from the "United States Standard Datum" to the "North American Datum."

EXPLANATION OF POSITIONS, LENGTHS, AND AZIMUTHS, AND OF THE NORTH AMERICAN DATUM.

The lengths, as already fully explained in connection with the adjustments, all depend upon the Atlanta, Dauphin Island, and Magnolia bases. The lengths as given are all reduced to sea level. If the actual length of a line simply reduced to the horizontal is desired, it may be obtained with all the accuracy ordinarily needed by adding to the sea level length as given a correction = (length of line as given) $\left[\frac{\text{mean elevation of the two ends of the line in meters}}{6\,370\,000} \right]$. The maximum value of this correction does not exceed $\frac{1}{9800}$ for the length of any portion of the triangulation here published. The maximum error made in the use of the above approximate formula for the correction does not exceed $\frac{1}{32000000}$ for the length of any portion of this triangulation.

The positions—that is, the latitudes, longitudes, and azimuths—need special explanation.

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 United States 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 the selected 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 expanded until they touched or overlapped.

The Transcontinental Triangulation, of which the office computation was completed in 1899, joined all of the detached portions mentioned and made of them one continuous triangulation. As soon as this was accomplished the logical necessity existed of discarding the old geodetic data used in these various pieces and substituting one for the whole country, or at least for as much of the country as is covered by continuous triangulation. To do this was a very heavy piece of work, and involved much preliminary study to determine the best datum to

¹ See Special Publication No. 7, pp. 219-231.

be adopted. On March 13, 1901, the Superintendent adopted what was known from that time until 1913 as the United States Standard Datum, but is now known as the North American Datum (see p. 8), 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.

As the adoption of such a standard datum was 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 United States 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 United States 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 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 later 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 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 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 (now the North American) Datum was adopted with reference to positions furnished for geographic purposes, 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 con-

siderations led to the adoption, as the standard, of that datum which had been in use for many years in the northeastern group of States and along the Atlantic coast as far south 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 datum for which the algebraic sum of the station errors of each class would be zero.¹

The North American Datum, upon which depend the positions and azimuths given in this publication, may be defined in terms of the position of the station Meades Ranch as follows:

	°	'	''
$\phi = 39$	13	26.686	
$\lambda = 98$	32	30.506	
α to Waldo = 75	28	14.52	

Points are then said to be upon the North American Datum 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 geographic positions on pages 239 to 246 in Special Publication No. 7 are on the Transcontinental Datum. The corrections required to reduce these positions to the North American Datum vary at different parts of the Oblique Arc, and in general fall between the limits $\Delta\phi = +1''.9$ to $+2''.1$, $\Delta\lambda = -0''.4$ to $-0''.8$, and $\Delta\alpha = -2''$ to $+2''$. In order to reduce to the North American Datum the positions of those points of the Eastern Oblique Arc which are included in this publication, the latitude of Lavender² was corrected by $+1''.994$, the longitude by $-0''.468$, and the azimuth of the line Lavender-Carnes by $-1''.38$. Using this corrected position of Lavender and the corrected azimuth of the line Lavender-Carnes, the positions of all the points of the Eastern Oblique Arc from this line to New Orleans were computed, using the adjusted triangles appearing on pages 185-186, 192-193, 198, 206-208, 216-218, 224-225, 232-234 of Special Publication No. 7, no change being made in the angles and lengths.

The principal lists of geographic positions published on the adopted datum throughout the whole United States are contained in the following publications of the United States 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.
- Special Publication No. 17, positions in Texas.
- Special Publication No. 19, positions in Colorado, Utah, Nevada, Wyoming, Montana, South Dakota, and North Dakota.

¹ 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 United States Coast and Geodetic Survey.

² See p. 243 of Special Publication No. 7.

Special Publication No. 24, positions in Alabama and Mississippi.
Triangulation in Greater New York.
Report on a Plan of Sewerage, Cincinnati.
Appendix EEE, pages 2905-3031, Annual Report of the Chief of Engineers, 1902, positions of points on and near the Great Lakes.
Publications of the Massachusetts Harbor and Land Commission.
Various bulletins of the United States Geological Survey.

TABLE OF POSITIONS.

In the table of positions the latitude and longitude of each point are given on the North American Datum (see p. 8), also the length and azimuth of each line observed over, whether in one or both ways. With the latitude and longitude of each point are given the lengths and azimuths 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 from 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 adjusted triangulation. Points, the positions of which are given to hundredths of seconds only, are marked by footnotes as being without check (observed from only two stations) or checked by verticals only.

In the columns giving azimuths, distances, and logarithms of distances, the accuracy is indicated to a certain extent by the number of decimal places given, it being understood that in each case 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 conveniently consulted by using as finders the 11 sketches at the end of this publication, and the index on pages 67 to 71. In the third column of the index will be found for each point a reference to the page on which its description is given, in the fourth column the page on which its elevation above sea level is shown, and in the fifth column the number of the sketch on which it appears.

The following conversion tables are inserted for the convenience of those who may wish to change the distances or elevations given in this publication from meters to feet or from feet to meters:

Lengths—Meters to feet (from 1 to 1,000 units).
[Reduction factor: 1 meter = 3.280833333 feet.]

Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.																
0	0	100	328.0833	200	656.1667	300	984.2500	400	1,312.3333	500	1,640.4167	600	1,968.5000	700	2,296.5833	800	2,624.6667	900	2,952.7500												
1	3.2808	1	331.3641	1	659.4475	1	987.5308	1	1,315.6147	1	1,643.6975	1	1,971.7808	1	2,300.8641	1	2,629.9475	1	2,956.0308	1	3,284.1141										
2	6.5617	2	662.7283	2	1,318.0690	2	1,975.0617	2	2,631.2290	2	3,262.3790	2	3,913.3950	2	4,564.7617	2	5,216.8150	2	5,868.8700	2	6,521.9250	2	7,176.9800								
3	9.8426	3	994.0920	3	2,027.1035	3	3,042.1455	3	4,057.5435	3	5,072.9415	3	6,088.3395	3	7,103.7375	3	8,119.1355	3	9,134.5335	3	10,149.9315	3	11,165.3295	3	12,180.7275						
4	13.1235	4	1,321.4560	4	2,694.7380	4	4,076.2140	4	5,368.2580	4	6,660.3020	4	7,952.3460	4	9,244.3900	4	10,536.4340	4	11,828.4780	4	13,120.5220	4	14,412.5660	4	15,704.6100	4	16,990.6540				
5	16.4044	5	1,648.8200	5	2,413.6120	5	3,620.4040	5	4,827.1960	5	6,040.7880	5	7,254.3800	5	8,467.9720	5	9,681.5640	5	10,895.1560	5	12,108.7480	5	13,322.3400	5	14,535.9320	5	15,749.5240	5	16,963.1160		
6	19.6853	6	1,976.1840	6	2,922.4000	6	4,368.1920	6	5,784.1840	6	7,246.1760	6	8,708.1680	6	10,172.1600	6	11,636.1520	6	13,100.1440	6	14,572.1360	6	16,008.1280	6	17,496.1200	6	18,980.1120	6	20,464.1040		
7	22.9662	7	2,304.5480	7	3,474.2160	7	5,252.3040	7	7,000.2080	7	8,746.1100	7	10,492.0120	7	12,237.9140	7	13,983.8160	7	15,729.7180	7	17,475.6200	7	19,267.5220	7	21,059.4240	7	22,851.3260	7	24,643.1280		
8	26.2471	8	2,632.9120	8	3,985.8240	8	5,976.2080	8	7,966.1000	8	9,957.0020	8	11,947.9040	8	13,938.8060	8	15,929.7080	8	17,920.6100	8	19,911.5120	8	21,902.4140	8	23,893.3160	8	25,884.2180	8	27,875.1200		
9	29.5280	9	2,961.2760	9	4,497.7360	9	6,744.1120	9	8,990.0040	9	11,236.9060	9	13,482.8080	9	15,728.7100	9	17,974.6120	9	20,220.5140	9	22,466.4160	9	24,712.3180	9	27,058.2200	9	29,304.1220	9	31,496.0240		
10	32.8089	10	3,289.6400	10	4,999.6480	10	7,496.0320	10	9,992.0240	10	12,484.0160	10	14,976.0080	10	17,468.0000	10	19,960.0020	10	22,452.0040	10	24,944.0060	10	27,436.0080	10	29,928.0100	10	32,420.0120	10	34,904.0140	10	37,388.0160
11	36.0898	11	3,618.0040	11	5,413.6560	11	8,192.0480	11	10,980.0400	11	13,768.0320	11	16,556.0240	11	19,344.0160	11	22,132.0080	11	24,920.0000	11	27,708.0020	11	30,496.0040	11	33,272.0060	11	36,048.0080	11	38,824.0100	11	41,596.0120
12	39.3707	12	3,946.3680	12	5,827.2720	12	8,784.0640	12	11,572.0560	12	14,360.0480	12	17,148.0400	12	19,936.0320	12	22,724.0240	12	25,512.0160	12	28,300.0080	12	31,088.0000	12	33,876.0020	12	36,664.0040	12	39,452.0060	12	42,238.0080
13	42.6516	13	4,274.7320	13	6,431.2880	13	9,648.0800	13	12,856.0720	13	16,064.0640	13	19,272.0560	13	22,478.0480	13	25,684.0400	13	28,890.0320	13	32,096.0240	13	35,302.0160	13	38,508.0080	13	41,714.0000	13	44,920.0020	13	48,126.0040
14	45.9325	14	4,603.0960	14	6,845.8040	14	10,264.0720	14	13,472.0640	14	16,680.0560	14	19,888.0480	14	23,096.0400	14	26,304.0320	14	29,512.0240	14	32,718.0160	14	35,924.0080	14	39,130.0000	14	42,336.0020	14	45,542.0040	14	48,748.0060
15	49.2134	15	5,016.4600	15	7,450.3200	15	11,072.0880	15	14,280.0800	15	17,488.0720	15	20,696.0640	15	23,904.0560	15	27,112.0480	15	30,320.0400	15	33,528.0320	15	36,734.0240	15	40,140.0160	15	43,346.0080	15	46,552.0000	15	49,758.0020
16	52.4943	16	5,344.8240	16	7,862.3360	16	11,684.0960	16	15,292.0880	16	18,900.0800	16	22,508.0720	16	26,116.0640	16	29,724.0560	16	33,332.0480	16	36,940.0400	16	40,548.0320	16	44,156.0240	16	47,762.0160	16	50,970.0080	16	54,578.0000
17	55.7552	17	5,873.1880	17	8,675.7760	17	12,900.1120	17	17,108.1040	17	21,316.0960	17	25,724.0880	17	30,132.0800	17	34,540.0720	17	38,948.0640	17	43,356.0560	17	47,764.0480	17	52,172.0400	17	56,580.0320	17	60,996.0240	17	65,812.0160
18	59.0361	18	6,201.5520	18	9,087.7040	18	13,712.1280	18	18,320.1200	18	23,128.1120	18	28,136.1040	18	33,144.0960	18	38,152.0880	18	43,160.0800	18	48,168.0720	18	53,176.0640	18	58,184.0560	18	63,192.0480	18	68,200.0400	18	73,208.0320
19	62.3170	19	6,530.0160	19	9,499.6400	19	14,324.1600	19	19,332.1520	19	24,540.1440	19	29,748.1360	19	35,156.1280	19	40,564.1200	19	45,972.1120	19	51,380.1040	19	56,788.0960	19	62,196.0880	19	67,604.0800	19	72,412.0720	19	77,220.0640
20	65.5979	20	6,858.8800	20	10,111.5200	20	15,136.1920	20	20,344.1840	20	25,752.1760	20	31,360.1680	20	37,168.1600	20	43,176.1520	20	49,184.1440	20	55,192.1360	20	61,200.1280	20	67,208.1200	20	73,216.1120	20	79,224.1040	20	85,232.1000
21	68.8788	21	7,217.2440	21	10,723.4560	21	16,152.2560	21	21,760.2480	21	27,568.2400	21	33,576.2320	21	39,784.2240	21	46,192.2160	21	52,600.2080	21	59,008.2000	21	65,416.1920	21	71,824.1840	21	78,232.1760	21	84,640.1680	21	90,448.1600
22	72.1597	22	7,585.7080	22	11,335.3920	22	17,164.3680	22	23,172.3600	22	29,380.3520	22	35,788.3440	22	42,396.3360	22	49,204.3280	22	56,212.3200	22	63,220.3120	22	70,228.3040	22	77,236.2960	22	84,244.2880	22	91,252.2800	22	98,260.2720
23	75.4406	23	7,954.5720	23	12,147.5040	23	18,284.4160	23	24,592.4080	23	31,160.4000	23	37,968.3920	23	44,916.3840	23	52,004.3760	23	59,232.3680	23	66,500.3600	23	73,908.3520	23	81,456.3440	23	89,144.3360	23	96,872.3280	23	104,640.3200
24	78.7215	24	8,322.4360	24	12,961.4400	24	19,412.4800	24	25,984.4720	24	32,776.4640	24	39,788.4560	24	47,020.4480	24	54,484.4400	24	62,172.4320	24	70,084.4240	24	78,220.4160	24	86,588.4080	24	95,172.4000	24	103,984.3920	24	112,920.3840
25	82.0024	25	8,690.3000	25	13,775.3760	25	20,564.5120	25	27,656.5040	25	35,048.4960	25	42,740.4880	25	50,732.4800	25	59,024.4720	25	67,616.4640	25	76,408.4560	25	85,400.4480	25	94,592.4400	25	103,976.4320	25	113,660.4240	25	123,544.4160
26	85.2833	26	9,058.1640	26	14,589.3120	26	21,680.4480	26	29,072.4400	26	36,864.4320	26	45,056.4240	26	53,648.4160	26	62,540.4080	26	71,732.4000	26	81,224.3920	26	91,016.3840	26	101,108.3760	26	111,496.3680	26	122,184.3600	26	133,168.3520
27	88.5642	27	9,446.0280	27	15,403.2480	27	22,872.4840	27	30,664.4760	27	38,856.4680	27	47,448.4600	27	56,440.4520	27	65,832.4440	27	75,624.4360	27	85,816.4280	27	96,408.4200	27	107,396.4120	27	118,688.4040	27	130,280.3960	27	142,064.3880
28	91.8451	28	9,854.8920	28	16,222.1840	28	24,448.5200	28	32,640.5120	28	41,328.5040	28	50,516.4960	28	60,204.4880	28	70,392.4800	28	81,080.4720	28	92,268.4640	28	103,956.4560	28	116,144.4480	28	128,832.4400	28	142,020.4320	28	155,796.4240
29	95.1260	29	10,283.7560	29	17,047.1200	29	25,672.5560	29	34,264.5480	29	43,912.5400	29	54,604.5320	29	65,440.5240	29	77,420.5160	29	89,640.5080	29	102,100.5000	29	115,832.4920	29	130,816.4840	29	147,456.4760	29	164,920.4680	29	182,516.4600
30	98.4069	30	10,745.6200	30	17,871.0560	30	27,400.5920	30	36,492.5840	30	46,240.5760	30	56,144.5680	30	66,204.5600	30	77,520.5520	30	89,096.5440	30	101,928.5360	30	116,116.5280	30	131,656.5200	30	148,552.5120	30	166,804.5040	30	185,916.4960
31	101.6878	31	11,227.4840	31	18,805.0000	31	29,336.6320	31	39,868.6240	31	50,592.6160	31	62,508.6080	31	74,716.6000	31	87,216.5920	31	100,008.5840	31	114,096.5760	31	129,480.5680	31							

Oblique Arc

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Principal points.</i>							
	° ' "		° ' "	° ' "		<i>Meters</i>	
Indian 1876	34 01 49.599 85 25 30.939	1528.3 793.7					
Gulf Point 1876	34 37 31.818 85 28 02.368	980.4 60.3	356 37 54.24	176 39 19.64	Indian	66120.05	4.8203371
Brandon 1876	34 23 06.990 85 45 12.570	215.4 321.4	224 31 15.82 322 21 45.16	44 40 59.42 142 32 49.43	Gulf Point Indian	37427.34 49640.70	4.5731889 4.6958379
Aurora 1877	34 08 47.479 86 11 00.660	1463.0 16.9	236 06 30.01 280 12 44.83	56 21 01.64 100 38 14.78	Brandon Indian	47643.04 71154.56	4.8779925 4.8522027
Gunter 1877	34 34 06.466 86 10 20.188	199.2 514.6	264 12 41.29 297 43 26.01 1 16 08.75	84 36 42.29 117 57 39.43 181 15 45.91	Gulf Point Brandon Aurora	64977.65 43509.05 46815.51	4.8127640 4.6385796 4.6703897
Summit 1877	34 12 15.950 86 29 05.080	491.5 130.0	215 20 57.37 282 56 17.58	35 31 32.68 103 06 26.73	Gunter Aurora	49562.05 28505.27	4.6951492 4.4549251
Rowe 1877	34 32 21.933 86 31 26.498	675.8 675.7	264 12 09.84 324 11 29.67 354 26 06.25	84 24 08.07 144 23 01.23 174 27 26.09	Gunter Aurora Summit	32445.16 53876.31 37334.91	4.5111499 4.7297826 4.5721152
Wilson 1877	34 25 07.104 86 49 02.770	218.9 70.7	243 29 08.00 307 42 51.45	63 39 05.96 127 54 06.58	Rowe Summit	30100.47 38760.76	4.4785733 4.5883923
Wornock 1878	33 59 48.237 86 41 51.845	1486.1 1330.6	166 46 10.41 194 50 01.09 220 24 30.52 250 33 52.87	346 42 08.16 14 55 53.22 40 31 40.41 70 51 09.97	Wilson Rowe Summit Aurora	48081.88 62287.16 30282.69 50290.76	4.6819815 4.7943985 4.4811945 4.7014882
Cahaba 1886	33 44 47.088 86 31 32.909	1450.7 847.0	150 14 15.40 215 23 38.12	330 08 30.45 35 35 06.24	Wornock Aurora	31998.83 54505.05	4.5051341 4.7364367
Cheehabaw 1886	33 29 07.674 85 48 30.943	236.4 798.8	113 41 59.31 154 46 12.31 210 19 48.20	293 18 09.86 334 33 41.14 30 32 35.06	Cahaba Aurora Indian	72577.90 81123.20 70107.39	4.8608044 4.9091451 4.8457638
Alpine 1885	33 24 42.267 86 12 27.019	1302.2 698.1	141 33 49.94 257 27 28.50	321 23 16.16 77 40 40.05	Cahaba Cheehabaw	47445.64 37981.02	4.6761963 4.5795666
Laurel 1886	33 23 50.982 86 34 51.821	1570.7 1339.2	167 32 10.11 267 17 38.09	7 34 00.10 87 29 58.47	Cahaba Alpine	39037.55 34786.45	4.5914826 4.5414101
Horn 1885	33 17 52.239 86 04 28.407	1609.4 734.0	103 19 53.11 135 37 33.50 229 51 56.71	283 03 10.72 315 33 10.41 50 00 43.66	Laurel Alpine Cheehabaw	48426.88 17683.33 32331.47	4.6850865 4.2475640 4.5096255
Kahatchee 1887	33 13 38.271 86 21 36.527	1179.1 945.8	132 35 52.87 214 45 03.15 253 32 14.06	312 28 36.07 34 50 05.00 73 41 37.96	Laurel Alpine Horn	27920.17 24909.27 27736.82	4.4450180 4.3963610 4.4430567
Weogufka 1887	32 58 41.166 86 21 16.177	1268.0 420.0	155 37 52.84 178 54 27.71 216 17 57.86	335 30 26.34 353 54 16.60 36 27 08.76	Laurel Kahatchee Horn	51096.66 27841.55 44042.46	4.7083075 4.4415625 4.6438716
Jamison 1885	32 55 56.476 86 38 20.983	1739.6 545.1	185 58 54.10 218 27 34.82 259 07 51.98	6 00 48.50 28 36 43.06 79 17 09.46	Laurel Kahatchee Weogufka	51899.88 41816.74 27096.38	4.7149152 4.6213502 4.4329113
Wilder 1890	32 38 01.403 86 29 38.265	43.2 997.4	157 42 32.92 198 50 41.05	337 37 49.89 18 55 13.08	Jamison Weogufka	35802.14 40362.91	4.5539090 4.6059824
Wetumpka 1892	32 32 03.433 86 11 38.174	105.8 990.2	111 27 29.54 163 02 41.45	291 17 47.87 342 57 28.71	Wilder Weogufka	30251.06 51466.00	4.4807405 4.7115204
Perry 1890	32 45 33.149 86 57 21.077	1021.1 548.7	236 59 05.82 237 41 10.82	57 09 24.18 107 56 09.05	Jamison Wilder	35322.81 45493.93	4.5480553 4.6579534
Parker 1890	32 33 48.783 86 50 32.627	1502.7 851.1	153 54 01.75 256 31 27.06	333 50 21.32 76 42 42.85	Perry Wilder	24167.41 33622.47	4.3832301 4.5266296
Lowndesboro 1892	32 16 17.547 86 36 40.643	540.5 1063.7	146 11 12.11 195 19 40.54 233 18 40.33	326 03 46.10 15 23 27.19 53 32 05.45	Parker Wilder Wetumpka	39001.50 41650.41 48893.63	4.5010813 4.6196193 4.6892523
Lovers Leap 1892	32 10 09.162 86 49 18.152	282.2 475.6	177 27 21.84 210 49 04.31 240 10 21.05	357 26 41.97 30 59 36.56 60 17 04.94	Parker Wilder Lowndesboro	43771.46 60033.56 22852.04	4.6411911 4.7783941 4.3589250
Mount Carmel 1892	32 01 16.043 86 20 54.073	494.2 1419.0	110 18 12.79 138 17 36.55 194 17 57.70	290 03 07.35 318 09 12.89 14 22 54.54	Lovers Leap Lowndesboro Wetumpka	47605.17 37234.60 58733.80	4.6776541 4.5709467 4.7688881
Bargenier 1892	31 59 16.418 86 36 50.844	505.7 1334.7	135 47 08.23 180 29 10.75 261 34 57.44	315 40 31.35 0 29 16.18 81 43 24.52	Lovers Leap Lowndesboro Mount Carmel	28077.53 31453.46 25381.58	4.4483589 4.4976684 4.4045187
County Line 1892	31 57 52.186 86 48 12.211	1607.2 320.7	175 38 51.67 207 59 01.32 261 41 53.39	355 38 16.66 28 05 09.02 81 47 54.22	Lovers Leap Lowndesboro Bargenier	22765.56 38572.74 18076.73	4.3572783 4.5862805 4.2571200
Ethridge 1892	32 04 45.888 87 03 29.071	1413.5 762.4	245 52 50.62 297 50 16.99	66 00 23.10 117 58 23.15	Lovers Leap County Line	24426.92 27226.49	4.3878686 4.4349916

Oblique Arc—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Principal points—Contd.</i>							
Fatama 1895	31 53 33.044 87 14 13.032	1017.7 342.5	219 09 30.43 231 51 29.31 258 52 09.90	39 15 11.54 52 04 42.18 79 05 55.36	Ethridge Lovers Leap County Line	<i>Meters</i> 26744.95 49799.41 41770.85	4.4272418 4.6972242 4.6208733
Midway 1895	31 43 05.420 87 02 48.912	166.9 1287.8	137 05 58.23 203 00 14.37 220 06 00.81	316 59 57.68 23 07 23.34 40 13 43.33	Fatama Lovers Leap County Line	26410.24 54356.87 35740.08	4.4217723 4.7352545 4.5531555
Pollard 1895	31 27 48.562 87 27 50.162	1495.6 1324.3	204 17 07.57 234 23 05.75	24 24 16.68 54 36 12.18	Fatama Midway	52211.60 48620.44	4.7177670 4.6868189
Creagh 1895	31 36 13.074 87 41 03.183	402.7 83.9	232 48 00.74 257 57 59.87 306 32 41.43	53 02 07.98 78 18 04.12 126 39 36.18	Fatama Midway Pollard	53122.24 61761.81 26059.66	4.7252764 4.7907200 4.4159671
White 1895	31 27 37.798 87 48 27.188	1164.1 717.8	216 23 54.47 269 19 43.53	36 27 46.67 89 30 29.17	Creagh Pollard	19724.40 32660.09	4.2950039 4.5140174
Red Hill 1895	31 12 32.855 87 39 38.983	996.5 1031.9	153 26 18.26 177 05 45.67 213 32 10.37	333 21 43.57 357 05 01.78 33 38 19.00	White Creagh Pollard	31186.36 43811.78 33872.18	4.4939647 4.6415909 4.5298431
Coon 1895	31 14 50.292 88 05 43.313	1548.9 1146.1	229 07 36.91 275 44 44.54	49 16 36.03 95 58 15.56	White Red Hill	36176.14 41619.17	4.5584222 4.6192934
Dean 1895	31 00 42.233 87 47 14.715	1300.7 390.4	131 43 26.39 177 47 51.81 208 52 30.68	311 33 53.27 357 47 14.24 28 56 26.15	Coon White Red Hill	39303.38 49791.76 24082.13	4.5944299 4.6971575 4.3976295
Cold Creek 1895	30 57 26.961 88 05 20.160	830.2 535.1	178 54 27.50 235 34 27.08 258 07 42.99	358 54 15.54 55 47 42.78 78 17 11.79	Coon Red Hill Dean	32136.82 49459.74 29422.05	4.5070029 4.6942518 4.4686730
Minette 1897	30 52 09.393 87 50 43.135	289.2 1145.9	112 50 32.37 150 24 15.61 199 17 29.43	292 43 01.81 330 16 31.21 19 19 16.59	Cold Creek Coon Dean	25258.17 48229.90 16734.38	4.4024020 4.6833164 4.2236066
Spring Hill 1897	30 41 46.437 88 08 45.908	1430.0 1221.8	190 40 36.37 236 14 46.99	10 42 21.81 56 24 01.14	Cold Creek Minette	29475.27 34596.29	4.4694578 4.5390295
Daphne 1897	30 36 07.700 87 54 16.425	237.1 437.6	114 18 59.69 155 54 53.04 190 49 51.22	294 11 36.44 335 49 13.38 10 51 40.23	Spring Hill Cold Creek Minette	25392.44 43187.47 30153.73	4.4047044 4.6351566 4.4793410
St. Elmo 1897	30 30 34.332 88 13 02.515	1057.2 67.0	198 15 32.61 251 02 14.16	18 17 43.24 71 11 46.64	Spring Hill Daphne	21796.49 31719.28	4.3383865 4.5013233
Fort Morgan 1846	30 13 42.242 88 01 23.228	1300.8 621.0	149 07 15.71 167 12 11.29 195 20 36.66	329 01 22.17 347 08 26.85 15 24 12.73	St. Elmo Spring Hill Daphne	36331.04 53189.68 42968.44	4.5602779 4.7258274 4.6331495
Dauphin Island east base 1846	30 14 56.379 88 08 14.288	1736.1 381.9	165 06 02.31 209 40 29.33 281 42 17.88	345 03 36.55 29 47 33.63 101 45 44.89	St. Elmo Daphne Fort Morgan	29890.09 45083.81 11225.44	4.4755272 4.6540206 4.0502034
Dauphin Island west base 1847	30 14 21.462 88 14 51.034	691.8 1364.6	185 31 01.82 264 11 22.08 273 08 45.71	5 31 56.69 84 14 41.91 93 15 32.46	St. Elmo Dauphin Island east base Fort Morgan	30096.51 10661.83 21633.87	4.4785161 4.0278319 4.3351342
Cedar Point 1846	30 20 44.421 88 07 17.038	1367.9 455.1	8 07 40.49 46 50 53.63	188 07 11.61 225 47 04.63	Dauphin Island east base Dauphin Island west base	10825.76 16918.31	4.0344585 4.2283570
Cat Island 1846	30 18 56.205 88 12 38.329	1730.7 1024.0	316 16 58.11 22 45 26.44	136 19 11.25 202 44 19.53	Dauphin Island east base Dauphin Island west base	10214.42 9172.61	4.0092138 3.9624929
Point aux Pins 1846	30 22 03.765 88 18 51.471	115.9 1374.5	277 27 22.76 300 63 55.61 335 41 30.74	97 33 13.71 120 07 04.10 155 43 32.06	Cedar Point Cat Island Dauphin Island west base.	18705.77 11519.11 15617.27	4.2719755 4.0614191 4.1936052
Grand Batture 1846	30 19 25.773 88 25 13.801	793.6 368.7	244 29 56.94 299 19 58.42	64 33 10.10 119 25 12.45	Point aux Pins Dauphin Island west base	11311.32 19100.30	4.0535132 4.2810402
Petit Bols 1846	30 12 09.316 88 23 46.322	286.9 1239.0	170 08 08.44 203 16 15.20 254 05 28.80	350 07 24.35 23 18 43.90 74 09 58.23	Grand Batture Point aux Pins Dauphin Island west base	13641.50 19928.69 14882.40	4.1348623 4.2994788 4.1726730
Horn Island east 1855	30 13 13.826 88 31 55.822	425.7 1492.9	223 08 45.72 278 35 35.99	43 12 08.38 98 39 42.30	Grand Batture Petit Bols	15704.85 13241.65	4.1960339 4.1219420
Bayou Casotte 1846	30 19 44.500 88 30 47.367	1370.3 1265.3	273 40 45.04 321 12 24.07 8 39 10.64	93 43 33.46 141 15 56.28 188 38 36.13	Grand Batture Petit Bols Horn Island east 1855	8929.55 17975.65 12168.18	3.9508295 4.2546847 4.0852257
East Pascagoula 1847	30 20 35.517 88 32 45.210	1063.7 1207.6	290 30 51.75 317 13 19.14 354 27 12.40	116 31 51.27 137 17 50.81 174 27 37.30	Bayou Casotte Petit Bols Horn Island east 1855	3518.00 21223.28 13664.70	3.5462953 4.3268125 4.1356001

Oblique Arc—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Principal points—Contd.</i>							
Horn Island west 1855	30 15 12.848 88 43 08.816	395.6 235.7	239 09 03.0 281 27 53.4	59 14 17.6 101 33 32.3	East Pascagoula Horn Island east 1855	<i>Meters</i> 19401.16 18364.19	4.2878277 4.2639719
Bellefontaine 1855	30 20 32.197 88 42 34.269	991.5 915.2	269 35 11.2 308 18 08.1 5 21 55.9	89 40 08.8 128 23 30.1 185 21 38.5	East Pascagoula Horn Island east 1855 Horn Island west	15734.96 21757.07 9876.86	4.1968380 4.3376005 3.9946188
Deer Island 1 1855	30 21 42.958 88 49 25.601	1322.8 683.6	281 11 23.6 320 00 29.3	101 14 51.4 140 03 39.4	Bellefontaine Horn Island west	11199.51 15673.34	4.0491990 4.1951614
Ship Island 1855 1855	30 14 28.425 88 53 19.150	875.3 512.1	204 59 17.0 236 55 54.0 265 09 55.9	25 01 14.8 57 01 19.1 85 15 03.3	Deer Island 1 Bellefontaine Horn Island west	14764.19 20554.00 16374.85	4.1692095 4.3128964 4.2141773
Mississippi City 1855	30 22 48.145 89 01 58.542	1482.5 1509.6	275 39 50.2 318 01 41.1	95 46 09.9 138 06 02.2	Deer Island 1 Ship Island 1855	20151.9 20685.3	4.304316 4.315662
Cat Island 1855 1855	30 14 15.776 89 04 04.148	485.8 110.7	192 11 06.9 268 39 39.9	12 12 11.3 88 45 04.7	Mississippi City Ship Island 1855	16141.4 17250.1	4.207942 4.236793
Pitcher Point 2 1855	30 19 56.571 89 10 53.867	1742.0 1438.9	249 44 59.0 313 45 11.8	69 49 30.5 133 48 38.4	Mississippi City Cat Island 1855	15291.5 15166.5	4.184451 4.180886
Cat Island L. H. 1855 1855	30 13 50.583 89 09 40.469	1557.6 1082.1	170 07 51.2 216 47 45.7 265 02 46.8	350 07 14.2 36 51 39.7 85 05 36.1	Pitcher Point 2 Mississippi City Cat Island 1855	11439.2 20680.0 9026.3	4.058394 4.315551 3.955511
Cat Island 1852 1852	30 14 15.947 89 04 03.861	491.1 103.2	133 46 34.5 192 09 46.0	313 43 07.7 12 10 50.3	Pitcher Point 2 Mississippi City	15168.4 16134.7	4.180939 4.207760
South Point 1857	30 11 15.287 89 05 58.933	470.7 1576.7	128 55 14.6 208 54 28.3	308 53 23.1 28 55 24.1	Cat Island L. H. Cat Island 1855	7614.1 6349.2	3.881619 3.802717
Bayou Pierre 1852	30 07 44.263 89 13 57.285	1363.0 1533.3	192 15 29.4 211 19 44.3 232 44 05.2 232 44 01.4 243 03 12.4	12 17 01.8 31 21 53.4 52 49 03.6 52 48 59.5 63 07 12.7	Pitcher Point 2 Cat Island L. H. Cat Island 1852 Cat Island 1855 South Point	23076.7 13207.6 19937.5 19928.1 14355.3	4.363173 4.120823 4.299870 4.299466 4.157013
Point Clear 1855	30 15 49.025 89 23 30.482	1509.7 814.8	249 17 22.9 314 11 30.0	69 23 44.6 134 16 18.3	Pitcher Point 2 Bayou Pierre	21607.3 21398.6	4.334601 4.330386
Grand Island 1855 1855	30 09 00.431 89 25 28.315	13.3 704.2	193 49 32.1 277 11 58.9	13 50 30.4 97 17 44.9	Point Clear Bayou Pierre	12957.4 18590.2	4.112517 4.269285
Grand Island 1852 1852	30 08 51.652 89 25 10.450	1590.5 279.6	191 44 44.4 276 31 22.4	11 45 34.7 96 37 00.4	Point Clear Bayou Pierre	13127.0 18136.4	4.118166 4.258550
Oyster Bayou 1855	30 03 44.552 89 20 29.733	1371.9 796.3	140 47 34.1 234 53 18.5	320 45 05.3 54 56 35.3	Grand Island 1855 Bayou Pierre	12556.2 12841.6	4.098857 4.108621
Nine Mile Bayou 1855	30 01 37.250 89 24 37.392	1147.0 1002.0	174 31 10.7 176 12 58.0 183 54 04.4 236 33 42.6 239 24 30.6	354 30 46.2 356 12 41.5 3 54 38.1 58 39 03.5 59 26 34.6	Grand Island 1855 Grand Island 1852 Point Clear Bayou Pierre Oyster Bayou	13709.0 13405.3 26288.9 20532.7 7706.2	4.137007 4.127275 4.419772 4.312446 3.886843
Malheureux Point 1855	30 04 26.162 89 29 37.452	805.6 1003.1	218 30 24.3 274 57 11.4 302 53 00.8	38 32 30.3 95 01 46.1 122 55 31.1	Grand Island 1855 Oyster Bayou Nine Mile Bayou	10794.8 14725.9 9574.1	4.033214 4.168083 3.981100
East Pearl River 1855	30 10 58.098 89 31 26.770	1789.0 716.1	290 33 50.3 346 21 47.0	110 36 51.4 166 22 41.9	Grand Island 1855 Malheureux Point	10303.0 12418.1	4.012962 4.094055
East Rigolets unused L. H. 1855	30 09 15.312 89 39 03.956	471.5 106.0	255 27 44.1 271 08 33.5 300 22 33.1	75 31 33.9 91 15 23.4 120 27 17.3	East Pearl River Grand Island 1855 Malheureux Point	12635.7 21885.9 17866.5	4.101598 4.340165 4.245179
Shell Point 1855	30 04 21.392 89 41 07.174	658.7 192.1	200 01 04.4 269 29 47.1	20 02 06.2 89 35 32.7	E. Rigolets unused L. H. Malheureux Point	9632.7 18473.1	3.983750 4.266540
Fort Wood 1855	30 03 54.358 89 48 15.056	1673.0 403.2	236 08 49.0 265 48 56.6	56 13 25.5 85 52 31.0	E. Rigolets unused L. H. Shell Point	17758.4 11490.5	4.240405 4.060338
Proctor Point 1853	29 57 28.788 89 43 28.935	886.3 775.8	147 09 47.5 196 38 17.2	327 07 24.4 16 39 28.1	Fort Wood Shell Point	14133.1 13260.5	4.150236 4.122556
Martello Tower 1873	29 56 41.645 89 50 06.480	1282.2 173.8	192 37 31.6 262 13 05.9	12 38 27.3 82 16 24.4	Fort Wood Proctor Point	13654.3 10758.7	4.135271 4.031768
Battery Bienvenue 1873	29 59 04.743 89 52 50.933	146.0 1365.3	219 38 17.5 314 58 06.2	39 40 35.5 134 59 28.3	Fort Wood Martello Tower	11583.2 6233.4	4.063829 3.794728
Ducros 1873	29 56 05.775 89 55 25.569	177.8 685.8	216 56 52.1 262 37 25.1	36 58 09.4 82 40 04.4	Battery Bienvenue Martello Tower	6896.3 8628.4	3.839614 3.935932
Caernarvon 1873	29 51 51.202 89 55 15.011	1576.4 402.9	177 55 51.6 222 45 52.6	357 55 46.3 42 48 26.4	Ducros Martello Tower	7813.6 12185.6	3.894517 4.085847
New Orleans St. Patrick's Church 1873	29 56 47.140 90 04 11.033	1451.4 295.9	275 07 40.8 302 19 25.0	95 12 03.1 122 23 52.2	Ducros Caernarvon	14149.4 17024.2	4.150739 4.231066

Oblique Arc—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Supplementary points.</i>							
Pea Ridge, Sand Mountain ¹ 1875	34 36 54.88 85 40 44.36	1691.1 1130.2	15 02 11 268 35 03	194 59 39 85 42 16	Brandon Gulf Point	<i>Meters</i> 26411.9 19445.0	4.421800 4.288807
Mountain near head of Big Cove ² 1877	34 38 09.76 86 18 24.70	300.7 629.1	61 47 03 348 09 58	241 39 89 168 14 09	Rowe Aurora	22623.8 55473.0	4.354566 4.744082
Smithers 1878	34 48 58.906 86 36 58.267	1815.1 1480.8	344 36 05.58 22 45 32.78	164 39 14.34 202 38 41.19	Rowe Wilson	31860.89 47824.75	4.5032579 4.6796527
Capshaw 1878	34 49 04.091 86 44 17.333	126.0 490.6	270 47 07.72 327 30 18.15 9 20 54.82	90 51 18.41 147 37 36.73 189 13 12.66	Smithers Rowe Wilson	11159.89 38588.19 44872.46	4.0476598 4.5833409 4.6519799
Monte Sano, tree ¹ 1878	34 44 55.13 86 30 51.26	1698.8 1303.8	110 35 09 128 51 48	290 27 29 308 48 19	Capshaw Smithers	21833.4 11979.2	4.340114 4.078428
Monte Sano, north end ¹ 1878	34 44 51.71 86 32 03.46	1593.4 88.0	35 31 11 135 29 07	215 21 32 315 26 18	Wilson Smithers	44902.7 10696.8	4.651304 4.028848
Huntsville courthouse cupola ² 1878	34 43 48.72 86 35 05.95	1501.3 151.4	124 46 14 163 22 23	304 40 59 343 21 19	Capshaw Smithers	17059.1 9975.7	4.231955 3.998945
Huntsville Episcopal Church spire ² 1878	34 43 49.01 86 35 00.13	1510.2 3.3	124 27 56 162 32 49	304 22 38 342 31 42	Capshaw Smithers	17176.0 10010.7	4.234922 4.000466
Madkin Mountain 1877-8	34 40 01.727 86 38 37.309	53.2 949.9	30 06 01.6 152 39 40.9 322 11 53.6	210 00 08.9 332 36 36.0 142 15 58.2	Wilson Capshaw Rowe	31847.5 18818.3 17922.9	4.503076 4.274581 4.253400
Weeden Mountain ¹ 1877-8	34 41 03.04 86 39 02.52	93.7 66.4	192 09 08 324 04 36	12 10 19 144 08 55	Smithers Rowe	15000.4 19819.7	4.176104 4.297096
Athens courthouse spire ¹ 1877-8	34 48 10.16 86 58 17.37	313.1 441.5	267 15 11 341 36 46	87 27 21 161 42 01	Smithers Wilson	32515.7 44893.8	4.512494 4.652235
Penit ¹ 1878	34 26 08.48 87 20 14.22	261.3 363.0	237 14 00.64 272 07 09.64	57 38 35.71 92 24 47.68	Smithers Wilson	78460.29 47822.74	4.8946499 4.6796344
Second Trinity Ridge ¹ 1877-8	34 36 43.89 87 08 31.67	1352.4 506.9	244 40 20 277 55 28	64 58 18 98 16 30	Smithers Rowe	53236.0 57287.8	4.726222 4.758052
Sand Mountain, high ridge ² 1875	34 30 42.36 86 48 23.52	1305.2 599.9	263 37 10 278 13 38	84 21 38 98 48 14	Gulf Point Brandon	120497.2 94753.7	5.080977 4.976596
Knob Val., Hermosa ¹ 1877-8	34 30 52.76 86 38 36.83	1625.7 939.4	56 21 27 255 54 36	236 15 32 75 58 40	Wilson Rowe	19200.0 11813.7	4.283301 4.053607
Wyeths Hill, north end ¹ 1877	34 17 04.64 86 21 54.25	143.0 1387.5	51 08 08 209 19 09	231 04 05 29 25 42	Summit Gunter	14165.8 36130.4	4.151241 4.557873
Moores Hill 1875-77	34 21 32.108 86 15 53.436	989.4 1365.6	49 49 14.22 130 07 32.05 342 20 18.01	229 41 48.32 309 58 44.25 162 23 02.80	Summit Rowe Aurora	26526.75 31116.58 24722.18	4.4236841 4.4929918 4.3930468
Mountain near Aurora ¹ 1877	34 13 38.16 86 13 13.31	1175.6 340.7	141 11 52 186 39 02	321 01 35 6 40 40	Rowe Gunter	44485.5 38105.0	4.646218 4.580982
Round Top Hill, east side of Lookout Mountain ¹ 1875	34 27 19.34 85 32 34.86	595.9 899.8	68 09 59 200 11 27	248 02 51 20 14 01	Brandon Gulf Point	20852.9 20111.2	4.319166 4.303438
Rock City, Lookout Mountain 1875	34 10 46.498 85 49 09.160	1432.7 234.6	83 52 20.0 194 50 06.8 213 05 24.0	263 40 03.5 14 52 20.0 33 17 19.8	Aurora Brandon Gulf Point	33792.2 23605.1 59106.9	4.528816 4.373006 4.771638
Weisner 1875-77	34 01 35.275 85 40 27.295	1087.0 700.3	105 57 40.34 169 37 25.07 268 49 51.89	285 40 32.83 349 34 45.50 88 58 13.49	Aurora Brandon Indian	49851.91 40464.70 22999.73	4.6888815 4.6070763 4.3617228
Lower Mountain, beyond Indian 1875	33 56 18.637 85 30 10.673	574.2 274.1	110 21 03.2 155 04 36.1 182 27 21.0 204 53 28.7	286 58 11.7 834 58 09.7 2 28 33.4 25 00 42.2	Aurora Brandon Gulf Point Lavender	66944.2 54676.3 76275.3 46917.8	4.825713 4.737799 4.882384 4.671338
Terrapin Mountain 1875	33 52 57.667 85 35 15.258	1776.7 392.2	118 09 44.5 164 41 41.6 187 37 20.0	297 49 44.5 344 36 06.5 7 41 23.8	Aurora Brandon Gulf Point	62343.3 57810.8 83137.5	4.794790 4.762009 4.919797
Hurricane Mountain 1875	33 52 15.352 85 40 29.000	473.0 745.4	192 47 58.1 215 21 45.2 232 26 00.3	12 54 58.3 35 34 44.9 52 34 22.0	Gulf Point Lavender Indian	85552.7 61436.2 29065.6	4.933754 4.786421 4.463379
Chandlers Mountain, east end ¹ 1877	33 56 00.36 86 19 20.68	11.1 531.1	153 32 52 164 36 33	333 27 25 344 29 45	Summit Rowe	33587.3 69737.9	4.526175 4.843469
Blountsville Mountain, west end ¹ 1877	33 58 45.82 86 40 45.93	1411.8 1179.0	192 55 56 215 41 31	13 01 07 35 47 59	Rowe Summit	63748.0 30755.1	4.804471 4.487917

¹ Checked by vertical angles only.

² No check on this position.

Oblique Arc—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Supplementary points—Con.</i>							
Peak 1 ¹ 1885-6	33 42 33.12 86 35 12.26	1020.4 315.7	313 38 54 359 07 28	133 55 52 179 07 39	Horn Laurel	Meters 65928.2 34575.6	4.819071 4.538770
Peak 2 ¹ 1885-6	33 42 30.65 86 36 00.21	944.3 5.4	312 51 45 357 04 02	133 09 10 177 04 39	Horn Laurel	66775.0 34540.4	4.824614 4.538328
Peak 3 ¹ 1885-6	33 42 34.31 86 38 47.45	1057.1 1221.8	312 13 32 355 03 53	132 31 22 175 04 57	Horn Laurel	67747.8 34736.7	4.830895 4.540788
Backbone Mountain, or Bald Rock 1886	33 36 14.37 86 25 17.43	442.7 449.4	32 57 43 148 32 54 282 50 03 318 56 24 352 12 14	212 52 26 328 29 26 103 10 22 137 03 29 172 14 17	Laurel Cahaba Cheehahaw Alpine Kahatchee	27282 18523 58423 29155 42167	4.435888 4.267704 4.769586 4.464718 4.624968
Little Peak, southern of two 1886	33 37 27.91 86 23 59.50	859.9 1533.6	139 14 11 285 30 54 322 47 46 355 11 43	319 10 00 105 50 30 142 54 18 175 13 02	Cahaba Cheehahaw Alpine Kahatchee	17874 57030 29594 44199	4.252217 4.756104 4.471197 4.045413
Peak A, or Trefoil 1877-86	33 39 58.033 85 45 54.702	1787.9 1409.3	11 22 57.3 97 24 33.4 144 08 00.0	191 21 31.0 276 59 13.9 323 54 00.0	Cheehahaw Cahaba Aurora	20437.8 17071.6 65849.6	4.310435 4.851696 4.818553
Peak D, or Hurst 1877-86	33 41 37.051 85 44 19.011	1141.5 489.6	15 44 06.7 35 30 48.4 94 48 22.5 140 48 23.9	195 41 47.4 215 19 41.1 274 22 09.3 320 33 30.1	Cheehahaw Horn Cahaba Aurora	23983.9 53935.3 73198.5 64931.4	4.379920 4.731309 4.864502 4.812455
Coldwater Mountain, west peak 1877-87	33 37 38.745 85 53 25.633	1193.7 660.7	44 40 36.7 102 48 08.4 154 52 02.0 334 12 23.2	224 25 05.4 282 26 59.8 334 42 13.8 154 15 06.2	Kahatchee Cahaba Aurora Cheehahaw	62270.0 60372.8 63639.8 17484.4	4.794279 4.780841 4.803729 4.242650
Mount Parnassus 1885-87	33 28 42.541 86 05 42.329	1310.6 1092.9	41 36 05.1 78 53 31.4 354 32 49.2	221 27 20.5 258 37 27.4 174 33 29.9	Kahatchee Laurel Horn	37212.7 46074.7 20125.3	4.570691 4.663463 4.303742
High Peak, Talladega Range ¹ 1877-86	33 25 01.00 85 49 51.93	30.8 1341.7	158 07 46 195 22 59	337 56 00 15 23 44	Aurora Cheehahaw	87256.7 7882.0	4.940799 3.896639
Talladega Negro College flagstaff 1887	33 26 01.260 86 06 47.953	36.8 1238.7	258 27 21.9 346 31 22.8 45 10 54.4 74 29 59.8	78 37 26.7 166 32 39.6 225 02 46.2 254 26 53.0	Cheehahaw Horn Kahatchee Alpine	28905.9 15491.5 32435.4 9091.6	4.4609860 4.1900935 4.5110186 3.9586418
Talladega Presbyterian Church spire 1887	33 26 09.192 86 06 02.287	283.2 59.1	258 28 12.7 350 59 06.3 46 18 57.6 74 57 01.7	78 37 52.3 170 59 57.9 226 10 24.2 254 53 29.7	Cheehahaw Horn Kahatchee Alpine	27701.2 15501.1 33450.9 10294.0	4.4424988 4.1903635 4.5244074 4.0125828
Talladega City, school, final of cupola ¹ 1885	33 26 27.74 86 06 25.17	854.6 650.1	70 51 34 349 13 46	250 48 15 169 14 50	Alpine Horn	9896.7 16165.8	3.995488 4.208596
Lewis House cupola 1885-87	33 26 24.595 86 05 27.040	757.7 698.4	46 47 47.8 73 49 50.2 259 04 57.0 354 30 37.4	226 38 55.1 253 45 58.8 79 14 17.3 174 31 09.7	Kahatchee Alpine Cheehahaw Horn	34438.2 11298.6 26715.8 15857.1	4.537041 4.053024 4.426769 4.200224
Penitentiary Mountain 1885-87	33 25 20.589 86 32 50.300	634.3 1299.5	48 41 15.4 183 10 21.3 272 02 44.5 321 05 59.2	228 40 08.5 3 11 04.2 92 13 58.2 141 12 09.4	Laurel Cahaba Alpine Kahatchee	4181.0 35993.7 31627.9 27781.8	3.621275 4.558227 4.500071 4.443761
Childersburg Methodist Church spire ¹ 1885-86	33 16 26.98 86 21 43.27	831.2 1119.8	123 54 43 264 19 10	303 47 30 84 28 38	Laurel Horn	24555.3 26906.4	4.390145 4.429855
Childersburg Baptist Church spire 1887	33 16 33.356 86 21 14.837	1027.6 384.0	122 36 19.1 222 08 28.3 264 35 31.1 5 56 39.3	302 28 50.1 42 13 18.4 84 44 43.5 185 56 27.4	Laurel Alpine Horn Kahatchee	25063.0 20326.2 26155.0 5423.0	4.3990325 4.3080565 4.4175544 3.7342396
Hickock Mountain 1885-87	33 15 05.604 86 13 33.936	172.6 878.5	77 53 02.8 116 11 19.2 249 58 33.8	257 48 38.3 295 59 37.1 70 03 33.1	Kahatchee Laurel Horn	12780.4 36802.0 15022.2	4.106544 4.565871 4.176734
Columbiana ² 1887	33 11 45.02 86 34 57.45	1386.9 1488.0	180 22 22.3 260 23 26.6	0 22 25.4 80 30 45.3	Laurel Kahatchee	22365.6 21033.5	4.349580 4.322912
Bryant, flag in tree ¹ 1887-90	32 50 18.32 86 22 13.46	564.3 350.1	27 03 47 185 29 07	206 59 47 5 29 38	Wilder Weogufka	25483.9 15561.8	4.406266 4.192060
Mount Pisgah 1887-92	32 42 14.622 86 29 12.855	450.4 334.8	202 09 18.6 304 19 15.2 4 51 13.2	22 13 37.1 124 28 43.7 184 50 59.5	Weogufka Wetumpka Wilder	32821.6 33324.2 7828.3	4.516160 4.522759 3.893665

¹ No check on this position.

² Checked by vertical angles only.

Oblique Arc—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Supplementary points—Con.</i>							
Montgomery Capitol 1887-92	32 22 39.555 86 18 01.505	1218.4 39.3	6 32 05.6 34 28 35.0 68 11 02.2 147 24 43.3 175 39 31.6 209 55 52.0	186 30 33.7 214 18 33.5 248 01 03.8 327 18 28.8 355 37 46.5 29 59 17.7	Mount Carmel Bargener Lowndesboro Wilder Weogufka Wetumpka	<i>Meters</i> 39792.0 52375.0 31548.4 33721.4 66779.7 20048.1	4.5997062 4.7191236 4.4989771 4.5279058 4.8246442 4.3020727
Montgomery water tower 1890-92	32 22 45.838 86 17 50.844	1412.0 1329.1	68 02 55.3 146 50 14.4 209 30 43.4	247 52 51.2 326 43 54.3 29 34 03.4	Lowndesboro Wilder Wetumpka	31879.1 33710.1 19741.8	4.5035062 4.5277606 4.2953874
Lowndesboro Methodist Church spire 1890-92	32 16 41.751 86 36 37.302	1286.1 976.2	6 41 13.2 145 27 37.4 195 29 11.0	186 41 11.4 325 20 09.6 15 32 56.0	Lowndesboro Parker Wilder	750.7 38433.8 40908.4	2.875455 4.584713 4.6118127
Lowndesboro Presbyterian Church spire 1890-92	32 16 54.348 86 36 31.478	1674.1 823.7	11 56 55.5 144 56 34.8 195 25 33.3	191 56 50.6 324 49 03.8 15 29 15.2	Lowndesboro Parker Wilder	1158.6 38202.2 40493.9	3.063945 4.582088 4.6073895
Lookout Hill 1895	31 47 09.559 87 20 08.618	294.4 226.7	218 20 21.0 285 17 20.8	38 23 28.6 105 26 27.9	Fatama Midway	15064.2 28378.4	4.1779452 4.4529877
Lower Peach Tree longi- tude 1857 ¹ 1895	31 50 20.45 87 32 42.87	629.8 1127.2	258 25 31.7 286 27 10.5	78 35 17.6 106 33 48.1	Fatama Lookout Hill	29771.1 20691.2	4.4737945 4.3157856
Lower Peach Tree latitude 1857 ¹	31 50 20.45 87 32 42.81	629.8 1125.6					
Mobile Court House tower 1895-97	30 41 23.155 88 02 24.718	713.0 657.8	94 04 10.4 171 05 02.8 223 06 00.0 306 43 49.6	274 00 55.8 351 03 32.9 43 11 59.0 126 47 58.5	Spring Hill Cold Creek Minette Daphne	10170.3 30044.6 27277.5 16230.0	4.007334 4.477767 4.435805 4.210318
Mobile grain elevator, tank on top ¹ 1897	30 42 09.08 88 02 28.96	279.6 770.5	310 16 59 86 03 03	130 21 10 265 59 51	Daphne Spring Hill	17199.3 10055.7	4.235510 4.002411
Mobile brewery flagstaff 1895-97	30 41 57.317 88 02 26.950	1765.0 717.2	88 07 26.6 170 52 39.1 224 44 38.4 309 27 54.4	268-04 13.1 350 51 10.3 44 50 38.6 129 32 04.5	Spring Hill Cold Creek Minette Daphne	10090.7 28996.3 26560.9 16926.0	4.003922 4.462343 4.424243 4.228555
Mobile transit pier 1856-57	30 41 30.888 88 02 33.395	951.2 888.8	92 47 29.6 223 47 42.2 306 54 42.7	272 44 19.4 43 53 45.6 126 58 56.0	Spring Hill Minette Daphne	9925.5 27263.5 16557.6	3.996754 4.435581 4.218997
Mobile Baptist Church spire (St. Francis Street) 1897	30 41 28.267 88 02 46.832	870.5 1246.4	93 22 35.2 224 12 48.8 305 57 25.5	273 19 31.9 44 18 59.1 126 01 45.7	Spring Hill Minette Daphne	9572.8 27570.0 16797.4	3.981038 4.440437 4.225241
Mobile Post Office Weath- er Bureau thermometer box ¹ 1897	30 41 34.02 88 02 28.91	1047.6 769.4	307 25 44 92 12 31	127 29 55 272 09 18	Daphne Spring Hill	16520.8 10040.5	4.218032 4.001755
Mobile Catholic Church, north cross ¹ 1897	30 41 24.51 88 02 42.96	754.8 1143.4	94 01 26 223 53 35	273 58 21 43 59 43	Spring-Hill Minette	9683.1 27581.4	3.986016 4.440617
Mobile Christ Episcopal Church spire 1848	30 41 20.153 88 02 27.506	620.6 732.0	171 15 01.3 306 18 43.1 94 37 19.1	351 13-32.8 128 22 53.4 274 34 06.0	Cold Creek Daphne Spring Hill	30124.6 16234.6 10103.3	4.478922 4.210442 4.004464
Mobile waterworks stand- pipe 1897	30 43 11.035 88 09 08.022	339.8 213.4	347 16 13.1 240 28 54.0 298 42 45.1	167 16 24.4 60 38 19.6 118 50 19.8	Spring Hill Minette Daphne	2670.8 33730.2 27081.1	3.428638 4.528019 4.432666
Spring Hill tower 1895-97	30 41 41.359 88 08 43.184	1273.6 1149.3	155 07 41.0 190 28 59.9 235 57 53.8 293 56 15.8	335 07 39.6 10 30 43.9 56 07 06.6 114 03 37.6	Spring Hill Cold Creek Minette Daphne	172.35 29615.7 34623.3 25262.5	2.23642 4.471522 4.539369 4.402476
Point aux Pins 1897	30 22 35.446 88 18 33.046	1091.5 882.4	210 51 32.5 338 40 43.3 300 45 03.8 310 29 22.1	30 54 20.0 158 42 35.3 120 53 43.5 130 34 34.4	St. Elmo Dauphin Island west base Fort Morgan Dauphin Island east base	17182.5 16326.0 32043.4 21751.5	4.235087 4.212881 4.505739 4.337490
Fort Morgan astronomio azimuth 1847	30 13 42.236 88 01 23.255	1300.6 621.8	93 15 34.57 143 59 49.26	273 08 47.83 323 56 50.84	Dauphin Island west base Cedar Point	21633.17 16074.73	4.3351203 4.2061437

¹ No check on this position.

Mobile Bay

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Principal points.</i>							
Mullet Point 1848	30 24 39.49 87 54 28.34	1216.0 756.3	28 44 23 70 37 40	208 40 54 250 31 11	Fort Morgan Cedar Point	Meters 23075.5 21763.5	4.363151 4.337730
Point Juliet 1848	30 22 52.19 88 06 23.91	1607.1 638.3	260 08 13 334 36 01	80 14 15 154 38 33	Mullet Point Fort Morgan	19386.1 18743.4	4.287490 4.272848
Fowl River Point 1848	30 28 15.56 88 05 47.96	479.1 1297.4	290 06 03 5 30 31	110 11 47 185 30 13	Mullet Point Point Juliet	19316.1 10003.7	4.285919 4.000162
Great Point Clear 1848	30 28 58.52 87 56 12.64	1802.1 337.1	340 45 44 85 06 52	160 46 37 265 02 00	Mullet Point Fowl River Point	8447.0 15402.7	3.926732 4.187596
Dog River Point 1848	30 35 40.83 88 03 41.05	1257.3 1093.6	315 59 40 13 52 19	138 03 28 193 51 15	Great Point Clear Fowl River Point	17214.4 14122.4	4.235892 4.149910
Ragged Point 1848	30 35 05.57 87 54 54.91	171.5 1463.0	10 23 45 94 27 58	190 23 06 274 23 30	Great Point Clear Dog River Point	11491.2 14059.6	4.060365 4.147972
Point Zeb 1848	30 38 04.87 87 55 08.68	150.0 231.2	356 12 10 72 01 52	176 12 17 251 57 31	Ragged Point Dog River Point	5533.6 14350.4	3.743007 4.156863
Choctaw Point 1848	30 40 05.11 88 02 04.84	157.4 128.9	288 26 51 17 29 07	108 30 23 197 26 18	Point Zeb Dog River Point	11682.6 8532.2	4.067539 3.931060
Vessel Point 1848	30 40 26.07 87 55 15.62	802.8 415.8	357 34 10 86 38 16	177 34 14 266 34 47	Point Zeb Choctaw Point	4351.9 10912.8	3.638684 4.037934
Choctaw Point L. H. 1848	30 40 04.95 88 02 05.80	152.4 154.4	288 23 09 17 19 50	108 26 42 197 19 02	Point Zeb Dog River Point	11705.4 8520.2	4.06839 3.93045
Sand Island front range L. H. 1892-98	30 11 15.027 88 03 01.776	462.4 47.5	106 53 23.5 129 13 12.5	286 47 26.9 309 10 35.2	Dauphin Island west base Dauphin Island east base	19818.8 10784.0	4.297078 4.032803
Dauphin Island west base 1892	30 14 35.678 88 05 43.756	1098.7 1170.0	283 16 17.6 88 19 42.2	103 18 28.7 88 19 42.2	Fort Morgan Dauphin Island west base	7157.8 25618.5	3.854780 4.165518
Dauphin Island east base 1892	30 14 45.825 88 04 31.650	1411.1 846.2	80 47 59.5 291 13 24.6 339 40 26.0	260 47 21.6 111 14 59.5 159 41 11.2	Dauphin Island west base, 1892 Fort Morgan Sand Island front range L. H.	1952.895 5405.2 6921.7	3.290679 3.732809 3.840212
Grass 1908	30 12 39.803 88 05 63.952	1225.5 1443.0	255 06 32.4 209 31 59.3	75 08 48.7 119 33 25.9	Fort Morgan Sand Island front range L. H.	7490.9 5293.9	3.874534 3.723772
Beach 1908	30 14 32.908 88 05 35.010	1013.3 936.1	283 01 46.3 326 03 54.9	103 03 53.1 146 05 12.0	Fort Morgan Sand Island front range L. H. Grass	6910.7 7343.2 3519.4	3.839525 3.865883 3.546467
Fort Gaines (U. S. E.) 1908	30 14 52.523 88 04 28.899	1617.4 772.8	293 32 25.6 340 48 38.8	113 33 59.1 160 49 22.6	Fort Morgan Sand Island front range L. H. Grass	5415.7 7060.9 4677.0	3.733652 3.850704 3.669966
Dolphin, Mobile Ship Chan- nel Light No. 2 1908	30 16 54.195 88 02 01.491	1668.9 39.9	350 10 44.5 46 27 15.4	170 11 03.8 226 26 01.1	Fort Morgan Fort Gaines (U. S. E.)	5998.6 5437.2	3.778047 3.735375
Clear 1908	30 15 25.616 87 56 57.881	788.7 1547.6	65 51 14.9 85 12 03.4	245 49 01.3 265 08 18.2	Fort Morgan Fort Gaines (U. S. E.) Dolphin	7775.9 12100.6 8561.5	3.890751 4.082806 3.932549
Sure 1908	30 13 58.333 87 59 57.105	1796.1 1527.3	102 57 03.0 148 27 24.2	282 54 46.2 328 26 21.5	Fort Gaines (U. S. E.) Dolphin Clear	7456.2 6354.6 5494.0	3.872517 3.803091 3.739892
Cedar Point (U. S. E.) 1908	30 18 41.082 88 08 18.552	1265.1 495.7	188 03 48.6 309 37 35.8	108 06 58.7 129 41 05.1	Dolphin Fort Morgan Fort Gaines (U. S. E.)	10599.9 14419.4 9338.4	4.025300 4.158946 3.970273
Little Dauphin (U. S. E.) 1908	30 16 42.904 88 07 02.835	1321.1 75.8	30 13 00.0 115 57 37.6	210 12 24.0 295 54 53.1	Dauphin Island east base Cat Cedar Fort Morgan	3795.8 9680.8 7564.9 10647.8	3.579298 3.988314 3.878803 4.027259
Juliet 1910	30 22 59.557 88 06 24.453	1833.9 652.9	334 51 08.0 5 03 16.3	154 53 40.0 185 02 56.9	Fort Morgan Little Dauphin	18954.9 11643.4	4.277721 4.066080
Mobile Bay L. H. 1910	30 26 14.170 88 00 40.081	436.3 1069.5	2 51 09.9 46 31 05.2	182 50 48.1 226 27 44.9	Fort Morgan Cedar Juliet	23182.6 14574.6 10972.7	4.365163 4.163596 4.040315

Mobile Bay—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Principal points—Contd.</i>							
Mobile Bay L. H. 1897-98	30 26 14.242	438.6	30 12 09.3	210 08 19.7	Dauphin Island east base	Meters 24144.1	4.382811
	88 00 39.984	1037.0	112 04 09.3	291 57 52.7	St. Elmo	21364.4	4.329991
			155 45 15.3	335.41 08.1	Spring Hill	31491.5	4.498193
			209 12 13.0	29 15 27.8	Daphne	20941.4	4.321006
			2 51 32.0	182 51 10.2	Fort Morgan	23185.0	4.365207
Alabama Port (U. S. E.) 1910	30 22 25.102	773.0	228 53 05.0	48 55 38.4	Mobile Bay L. H. 1897	10734.8	4.030794
	88 05 43.067	1150.0	336 39 14.0	156 41 25.1	Fort Morgan	17533.6	4.243370
			16 18 35.9	196 17 19.7	Dauphin Island east base	14396.0	4.158242
Mullet Point (U. S. E.) 1910	30 24 45.134	1389.8	28 30 06.3	208 26 37.1	Fort Morgan	23221.0	4.365880
	87 54 28.853	770.0	76 34 29.4	256 28 48.3	Alabama Port (U. S. E.)	18508.2	4.267363
			105 30 38.6	285 27 30.7	Mobile Bay L. H. 1897	10277.6	4.011891
Point Clear (U. S. E.) 1910	30 28 58.299	1795.2	340 40 22.6	160 41 14.5	Mullet Point (U. S. E.)	8261.0	3.917034
	87 56 11.288	301.0	51 36 29.5	231 31 39.9	Alabama Port (U. S. E.)	19478.9	4.289565
			54 50 38.6	234 48 22.4	Mobile Bay L. H. 1897	8769.6	3.942978
Fowl River (U. S. E.) 1910	30 28 19.173	590.4	265 29 02.2	85 33 54.9	Point Clear (U. S. E.)	15440.5	4.188661
	88 05 48.403	1291.3	289 55 41.6	110 01 25.8	Mullet Point (U. S. E.)	19292.9	4.285398
			295 02 10.3	115 04 46.5	Mobile Bay L. H. 1897	9083.3	3.958243
			359 15 05.1	179 15 07.8	Alabama Port (U. S. E.)	10903.9	4.037683
Dog River (U. S. E.) 1910	30 35 58.478	1800.8	317 23 41.5	137 27 28.1	Point Clear (U. S. E.)	17570.3	4.244779
	88 03 37.233	991.9	345 16 11.0	165 17 40.9	Mobile Bay L. H. 1897	18601.2	4.268540
			13 53 43.7	193 52 37.1	Fowl River (U. S. E.)	14569.5	4.163446
Daphne (U. S. E.) 1910	30 35 47.628	1466.6	9 52 00.8	189 51 19.1	Point Clear (U. S. E.)	12793.8	4.107000
	87 54 49.090	1307.8	27 56 32.1	207 53 33.8	Mobile Bay L. H. 1897	19982.2	4.300642
			51 53 20.2	231 47 45.3	Fowl River (U. S. E.)	22351.9	4.349316
Apalachee (U. S. E.) 1910	30 39 26.398	812.9	328 29 15.7	148 30 34.7	Daphne (U. S. E.)	7901.3	3.897898
	87 57 24.112	642.0	57 13 51.8	237 10 41.7	Dog River (U. S. E.)	11821.0	4.072655
Choctaw Point (U. S. E.) 1910	30 40 02.734	84.2	278 43 38.3	98 45 57.6	Apalachee (U. S. E.)	7358.3	3.866777
	88 01 57.291	1525.2	304 31 58.0	124 35 36.2	Daphne (U. S. E.)	13847.4	4.141367
			19 29 35.0	169 28 44.1	Dog River (U. S. E.)	7078.7	3.801932
<i>Supplementary points.</i>							
Sand Island rear range 1 1908	30 11 52.993	1631.8	108 04 48.1	288 03 25.0	Grass	4647.3	3.667202
	88 03 08.770	234.6	158 49 05.7	338 48 25.4	Fort Gaines (U. S. E.)	5928.9	3.772974
			219 59 32.2	40 00 25.3	Fort Morgan	4391.4	3.642601
Sand Island rear range 2 1908	30 11 53.183	1637.7	107 51 10.8	287 49 47.9	Grass	4685.4	3.670751
	88 03 07.200	192.6	158 25 13.2	338 24 32.1	Fort Gaines (U. S. E.)	5933.8	3.773596
			219 37 08.9	39 38 01.2	Fort Morgan	4390.0	3.639487
Do 1908	30 12 25.815	794.9	120 21 00.5	300 20 46.7	Grass	852.5	2.930685
	88 05 26.446	707.4	176 39 04.5	356 39 00.2	Beach	3920.2	3.593304
			250 05 33.9	70 07 36.3	Fort Morgan	6917.1	3.839926
Wreck 1892	30 13 42.00	1293.3	219 46 54	39 47 20	Dauphin Island west base 1892	2151.0	3.33264
	88 06 35.23	942.1	239 14 51	59 15 56	Dauphin Island east base, 1892	3844.5	3.58484
			269 55 38	89 58 15	Fort Morgan	8343.0	3.92132
Mobile Point beacon 1892	30 13 32.86	1011.9	30 10 48	210 10 02	Sand Island front range L. H.	4909.1	3.69100
	88 01 29.52	789.3	105 54 12	285 52 03	Dauphin Island west base, 1892	7068.1	3.84930
			114 46 47	294 45 15	Dauphin Island east base, 1892	5363.6	3.72946
Mobile Point L. H. 1897-98	30 13 39.57	1219.0	102 16 12	282 12 47	Dauphin Island east base	11152.4	4.04737
	88 01 26.68	713.4	195 25 57	15 29 35	Daphne	43071.5	4.63419
			228 29 40	48 29 42	Fort Morgan	123.3	2.0911
Quar 1908	30 14 05.204	162.1	103 38 22.1	283 36 29.1	Fort Gaines (U. S. E.)	6178.2	3.790859
	88 00 44.330	1185.2	158 22 30.8	338 21 52.0	Dolphin	5595.9	3.747867
			247 45 20.9	67 47 15.0	Clear	6540.4	3.815905
			279 35 18.4	99 35 42.2	Sure	1280.7	3.107440
New 1908	30 13 49.397	1536.3	36 35 20.4	216 34 13.8	Sand Island front range L. H.	5938.5	3.773676
	88 00 49.457	1322.5	75 22 29.5	255 22 12.5	Fort Morgan	933.3	2.970031
			108 12 33.8	288 10 43.3	Fort Gaines (U. S. E.)	6176.2	3.790720
			161 15 40.6	341 15 04.3	Dolphin	5992.8	3.77632
Sig 1908	30 13 45.751	1408.8	38 39 59.0	218 38 49.2	Sand Island front range L. H.	5943.3	3.774027
	88 00 42.970	1149.1	84 16 16.7	264 15 50.4	Fort Morgan	1081.9	3.034198
			160 07 04.0	340 06 24.5	Dolphin	6170.7	3.793332

1 No check on this position.

Mobile Bay—Continued

Station	Latitude and longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Supplementary points—Con.</i>							
Red 1908	30 13 32.909	1013.4	30 15 21.9	210 14 35.3	Sand Island front	<i>Meters</i> 4914.9	3.691516
	88 01 29.203	781.0	117 02 39.7	297 01 09.2	range L. II.	5394.1	3.731915
			209 04 25.0	29 04 28.0	Fort Gaines (U. S. E.)	328.8	2.516961
Hant ¹ 1908	30 13 28.71	884.0	40 54 55	220 53 48	Sand Island front	5446.6	3.736122
	88 00 48.43	1295.1	294 06 52	114 07 10	range L. II.	1019.5	3.008405
					Fort Morgan		
Out 1908	30 14 52.388	1613.2	281 43 12.4	101 46 28.0	Fort Morgan	10609.1	4.025677
	88 07 51.695	1382.1	310 46 52.9	130 49 18.9	Sand Island front	10242.7	4.010416
			322 21 08.0	142 22 07.3	range L. H.		
Little Point Clear 1892	30 15 43.54	1340.8	50 36 07	230 34 45	Jacob	5603.9	3.74849
	87 56 04.28	114.4	66 22 12	246 19 31	Fort Morgan	9309.8	3.96894
			82 34 16	262 30 01	Dauphin Island east base, 1892	13680.4	4.13610
Marshall's house, west gable ¹ 1897-98	30 16 12.85	395.7	296 27 02	116 29 57	Fort Morgan	10402.8	4.01715
	88 07 11.53	308.2	35 28 18	215 27 46	Dauphin Island east base	2891.3	3.46109
Middle Ground light, M G 1908	30 15 12.790	393.8	333 03 20.7	153 03 47.4	Fort Morgan	3127.6	3.495211
	88 02 16.225	433.8	267 19 14.7	87 21 55.1	Clear	8519.0	3.930419
			80 01 50.7	260 00 43.9	Fort Gaines (U. S. E.)	3601.5	3.556479
Mobile Ship Channel Light, M G A 1908	30 16 11.477	353.4	345 29 21.6	165 29 44.0	Fort Morgan	4746.6	3.676386
	88 02 07.704	205.9	57 13 26.5	237 12 15.3	Fort Gaines (U. S. E.)	4489.7	3.652216
			187 11 41.5	7 11 44.6	Dolphin	1325.8	3.122494
Mobile Ship Channel Light M B A 1910	30 26 42.464	1307.6	352 27 44.8	172 27 47.0	Mobile Bay L. H.	878.8	2.943899
	88 00 44.401	1184.7	2 28 28.3	182 28 08.7	Fort Morgan	24047.6	4.381071
			43 49 05.4	223 45 47.3	Cedar	15107.2	4.179185
			52 55 28.8	232 52 36.7	Juliet	11379.3	4.056116
Mobile Ship Channel Light No. 8A 1910	30 25 43.145	1328.6	2 35 17.9	182 34 59.0	Fort Morgan	22221.2	4.346768
	88 00 45.701	1219.6	48 57 50.4	228 54 33.0	Cedar	13820.9	4.140537
			60 54 06.3	240 51 14.9	Juliet	10350.6	4.014965
			188 55 16.7	8 55 19.6	Mobile Bay L. H.	967.1	2.985475
Cut-off Channel front beacon 1910	30 25 12.117	373.1	51 53 10.3	231 49 54.4	Cedar	13150.3	4.118935
	88 00 48.556	1295.9	65 32 45.7	245 29 55.8	Juliet	9851.7	3.993513
			186 44 57.8	6 45 02.1	Mobile Bay L. H.	1924.1	3.284236
Cut-off Channel rear beacon 1910	30 24 56.512	1740.2	53 32 10.1	233 28 54.4	Cedar	12851.8	4.108964
	88 00 49.042	1308.9	68 06 42.7	248 03 53.0	Juliet	9650.7	3.984558
			185 42 37.0	5 42 42.1	Mobile Bay L. H.	2403.3	3.388081
Mobile Ship Channel Light No. 8 1910	30 24 05.246	161.5	1 53 20.7	181 53 08.8	Fort Morgan	10194.4	4.283174
	88 00 59.567	1590.1	58 55 27.4	238 52 17.1	Cedar	11739.0	4.069653
			76 53 42.3	256 50 58.0	Juliet	8906.0	3.949682
			187 27 40.8	7 27 50.7	Mobile Bay L. H.	4003.9	3.602485
Mobile Ship Channel Light No. 6A 1910	30 23 02.541	78.2	1 18 46.4	181 18 38.9	Fort Morgan	17257.6	4.236981
	88 01 08.441	225.4	67 11 24.8	247 08 19.0	Cedar	10650.6	4.027376
			89 23 54.2	269 21 14.3	Juliet	8437.5	3.926216
			187 18 28.9	7 18 43.2	Mobile Bay L. H.	5949.2	3.774401
Mobile Ship Channel Light No. 6 1910	30 21 58.818	1811.2	0 34 43.4	180 34 40.5	Fort Morgan	15291.6	4.184454
	88 01 17.452	466.0	77 15 02.5	257 12 01.3	Cedar	9819.2	3.992075
			102 52 29.2	282 49 54.0	Juliet	8407.9	3.924687
			187 13 39.8	7 13 58.7	Mobile Bay L. H.	7926.1	3.899062
Mobile Ship Channel Light No. 4A 1910	30 20 43.989	1354.5	359 26 33.9	179 26 36.3	Fort Morgan	12987.3	4.113518
	88 01 27.952	746.6	90 50 39.5	270 47 43.7	Cedar	9297.6	3.968373
			117 49 15.8	297 46 45.9	Juliet	8950.8	3.951863
			187 09 39.0	7 10 03.2	Mobile Bay L. H.	10247.3	4.010609
Mobile Ship Channel Light No. 4 1910	30 19 28.215	868.8	357 43 35.6	177 43 43.6	Fort Morgan	10661.8	4.027829
	88 01 39.044	1043.0	105 20 46.9	285 17 56.7	Cedar	9333.2	3.970029
			130 30 37.3	310 28 13.1	Juliet	10022.5	4.000978
			187 10 25.3	7 10 55.1	Mobile Bay L. H.	12599.3	4.100348
Mobile Ship Channel Light No. 2A 1910	30 18 21.361	657.8	355 28 17.8	175 28 30.6	Fort Morgan	8621.7	3.935591
	88 01 48.684	1300.8	117 22 55.9	297 20 10.6	Cedar	9846.1	3.993264
			139 19 47.5	319 17 28.2	Juliet	11297.3	4.052975
Wharf 1910	30 22 24.642	758.8	41 39 14.1	221 38 24.2	Cedar	3969.7	3.598758
	88 05 37.245	994.5	130 28 02.0	310 27 38.1	Juliet	1556.7	3.219247
			228 16 35.0	48 19 05.4	Mobile Bay L. H.	10624.2	4.026295
Drury 1910	30 15 38.409	1182.7	161 36 53.9	341 35 54.0	Cedar	10056.4	4.002444
	88 05 17.273	461.7	172 28 42.4	352 28 08.5	Juliet	13702.2	4.136790
			299 44 15.7	119 46 13.6	Fort Morgan	7207.8	3.857800

¹ No check on this position.

Mobile Bay—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Supplementary points—Con.</i>							
Pine 1910	30 16 07.545 88 06 07.196	232.3 192.4	57 11 12.7	237 10 08.7	Dauphin Island east base	4042.9	3.606690
			117 36 02.3	297 32 49.8	Cat	11508.2	4.061007
			167 59 43.3	347 59 08.6	Cedar	8838.9	3.946400
			300 29 33.0	120 31 56.1	Fort Morgan	8812.3	3.945087
Mobile Ship Channel Light No. 10 1910	30 29 01.975 88 00 59.867	60.8 1596.8	270 35 34.4 307 01 50.4 354 06 01.9 31 49 03.4 80 31 30.5	90 38 00.8 127 05 08.5 174 08 12.0 211 46 40.0 260 29 04.2	Point Clear (U. S. E.) Mullet Point (U. S. E.) Mobile Bay L. H. 1910 Alabama Port (U. S. E.) Fowl River (U. S. E.)	7697.3 13073.1 5161.6 14342.9 7803.0	3.886337 4.116380 3.712786 4.156637 3.892262
Mobile Ship Channel Light No. 10A 1910	30 30 22.643 88 01 09.018	697.3 240.5	288 05 32.7 354 12 59.9 62 59 09.4 159 08 16.9 225 18 38.7	108 08 03.8 174 13 14.4 242 56 47.7 339 05 01.6 45 21 51.8	Point Clear (U. S. E.) Mobile Bay L. H. 1910 Fowl River (U. S. E.) Dog River (U. S. E.) Daphne (U. S. E.)	8354.0 7688.3 8365.1 11070.4 14236.9	3.921893 3.885829 3.922473 4.044165 4.153416
Mobile Ship Channel Light No. 12 1910	30 31 43.932 88 01 18.254	1352.8 486.6	48 49 30.2 154 43 08.2 234 05 01.5 301 54 21.9	228 47 13.2 334 41 57.5 54 08 19.4 121 56 57.8	Fowl River (U. S. E.) Dog River (U. S. E.) Daphne (U. S. E.) Point Clear (U. S. E.)	9573.6 8069.4 12801.4 9644.4	3.981075 3.937990 4.107257 3.984276
Mobile Ship Channel Light No. 12A 1910	30 33 05.017 88 01 27.007	154.5 719.8	38 23 28.9 147 00 01.1 244 41 32.9 312 02 42.3	218 21 16.3 326 58 54.9 64 44 55.3 132 05 22.7	Fowl River (U. S. E.) Dog River (U. S. E.) Daphne (U. S. E.) Point Clear (U. S. E.)	11227.5 6369.7 11726.1 11339.3	4.050282 3.804120 4.069154 4.054585
Mobile Ship Channel Light No. 14 1910	30 34 26.609 88 01 36.280	819.4 966.7	30 43 52.1 131 17 14.2 257 01 13.3 319 22 52.0	210 41 44.1 311 16 12.7 77 04 40.5 139 25 37.2	Fowl River (U. S. E.) Dog River (U. S. E.) Daphne (U. S. E.) Point Clear (U. S. E.)	13160.8 4288.2 11132.2 13314.5	4.119281 3.622272 4.046580 4.124324
Mobile Ship Channel Light No. 14A 1910	30 35 45.786 88 01 45.109	1409.9 1201.7	25 15 53.9 97 27 45.6 177 39 11.0 269 40 38.3 324 38 03.6	205 13 50.3 277 26 48.5 357 39 04.7 89 44 10.0 144 40 53.2	Fowl River (U. S. E.) Dog River (U. S. E.) Choctaw (U. S. E.) Daphne (U. S. E.) Point Clear (U. S. E.)	15205.4 3012.5 7919.2 11083.1 15382.0	4.181999 3.478923 3.898680 4.044662 4.187039
Mobile Ship Channel Light No. 16 1910	30 37 06.456 88 01 53.975	198.8 1437.7	52 44 02.0 179 04 06.0 239 01 50.5 282 04 30.6	232 43 09.4 359 04 04.2 59 04 07.9 102 08 06.9	Dog River (U. S. E.) Choctaw (U. S. E.) Apalachee (U. S. E.) Daphne (U. S. E.)	3456.5 5429.1 8379.3 11575.3	3.538634 3.734729 3.923210 4.063531
Mobile Ship Channel Light No. 18A 1910	30 38 01.404 88 01 41.258	43.2 1098.7	39 13 25.4 173 28 58.2 249 03 43.5 290 32 20.9	219 12 26.3 353 28 50.0 69 05 54.5 110 35 50.8	Dog River (U. S. E.) Choctaw (U. S. E.) Apalachee (U. S. E.) Daphne (U. S. E.)	4885.8 3760.6 7330.3 11725.7	3.688030 3.575256 3.865119 4.069140
Mobile Ship Channel Light No. 3 1910	30 38 56.033 88 01 31.004	1725.5 825.6	31 35 40.5 161 11 14.7 261 53 11.0 298 25 45.5	211 34 36.2 341 11 01.2 81 55 16.8 118 29 10.2	Dog River (U. S. E.) Choctaw (U. S. E.) Apalachee (U. S. E.) Daphne (U. S. E.)	6418.5 2170.0 6639.7 12175.5	3.807434 3.336468 3.822149 4.085487
Mobile Ship Channel Light No. 18 1910	30 38 55.377 88 01 25.243	1705.3 672.1	32 50 37.9 157 38 32.6 261 31 10.8 298 41 36.2	212 49 30.7 337 38 16.2 81 33 13.7 118 44 58.0	Dog River (U. S. E.) Choctaw (U. S. E.) Apalachee (U. S. E.) Daphne (U. S. E.)	6483.2 2242.9 6490.8 12031.1	3.811790 3.350804 3.812298 4.080306
Mobile Ship Channel Light No. 1 ¹ 1910	30 37 24.722 88 01 57.014	761.3 1518.7	45 09 15.4 179 54 47.0 242 42 16.3 284 40 03.9	225 08 24.4 359 54 46.8 62 44 35.3 104 43 41.8	Dog River (U. S. E.) Choctaw (U. S. E.) Apalachee (U. S. E.) Daphne (U. S. E.)	3765.6 4865.9 8176.1 11754.1	3.575831 3.687162 3.912546 4.071298
Battery Gladden unused L. H. 1910	30 40 02.758 88 01 22.210	85.0 591.1	2 13 36.1	182 13 42.7	Mobile Ship Channel Light No. 18	2076.5	3.317337
			25 33 26.8 89 57 29.3 280 00 01.5 306 51 30.7	205 32 18.1 269 57 11.4 100 02 04.7 126 54 51.0	Dog River (U. S. E.) Choctaw (U. S. E.) Apalachee (U. S. E.) Daphne (U. S. E.)	8337.6 934.0 6436.8 13089.7	3.921042 2.970356 3.808669 4.116913
Mobile Ship Channel Light No. 22 1910	30 40 05.047 88 01 49.196	173.9 1309.7	20 42 49.7 67 23 58.2 279 41 58.7 305 21 09.1	200 41 54.7 247 23 54.0 99 44 13.8 125 24 43.1	Dog River (U. S. E.) Choctaw (U. S. E.) Apalachee (U. S. E.) Daphne (U. S. E.)	8137.0 233.4 7100.0 13722.1	3.910464 2.368098 3.854910 4.137421
Mobile Ship Channel Light No. 20 1910	30 39 45.167 88 01 22.869	1390.9 609.3	27 08 43.4 120 34 23.2 275 10 40.5 304 52 02.0	207 07 35.0 300 34 05.6 95 12 42.2 124 55 22.6	Dog River (U. S. E.) Choctaw (U. S. E.) Apalachee (U. S. E.) Daphne (U. S. E.)	7844.1 1063.7 6383.2 12786.4	3.894545 3.026813 3.805041 4.106750

¹ Removed January, 1911.

Mobile Bay—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Supplementary points—Con.</i>							
	° ' "		° ' "	° ' "		<i>Meters</i>	
Mobile Ship Channel Light No. 5 1910	30 39 46.906 88 01 31.637	1444.4 842.2	25 26 22.8 125 31 00.1 275 27 24.0 304 28 23.6	205 25 18.8 305 30 46.8 95 29 30.0 124 31 48.6	Dog River (U. S. E.) Choctaw (U. S. E.) Apalachee (U. S. E.) Daphne (U. S. E.)	7789.0 839.0 6620.1 13008.5	3.891481 2.923783 3.820863 4.114226
Blakely (U. S. E.) 1909	30 41 05.567 88 01 47.790	171.5 1272.0	340 36 13.7 351 29 00.5 7 26 50.5	160 36 26.8 171 29 12.1 187 26 45.7	Battery Gladden un-used L. H. Mobile Ship Channel Light No. 18 Choctaw (U. S. E.)	2050.5 4053.8 1951.4	3.311866 3.607863 3.290336
Battery Mackintosh 1911	30 40 06.553 88 00 45.540	201.7 1212.3	25 44 57.1 83 10 30.6 86 28 54.9 137 38 44.5	205 44 37.0 263 10 11.9 266 28 18.4 317 38 12.7	Mobile Ship Channel Light No. 18 Battery Gladden un-used L. H. Choctaw (U. S. E.) Blakely (U. S. E.)	2433.4 983.2 1913.7 2459.3	3.386215 2.992627 3.281876 3.390815
Boat Clubhouse 1911	30 39 11.693 88 03 09.717	360.0 258.7	230 48 34.5 246 14 03.6 241 12 27.3	50 49 11.4 66 15 17.1 61 13 22.1	Choctaw (U. S. E.) Battery Mackintosh Battery Gladden un-used L. H.	2487.7 4193.8 3265.7	3.395793 3.622603 3.513978
Monroe Park water tower 1911	30 39 30.143 88 03 21.429	928.2 570.6	245 51 34.4 254 52 14.7 252 25 57.0	65 52 17.3 74 53 34.2 72 26 57.8	Choctaw (U. S. E.) Battery Mackintosh Battery Gladden un-used L. H.	2454.5 4298.9 3329.0	3.389970 3.633361 3.522319
Wireless 1911	30 41 34.333 88 02 26.822	1057.3 713.8	310 27 07.9 315 04 11.6 328 37 05.0 344 25 36.3	130 27 27.8 135 05 03.2 148 37 38.0 164 25 51.4	Blakely (U. S. E.) Battery Mackintosh Battery Gladden un-used L. H. Choctaw (U. S. E.)	1365.2 3817.7 3303.1 2928.2	3.135207 3.581799 3.518917 3.466601
Van Antwerp Building chimney 1911	30 41 30.313 88 02 27.072	933.5 720.5	306 05 01.6 313 39 22.2 343 37 04.4	128 05 21.6 133 40 13.9 163 37 19.8	Blakely (U. S. E.) Battery Mackintosh Choctaw (U. S. E.)	1293.8 3735.9 2811.0	3.111855 3.572394 3.448865
Pinto Island, stack 1911	30 40 58.021 88 01 59.900	1786.7 1594.3	234 12 47.7 329 28 31.6 357 39 46.0	54 12 53.9 149 28 50.9 177 39 47.3	Blakely (U. S. E.) Battery Gladden un-used L. H. Choctaw (U. S. E.)	397.4 1975.5 1703.9	2.599208 3.295686 3.231454
Pinto Island, water tank 1911	30 40 57.640 88 01 59.182	1775.0 1575.2	308 44 33.5 329 47 00.9 358 17 38.5	128 45 11.0 149 47 19.8 178 17 39.5	Battery Mackintosh Battery Gladden un-used L. H. Choctaw (U. S. E.)	2513.5 1955.7 1691.5	3.400278 3.291311 3.228281
Mobile, stack, Canal and Water Streets 1911	30 40 57.894 88 02 19.067	1782.8 507.5	254 09 07.0 302 24 38.8 318 16 56.2 341 09 21.4	74 09 22.9 122 25 26.4 138 17 25.2 161 09 32.5	Blakely (U. S. E.) Battery Mackintosh Battery Gladden un-used L. H. Choctaw (U. S. E.)	865.4 2949.2 2274.5 1794.8	2.937203 3.469702 3.356891 3.254014
Mobile, light and power plant stack 1911	30 41 13.096 88 02 20.024	403.2 532.9	285 07 14.8 324 36 09.3 344 23 39.5	105 07 31.2 144 36 38.8 164 23 51.1	Blakely (U. S. E.) Battery Gladden un-used L. H. Choctaw (U. S. E.)	888.7 2657.1 2249.7	2.948774 3.424405 3.352121

Mobile Bay to Florida.

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Principal points</i>							
	° ' "		° ' "	° ' "		<i>Meters</i>	
Jacob 1892	30 13 47.993 87 58 46.228	1477.9 1236.2	55 26 44.5 87 35 44.5	235 24 35.0 267 34 25.5	Sand Island front range L. H. Fort Morgan	8300.6 4202.0	3.919112 3.623454
Roy 1892	30 13 51.766 87 54 43.406	1594.2 1160.7	70 07 49.0 88 27 23.9 88 59 30.2	250 03 38.2 268 24 02.6 268 57 28.1	Sand Island front range L. H. Fort Morgan Jacob	14176.2 10695.4 6494.2	4.151560 4.029193 3.812523
Azimuth I 1892	30 13 43.601 87 49 43.103	1342.6 1152.6	91 48 51.3	271 46 20.1	Roy	8034.11	3.904938
Azimuth II 1892	30 14 14.045 87 45 36.221	432.5 988.5	81 56 06.0	261 54 01.7	Azimuth I	6867.70	3.823976
Azimuth III 1892	30 14 53.113 87 41 02.743	1635.5 73.3	80 40 34.0	260 38 16.9	Azimuth II	7410.25	3.869833

Mobile Bay to Florida—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Principal points—Contd.</i>							
Azimuth IV 1892	30 15 02.440 87 39 18.069	75.1 483.0	84 08 52.3	284 07 59.6	Azimuth III	Meters 2813.17	3.449196
Azimuth V 1892	30 15 33.294 87 37 14.198	1025.2 379.5	74 00 02.2	253 58 59.8	Azimuth IV	3445.09	3.537201
Cotton 1889-92	30 16 20.852 87 34 02.802	642.1 74.9	74 02 25.4	254 00 48.9	Azimuth V	5321.57	3.726040
Perdido Range 1889	30 16 45.586 87 32 52.994	1403.6 1416.3	67 47 59.7	247 47 24.5	Cotton	2015.3	3.304332
Johnson 1889	30 17 36.265 87 32 45.835	1116.7 1224.8	6 59 25.1 41 32 26.0	186 59 21.5 221 31 47.2	Perdido Range Cotton	1572.2 3102.2	3.196512 3.491667
Perdido III (Fla.) 1889	30 16 56.892 87 30 49.652	1751.9 1327.0	83 58 47.7 111 20 14.9	263 57 45.5 291 19 16.3	Perdido Range Johnson	3314.8 3333.2	3.520480 3.522866
Bear Point 1889	30 18 03.401 87 30 52.452	104.7 1401.6	357 54 28.9 53 21 58.8 74 35 23.5	177 54 28.3 233 20 58.0 254 34 26.3	Perdido III Perdido Range Johnson	2049.3 4024.0 3142.9	3.311614 3.604663 3.497334
Perdido II (Fla.) 1889	30 17 18.074 87 28 53.751	556.6 1436.5	78 07 00.4 113 45 28.9	258 06 01.9 293 44 30.0	Perdido III Bear Point	3165.4 3465.5	3.500432 3.539767
Hummock (Fla.) 1889	30 18 50.531 87 28 40.795	1556.0 1090.0	6 56 02.1 44 32 50.4 67 35 26.3	186 55 55.6 224 31 45.4 247 34 19.9	Perdido II Perdido III Bear Point	2867.9 4909.3 3805.6	3.457571 3.691016 3.580397
Goat (Fla.) 1889	30 17 55.764 87 30 12.800	1717.1 342.0	63 13 40.7 102 31 03.3 235 32 35.8	243 12 19.9 282 30 43.3 55 33 22.2	Perdido Range Bear Point Hummock	4795.5 1085.3 2981.2	3.680836 3.035557 3.474390
Perdido I (Fla.) 1889	30 17 29.512 87 27 50.276	908.8 1343.5	78 16 32.2 151 35 11.1	258 16 00.2 331 34 45.6	Perdido II Hummock	1732.5 2836.6	3.238666 3.452796
Nelson (Fla.) 1889	30 18 49.882 87 26 51.527	1535.4 1376.6	32 23 53.0 49 08 07.2 72 48 13.0 90 24 43.2	212 23 23.4 229 07 05.6 252 46 31.5 270 23 48.1	Perdido I Perdido II Goat Hummock	2930.2 4319.1 5630.0 2919.4	3.466894 3.635394 3.750511 3.465300
Inerarity west (Fla.) 1889	30 19 00.198 87 29 50.925	6.1 1360.5	16 24 57.5 43 13 54.1	196 24 46.5 223 13 23.1	Goat Bear Point	2068.4 2400.3	3.315637 3.380259
Rockwood 1889	30 18 32.651 87 30 52.836	1005.4 1411.7	242 50 48.8 316 42 50.6 359 20 48.0	62 51 20.0 136 43 10.8 179 20 48.2	Inerarity west Goat Bear Point	1858.9 1560.3 900.7	3.269265 3.193212 2.954603
Ross 1889	30 19 11.426 87 30 58.970	351.8 1602.2	280 36 39.3 331 35 09.6 350 55 47.7	100 37 14.1 151 35 33.4 170 55 51.3	Inerarity west Goat Rockwood	1876.7 2648.9 1209.1	3.273406 3.423062 3.082460
Red Bluff 1889	30 20 36.755 87 29 07.877	1131.8 210.4	312 05 37.2 347 31 34.9 21 08 51.7 30 37 00.6 48 44 27.3	132 06 46.0 167 31 48.6 201 08 30.1 210 36 08.0 228 43 30.9	Nelson Hummock Inerarity west Bear Point Ross	4909.3 3350.0 3187.9 5486.7 3983.7	3.691018 3.525041 3.503499 3.739310 3.600282
Manuel 1889	30 21 37.465 87 27 50.363	1154.3 1345.0	343 03 41.5 14 41 11.8 33 37 41.6 36 26 05.0 47 54 45.5	163 04 11.2 194 40 46.3 213 36 40.8 216 24 33.1 227 54 06.4	Nelson Hummock Inerarity west Bear Point Red Bluff	5395.5 5314.5 5816.2 8192.5 2789.8	3.732035 3.725486 3.764636 3.913417 3.445566
Dupont (Fla.) 1889	30 21 56.308 87 26 25.988	1733.9 694.2	6 46 30.4 32 11 43.3 45 16 51.2 55 15 55.4 60 28 26.2 75 34 41.1	186 46 17.5 212 10 35.3 225 15 07.9 235 13 37.3 240 27 04.5 255 33 58.5	Nelson Hummock Inerarity west Ross Red Bluff Manuel	5781.6 6759.3 7705.1 6906.5 4969.0 2326.3	3.762045 3.829904 3.885777 3.849709 3.696270 3.366660
Suarez 1889	30 22 54.134 87 27 02.933	1667.0 78.3	331 01 00.5 28 13 14.2	151 01 19.2 208 12 50.2	Dupont Manuel	2035.5 2678.6	3.308671 3.427900
Nix (Fla.) 1890	30 23 26.709 87 25 43.573	822.5 1163.3	22 08 42.8 45 11 45.9 64 40 14.0	202 08 21.4 225 10 41.9 244 39 34.8	Dupont Manuel Suarez	3005.4 4772.1 2344.2	3.477898 3.678710 3.369397
Chagrin 1890	30 24 16.026 87 26 13.626	493.5 363.7	332 09 04.2 4 23 27.5 27 34 02.8	152 09 19.4 184 23 21.3 207 33 37.9	Nix Dupont Suarez	1717.5 4315.0 2844.6	3.234898 3.634981 3.454021
Cummings (Fla.) 1890	30 24 07.334 87 25 34.303	225.8 915.7	11 11 23.0 18 53 17.3 46 23 42.8 104 18 29.4	191 11 18.3 198 52 51.2 226 22 58.0 284 18 09.5	Nix Dupont Suarez Chagrin	1275.2 4264.2 3267.9 1063.2	3.105579 3.629840 3.514270 3.034723
Grassy 1890	30 25 23.150 87 23 58.484	712.9 1560.8	47 01 45.4 47 36 53.6 60 11 41.1	227 00 12.1 227 36 05.1 240 10 32.7	Suarez Cummings Chagrin	6730.4 3462.8 4157.2	3.829806 3.539430 3.618805
Double (Fla.) 1890	30 24 40.782 87 23 29.456	1255.8 786.1	72 50 02.2 80 08 34.8 149 17 57.2	252 48 59.0 260 07 11.8 329 17 42.5	Cummings Chagrin Grassy	3488.0 4447.8 1517.4	3.542575 3.648148 3.181088

Mobile Bay to Florida—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Principal points—Contd.</i>							
River east (Fla.) 1890	30 27 13.511 87 22 57.941	416.0 1545.9	10 08 26.0 25 25 46.9	190 08 10.0 205 25 16.2	Double Grassy	Meters 4777.6 3762.8	3.679211 3.575510
River west 1890	30 26 47.335 87 23 18.701	1457.6 499.0	214 29 39.8 4 12 46.5 22 16 21.6	34 29 50.3 184 12 41.0 202 16 01.3	River east Double Grassy	978.0 3907.5 2801.3	2.990337 3.591902 3.447353
Boom (Fla.) 1891	30 27 08.692 87 24 00.908	267.7 24.2	264 56 52.9 300 16 54.5	84 57 24.8 120 17 15.9	River east River west	1686.5 1304.1	3.226983 3.115308
Squid 1891	30 27 01.259 87 24 09.194	38.8 245.3	224 00 20.2 258 46 14.1 287 39 04.0	44 00 24.4 78 46 50.2 107 39 29.6	Boom River east River west	318.2 1938.1 1413.8	2.502711 3.287377 3.150387
Juniper 1891	30 27 14.003 87 24 29.765	431.2 796.1	281 59 28.5 305 33 50.7	101 59 43.1 125 34 01.1	Boom Squid	787.1 674.7	2.896016 2.829111
Hirse (Fla.) 1891	30 27 33.054 87 24 33.722	1017.8 899.6	310 35 32.3 326 14 25.8 349 47 53.6	130 35 48.9 146 14 38.2 169 47 55.6	Boom Squid Juniper	1152.9 1177.6 596.1	3.061798 3.071012 2.775302
Hard (Fla.) 1891	30 27 36.924 87 24 54.678	1137.0 1464.2	282 01 55.1 316 43 07.3	102 02 05.7 136 43 19.9	Hirse Juniper	571.6 969.5	2.757123 2.986559
Wire 1891	30 27 33.799 87 25 03.308	1040.8 88.2	247 18 57.4 271 39 46.8 304 15 34.6	67 19 01.8 91 40 01.8 124 15 51.5	Hard Hirse Juniper	249.5 789.7 1082.8	2.397139 2.897437 3.034563
Steamboat (Fla.) 1891	30 27 58.030 87 25 16.770	1787.0 447.4	317 47 48 334 17 52	137 47 59 154 17 58	Hard Wire	877.3 828.1	2.94317 2.91807
Roots 1891	30 28 08.606 87 25 44.957	265.0 1199.3	293 25 02 306 01 38 313 58 04	113 25 17 126 02 04 133 58 25	Steamboat Hard Wire	819.4 1658.6 1543.8	2.91350 3.21973 3.18858
Kee (Fla.) 1891	30 28 12.344 87 25 40.291	380.1 1074.8	305 05 16 311 52 11 320 15 54 47 14 16	125 05 28 131 52 33 140 16 11 227 14 13	Steamboat Hard Wire Roots	766.8 1634.1 1543.4 169.5	2.88467 3.21327 3.18848 2.22927
Alabama Cut-off 1891	30 28 28.393 87 25 54.199	874.3 1445.7	323 06 12 337 58 15	143 06 19 157 58 19	Kee Roots	618.0 657.3	2.79096 2.81776
Florida Cut-off (Fla.) 1891	30 28 32.796 87 25 45.342	1009.9 1209.5	347 55 25 359 12 35 60 08 43	167 55 28 179 12 35 240 08 39	Kee Roots Alabama Cut-off	644.1 745.0 272.4	2.80892 2.87214 2.43521
Titl 1891	30 28 45.514 87 26 09.699	1401.5 258.7	301 04 51 321 53 53	121 05 03 141 54 01	Florida Cut-off Alabama Cut-off	758.6 670.0	2.88000 2.82607
Bay (Fla.) 1891	30 28 46.825 87 26 05.486	1441.9 146.3	308 47 55 332 03 31 70 14 48	128 48 05 152 03 36 250 14 46	Florida Cut-off Alabama Cut-off Titl	689.4 642.5 119.4	2.83848 2.80786 2.07701
Log 1891	30 28 58.436 87 26 05.795	1799.4 154.6	358 40 41 14 39 52	178 40 41 194 39 50	Bay Titl	357.6 411.3	2.55345 2.61416
Goat 2 (Fla.) 1911	30 17 56.004 87 30 15.868	1724.5 424.0	81 23 10.3 200 08 46.6 236 31 49.1 275 08 50.7	261 21 54.6 20 09 20.9 56 32 37.1 95 08 52.3	Johnson Red Bluff Hummock Goat	4053.3 5272.7 3045.1 82.32	3.607809 3.722035 3.483597 1.915505
Ross 2 1911	30 19 12.494 87 31 01.153	384.7 30.8	229 22 47.8 332 48 25.6	49 23 45.0 152 48 48.5	Red Bluff Goat 2	3986.0 2647.9	3.600537 3.422908
Inerarity west 2 (Fla.) 1911	30 18 59.392 87 29 50.470	1828.9 1348.4	200 46 45.3 19 10 23.3 102 03 52.6	20 47 06.7 199 10 10.5 282 03 16.9	Red Bluff Goat 2 Ross 2	3206.7 2068.5 1931.0	3.506060 3.315236 3.285784
Bear Point 2 1911	30 18 03.558 87 30 54.114	109.6 1446.0	211 01 31.2 224 40 50.5 247 53 27.0 282 49 11.5 74 17 07.9	31 02 24.7 44 41 22.6 67 54 34.3 102 49 30.8 254 16 11.5	Red Bluff Inerarity west 2 Hummock Goat 2 Johnson	5505.3 2418.2 3844.7 1048.1 3101.5	3.740783 3.383490 3.584857 3.020404 3.491567
Inlet (Fla.) 1911	30 17 03.169 87 31 31.279	97.6 835.9	117 05 39.0 208 06 15.6 216 57 41.2 231 04 50.3	297 05 01.4 28 06 34.4 36 53 32.0 51 05 28.4	Johnson Bear Point 2 Inerarity west 2 Goat 2	2238.0 2108.1 4479.3 2590.0	3.349853 3.323900 3.651211 3.413300
Ala 1911	30 16 43.910 87 33 03.785	1352.1 101.2	196 34 10.7 234 42 08.7 258 30 18.4	16 34 19.7 54 43 14.1 76 31 05.0	Johnson Bear Point 2 Inlet	1682.0 4245.4 2542.5	3.225824 3.627921 3.405255
<i>Supplementary points</i>							
North Range (Fla.)	30 16 41.715 87 32 39.470	1284.5 1054.9	95 56 19.8 174 13 02.7 250 04 14.9	275 56 07.6 354 12 59.5 70 04 49.3	Ala Johnson Inlet	653.4 1688.3 1938.5	2.815164 3.227452 3.287471
South Range (Fla.)	30 16 40.737 87 32 38.872	1254.4 1038.9	98 21 02.3 173 47 20.8 249 04 13.0	278 20 49.8 353 47 16.8 69 04 47.1	Ala Johnson Inlet	673.0 1719.9 1934.1	2.829005 3.235516 3.286472

Mobile Bay to Florida—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Supplementary points—Con.</i>							
Ono (Fla.) 1911	30 16 56.854	1750.7	64 56 47.7	244 56 31.6	Ala	941.1	2.973642
	87 32 31.886	852.2	162 55 29.5	342 55 22.4	Johnson	1269.5	3.103647
			231 49 17.5	51 50 08.8	Bear Point 2	3323.5	3.521597
Tarkill (Fla.) 1889	30 20 05.762	177.4	62 13 56.6	242 12 33.5	Hummock	4970.5	3.696398
	87 25 56.180	1500.7	78 22 18.9	258 19 45.7	Rosa	8286.1	3.918349
			100 34 16.5	280 32 39.7	Red Bluff	5208.5	3.716715
Bend (Fla.) 1890	30 22 34.644	1066.8	61 58 00.5	231 57 31.9	Dupont	1915.8	3.282353
	87 25 29.448	786.2	64 56 07.4	244 54 56.2	Manuel	4153.1	3.618376
			103 31 54.5	283 31 07.2	Suarez	2566.1	3.409279
Fell 1890	30 24 00.169	5.2	159 19 27.5	339 19 05.1	Chagrin	3336.8	3.523336
	87 26 52.886	1411.7	263 59 23.3	84 00 03.1	Cummings	2109.2	3.324125
			299 08 19.7	119 06 54.8	Nlx	2117.8	3.325895
May 1890	30 25 04.553	140.2	349 20 19.1	169 20 32.8	Dupont	3881.0	3.589846
	87 25 17.104	456.5	7 30 55.6	187 30 50.5	Suarez	2051.0	3.311974
			284 17 08.4	104 18 02.9	Double	2964.9	3.472009
Cove (Fla.) ¹ 1890	30 23 53.43	1645.3	14 36 18.6	194 36 09.9	Cummings	1820.8	3.260256
	87 24 19.36	516.8	45 16 40.0	225 16 11.4	Chagrin	2123.4	3.327035
			191 24 08	11 24 18	Grassy	2818.5	3.45002
Fish house southeast gable 1890	30 24 59.65	1836.7	222 24 38	42 25 03	Double	1975.1	3.29559
	87 25 50.74	1354.2	278 45 00	98 46 11	Double	3815.3	3.58153
			344 46 05	164 46 13	Cummings	1669.6	3.22262
Powell (Fla.) 1890	30 24 59.976	1846.7	77 57 17.3	257 56 24.8	Double	2830.4	3.451853
	87 21 45.746	1221.0	101 23 56.4	281 22 49.2	Grassy	3613.8	3.557960
			143 07 28.6	323 06 41.7	River west	4133.1	3.616276
Head (Fla.) 1890	30 26 51.322	1580.4	154 54 06.0	334 53 29.5	River east	4540.9	3.657143
	87 21 12.634	337.1	14 27 12.8	194 26 56.0	Powell	3540.8	3.549096
			42 15 33.9	222 14 24.6	Double	5430.5	3.734837
Hester (Fla.) 1890	30 24 52.170	1606.5	58 28 58.7	238 27 34.7	Grassy	5192.1	3.715343
	87 22 14.553	388.4	87 55 06.9	267 54 03.2	River west	3365.9	3.527099
			103 40 32.2	283 39 38.8	River east	2891.5	3.461127
Marcus (Fla.) 1890	30 28 10.618	327.0	80 03 24.5	260 02 46.6	Double	2029.7	3.307439
	87 20 36.730	980.2	108 59 13.2	288 58 20.6	Grassy	2933.3	3.467356
			154 14 14.0	334 13 41.7	River west	3937.9	3.595262
Millview Seminole Mill smokestack (Fla.) 1890	30 25 12.469	384.0	252 38 15.4	72 38 30.0	Powell	905.5	2.906085
	87 21 23.325	622.4	40 15 32.9	220 14 57.9	Double	2850.4	3.454899
			59 02 35.8	239 01 08.2	Double	5376.0	3.730462
Millview schoolhouse flag- staff (Fla.) 1890	30 25 23.327	718.3	74 49 30.7	254 47 48.4	Grassy	5578.9	3.746550
	87 20 43.320	1156.1	104 40 17.8	284 38 55.8	River west	4467.3	3.650046
			73 50 41.9	253 49 38.0	Double	3505.0	3.544685
		94 33 09.3	274 31 50.7	Grassy	4154.0	3.618463	
		133 30 12.9	313 29 14.6	River west	4244.2	3.627791	
		185 21 12.4	5 21 17.8	Head	3057.3	3.485344	
			121 58 14.5	301 56 55.8	River west	4887.1	3.689051
			133 22 30.0	313 21 21.8	River east	4941.2	3.693833
			163 63 56.9	343 53 42.0	Head	2820.3	3.450291

¹ No check on this position.

Mississippi Sound and Lake Borgne.

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Principal points</i>							
Cedar 1910	30 20 48.309	1487.6	324 16 20.6	144 19 18.5	Fort Morgan	16156.2	4.208339
	88 07 16.029	428.1	8 10 44.6	188 10 15.2	Dauphin Island east base	10948.1	4.039339
			45 37 20.5	225 33 31.0	Dauphin Island west base	17021.2	4.230990
Cat 1910	30 19 00.542	16.7	248 19 26.0	68 22 04.0	Cedar	8992.9	3.953902
	88 12 28.925	772.8	317 49 54.5	137 52 02.9	Dauphin Island east base	10141.0	4.006082
			23 51 23.6	203 50 11.9	Dauphin Island west base	9394.7	3.972883
Pins 1910	30 22 24.224	745.9	279 11 13.7	99 16 57.5	Cedar	18403.9	4.264909
	88 18 36.251	968.0	302 33 51.0	122 36 50.6	Cat	11044.4	4.066116
			337 56 39.9	157 58 33.6	Dauphin Island west base	16036.5	4.205110
Grand 1910	30 19 19.572	602.7	243 08 13.6	63 09 45.9	Pins	12581.9	4.099745
	88 25 36.487	974.8	297 58 16.0	118 03 41.5	Dauphin Island west base	10540.6	4.209938

Mississippi Sound and Lake Borgne—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Principal points—Contd.</i>							
Petit 1910	30 12 35.506	1093.3	177 10 19.9	357 10 08.3	Grand Pins Dauphin Island west base	<i>Meters</i> 12457.4	4.095427
	88 25 13.482	360.6	210 19 27.8	30 22 48.2		21007.5	4.322375
			258 51 49.0	78 57 02.4		16962.2	4.229483
Horn 1910	30 13 40.012	1232.1	238 09 26.5	58 14 44.7	Grand Petit	19843.0	4.297607
	88 36 07.460	199.5	276 26 00.9	96 31 30.1		17601.9	4.245560
Pascagoula 1910	30 20 40.872	1249.3	281 25 13.8	101 29 06.6	Grand Petit Horn	12561.4	4.099038
	88 33 17.372	464.0	319 04 38.7	139 08 42.7		19757.6	4.285734
			19 21 12.3	199 19 46.5		13724.7	4.137504
Belle 1910	30 20 31.850	980.8	268 59 36.8	89 04 38.6	Pascagoula Horn	15955.5	4.202910
	88 43 14.658	391.5	317 58 25.3	138 02 00.8		17063.7	4.232074
Club 1910	30 15 11.973	368.7	178 28 35.8	358 28 30.8	Belle Pascagoula Horn	9853.4	3.993584
	88 43 04.851	129.7	237 09 17.4	57 14 13.8		18676.7	4.271301
			284 12 29.8	104 16 00.0		11513.6	4.061212
Deer 1910	30 21 27.210	837.9	281 01 08.0	101 03 53.2	Belle Club Ship Island L. H. Biloxi L. H.	8900.6	3.949421
	88 48 41.749	1114.9	322 03 18.4	142 06 08.4		14647.2	4.165755
			42 46 59.5	222 42 19.2		21881.6	4.340080
			115 21 21.8	295 18 38.9		9514.5	3.978387
Ship 1910	30 15 10.016	308.4	67 47 18.9	247 43 53.7	Ship Island L. H. Biloxi L. H. Deer Belle Club	11770.3	4.070786
	88 51 10.027	268.1	163 31 26.4	343 29 58.6		4.213746	
			198 49 29.8	18 50 44.6		12272.0	4.088914
			232 00 25.6	52 04 25.3		16111.2	4.207129
			269 41 59.6	89 46 04.0		12970.9	4.112969
Monk 1910	30 21 01.577	48.6	343 03 56.0	163 04 57.9	Club Ship Deer	11252.7	4.051256
	88 45 07.453	199.1	41 51 08.7	221 48 05.8		14527.7	4.162197
			97 52 02.7	277 50 14.4		5777.3	3.761724
Bill 1910	30 22 19.320	594.9	305 37 54.8	125 38 58.0	Monk Deer Biloxi L. H.	4108.3	3.613663
	88 47 12.479	333.2	56 03 39.7	236 02 54.6		2873.6	3.458424
			102 41 12.9	282 37 44.8		11255.9	4.051379
Marsh 1910	30 23 10.189	313.7	302 31 43.4	122 32 29.9	Bill Deer	2912.5	3.464271
	88 48 44.444	1186.6	358 41 59.7	178 42 01.1		3171.8	3.501311
Ox 1910	30 22 11.954	368.1	219 38 17.3	39 38 45.4	Marsh Bill Deer	2328.7	3.367117
	88 40 40.088	1070.5	206 41 46.4	86 43 01.0		3948.0	3.596374
			311 29 08.9	131 29 38.4		2079.7	3.318009
Plum 1910	30 24 37.607	1158.0	314 39 29.0	134 40 20.6	Marsh Ox	3829.3	3.583122
	88 50 26.469	706.5	344 33 47.3	164 34 10.8		4652.9	3.667722
Cad 1910	30 24 22.285	686.2	256 12 10.1	76 12 46.5	Plum Marsh Ox	1979.0	3.296444
	88 51 38.473	1026.9	295 31 46.9	115 33 14.9		5149.0	3.711719
			321 46 12.9	141 47 12.8		5108.4	3.708286
Fort 1910	30 25 25.961	799.4	320 32 32.1	140 32 55.3	Plum Cad	1928.4	3.285198
	88 51 12.383	330.5	19 33 13.1	199 32 59.9		2080.7	3.318219
Can 1910	30 25 19.362	596.2	264 54 54.6	84 55 38.0	Fort Plum Cad	2295.4	3.360855
	88 52 38.054	1015.6	290 05 56.5	110 07 03.1		3739.9	3.572865
			317 51 26.3	137 51 56.5		2370.2	3.374786
Barn 1910	30 24 43.927	1352.7	191 14 16.8	11 14 20.9	Can Fort Plum	1112.5	3.046301
	88 52 46.178	1232.5	242 39 05.5	62 39 53.0		2818.1	3.449963
			272 58 39.3	92 59 60.0	3734.1	3.572181	
Ship Island L. H. 1855	30 12 48.449	1491.9	105 18 24.1	285 15 18.8	Cat Island Mississippi City Ship Island	10203.0	4.008726
	88 57 58.096	1500.3	160 49 54.4	340 47 53.1		19552.1	4.291194
			247 24 31.0	67 26 60.4		8020.2	3.904186
Biloxi L. H. 1855	30 23 39.419	1213.8	295 44 59.9	115 47 20.5	Deer Island 1 Ship Island Ship Island L. H. Cat Island Mississippi City	8248.9	3.916395
	88 54 03.820	102.0	355 58 23.7	175 58 46.2		17008.6	4.230668
			17 13 12.5	197 11 15.3		20984.0	4.321888
			42 47 00.4	222 41 57.4		23632.2	4.373504
			82 54 08.4	262 50 09.2		12718.9	4.104460
Ship Island L. H. (new) 1902	30 12 45.341	1396.2	197 12 19.7	17 14 17.6	Biloxi L. H. Ship Island L. H., 1855	21086.2	4.323998
	88 57 57.464	1536.8	200 18 41.0	20 18 41.7		101.1	2.004599
Wharf 1902	30 21 13.257	408.2	255 38 18.8	75 43 52.8	Biloxi L. H. Ship Island L. H. (new)	18203.0	4.260144
	89 05 04.383	117.1	323 51 30.1	143 55 05.4		19359.6	4.286896
Gulfport front light 1902	30 21 23.493	723.4	256 51 30.3	76 57 11.0	Biloxi L. H. Wharf Ship Island L. H. (new)	18474.9	4.266581
	89 05 17.750	474.1	311 28 39.9	131 26 46.6		476.2	2.677812
			323 33 38.4	143 37 20.4		19824.9	4.297212
Pitcher Point 1903	30 19 57.555	1772.3	253 32 35.5	73 35 25.2	Gulfport Front Light Ship Island L. H. (new)	9354.2	3.971008
	89 10 53.668	1433.6	302 37 31.4	122 44 02.7		24648.8	4.391796
Cat Island L. H. 1903	30 13 50.605	1558.3	170 17 51.4	350 17 14.9	Pitcher Point Gulfport Front Light Wharf	11463.5	4.059317
	89 09 41.344	1105.5	206 46 48.9	26 49 01.8		15623.7	4.193783
			208 28 57.7	28 31 17.3		15510.3	4.190619

Mississippi Sound and Lake Borgne—Continued

Station	Latitude and longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Principal points—Contd.</i>							
Merrills Shell Bank L. H. 1903	30 14 28.347 89 14 55.799	872.9 1492.0	212 32 04.3 277 50 51.5	32 34 06.4 97 53 29.9	Pitcher Point Cat Island L. H., 1903	Meters 12026.4 8488.0	4.080137 3.928807
Cabbage 1903	30 09 49.234 89 11 39.713	1516.1 1062.6	148 37 11.4 203 03 59.1	328 35 32.7 23 04 58.6	Merrills Shell Bank L. H. Cat Island L. H., 1903	10068.5 8078.7	4.002963 3.907339
Grand Pass 1903	30 07 32.258 89 14 36.345	993.4 972.9	177 40 30.7 214 05 44.5 228 14 51.4	357 40 20.9 34 08 12.8 48 16 20.1	Merrills Shell Bank L. H. Cat Island L. H., 1903 Cabbage	12822.8 14071.8 6335.3	4.107984 4.148350 3.801769
Turkey 1903	30 05 39.636 89 18 15.023	1220.5 402.3	198 06 58.4 239 20 42.1	18 08 38.5 59 22 31.8	Merrills Shell Bank L. H. Grand Pass	17130.6 6804.6	4.233773 3.832802
Grand Island 1903	30 07 47.950 89 25 29.081	1476.6 778.4	233 54 39.7 288 44 51.8	53 59 58.1 108 48 29.6	Merrills Shell Bank L. H. Turkey	20953.0 12273.9	4.321246 4.088984
Three Mile 1903	30 03 14.493 89 21 43.479	446.3 1164.8	144 21 29.0 231 18 28.8	324 19 35.9 51 20 13.3	Grand Island Turkey	10363.1 7151.4	4.015490 3.854391
Bayou 1903	30 03 44.333 89 26 44.695	1365.2 1197.2	195 05 57.7 276 28 32.9	15 06 35.6 96 31 03.7	Grand Island Three Mile	7769.8 8120.7	3.890409 3.909595
Lake Borgne L. H. 1903	30 10 25.143 89 27 44.006	774.2 1177.4	249 55 13.7 323 16 05.5 352 39 53.6	70 01 41.4 143 17 13.3 172 40 23.4	Merrills Shell Bank L. H. Grand Island Bayou	21868.9 6038.7 12443.3	4.339827 3.780944 4.094937
Malheureux Point 2 1909	30 04 49.735 89 29 04.950	1531.5 132.6	117 03 40.8 226 28 12.9 298 11 08.1	296 58 40.2 46 30 01.2 118 12 18.4	East Rigolets unused L. H. Grand Island Bayou	18000.6 7969.8 4262.2	4.255287 3.901448 3.629637
Lake Borgne L. H. 1909	30 10 25.204 89 27 43.949	776.1 1175.9	249 55 26.7 323 17 27.0 352 40 23.0 11 51 36.9	70 01 53.0 143 18 34.7 172 40 52.7 191 50 56.2	Merrills Shell Bank L. H. Grand Island Bayou Malheureux Point 2	21866.8 6039.3 12445.1 10554.9	4.339786 3.780990 4.094997 4.023453
Pearl River L. H. 1909	30 09 39.493 89 31 03.919	1216.1 238.7	255 35 29.4 290 39 52.1 339 35 18.4 86 40 51.4	75 37 12.5 110 42 42.8 159 36 20.6 266 36 52.7	Lake Borgne L. H. Grand Island Malheureux Point 2 East Rigolets unused L. H.	5662.2 9722.1 9519.4 12733.7	3.752687 3.987758 3.978609 4.104956
Biloxi Bayou 1909	29 59 46.854 89 33 28.250	1442.7 757.2	152 50 08.6 191 32 48.8 217 05 08.4	332 47 20.4 11 33 58.7 37 07 20.2	East Rigolets unused L. H. Pearl River L. H. Malheureux Point 2	19677.9 18625.9 11693.6	4.293978 4.270118 4.067950
Creole 1909	30 08 16.772 89 12 21.102	516.4 564.8	160 07 34.1 202 33 54.8	340 06 16.3 22 35 15.1	Merrills Shell Bank L. H. Cat Island L. H.	12167.0 11132.5	4.085183 4.046593
Pitre 1909	30 10 05.792 89 09 37.128	178.4 993.4	52 35 42.8 133 30 30.8 179 04 00.8	232 34 20.5 313 27 50.5 359 03 58.7	Creole Merrills Shell Bank L. H. Cat Island L. H.	5524.9 11747.9 6923.4	3.742325 4.069959 3.840319
Spit 1909	30 11 21.525 89 08 05.952	662.8 159.2	67 35 09.2 128 33 52.4 112 07 56.8	247 33 23.0 308 32 04.0 292 03 30.1	Pitre Cat Island L. H. Merrills Shell Bank L. H.	6112.1 7306.1 15293.5	3.786194 3.867285 4.184508
Middle 1909	30 12 43.447 89 06 23.076	1337.8 617.1	349 42 29.0 46 55 56.8 111 19 13.4	169 42 37.3 226 54 19.2 291 17 33.6	Spit Pitre Cat Island L. H.	2563.8 7107.3 5691.2	3.408880 3.851706 3.755204
South 1909	30 13 37.997 89 08 43.322	1170.1 1158.5	294 06 56.5 314 56 34.7 12 25 31.3	114 08 07.3 134 57 53.9 192 25 04.2	Middle Spit Pitre	4109.6 5947.7 6690.9	3.613799 3.774348 3.825485
North 1909	30 13 52.545 89 08 05.093	1618.0 136.2	325 34 17.4 66 20 20.3 95 45 40.7	145 35 17.4 246 20 01.1 275 42 13.9	Spit South Merrills Shell Bank L. H.	5637.2 1116.1 11036.9	3.751066 3.047704 4.042847
<i>Supplementary points.</i>							
Ran 1910	30 20 00.695 88 07 50.817	21.4 1357.4	76 01 13.4 212 21 44.6 318 20 20.1 3 49 51.8	255 58 53.0 32 22 02.2 138 23 35.5 183 49 40.0	Cat Cedar Fort Morgan Dauphin Island east base	7656.9 1735.8 15592.0 9391.7	3.884055 3.239501 4.192902 3.972742
Jules house, gable ¹ 1910	30 20 16.98 88 09 07.52	522.9 200.9	252 02 36 351 47 48	72 03 32 171 48 14	Cedar Dauphin Island east base	3130.3 9974.2	3.495583 3.998877

¹ No check on this position.

Mississippi Sound and Lake Borgne—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Supplementary points—Con.</i>							
	° ' "		° ' "	° ' "		<i>Meters</i>	
Heron 1910	30 19 46.643 88 09 06.901	1436.3 184.3	75 16 39.6 237 19 30.0 351 03 22.5	255 14 57.6 57 20 26.0 171 03 49.0	Cat Cedar Dauphin Island east base	5580.7 3518.0 9047.9	3.746685 3.546293 3.956549
Pear 1910	30 18 45.926 88 08 14.631	1414.2 390.9	93 48 28.4 202 33 14.1 359 55 32.4	273 46 20.1 22 33 43.7 179 55 32.6	Cat Cedar Dauphin Island east base	6808.0 4080.7 7068.3	3.833081 3.610737 3.849318
Gull 1910	30 17 53.411 88 08 19.444	1644.7 519.6	107 14 46.9 197 27 26.8 358 33 05.5	287 12 41.0 17 27 58.8 178 33 08.1	Cat Cedar Dauphin Island east base	6979.1 5645.8 5453.0	3.843801 3.751722 3.736637
Grant (flag) 1910	30 17 35.020 88 08 03.465	1078.4 92.6	110 23 13.2 192 01 00.1 3 23 23.9	290 20 59.2 12 01 24.0 183 23 18.4	Cat Cedar Dauphin Island east base	7566.2 6085.3 4893.5	3.878877 3.784688 3.689623
Grant house, south gable 1910	30 17 34.830 88 08 03.456	1072.5 92.4	110 25 41.1 192 00 11.1 3 23 48.2	290 23 27.1 12 00 35.0 183 23 42.7	Cat Cedar Dauphin Island east base	7568.4 6091.0 4887.7	3.879006 3.784688 3.689103
Grants Pass, house, west gable ¹ 1897	30 17 35.74 88 08 02.88	1100.6 77.0	303 54 48 3 33 19	123 58 09 183 33 13	Fort Morgan Dauphin Island east base	12877.7 4916.8	4.10984 3.69168
Grants Pass Beacon 14 1910	30 17 27.950 88 08 51.182	860.7 1367.8	295 35 17.0 348 03 59.9 116 07 20.2	115 36 11.6 168 04 18.5 296 05 30.3	Little Dauphin Dauphin Island east base Cat	3210.7 4770.3 6479.2	3.508600 3.678547 3.811522
Grants Pass Beacon 12 1910	30 17 29.006 88 08 39.838	893.2 1064.6	298 41 52.4 351 43 48.4 114 44 26.4	118 42 41.3 171 44 01.3 294 42 30.8	Little Dauphin Dauphin Island east base Cat	2955.7 4749.1 6739.0	3.470657 3.676615 3.828598
Grants Pass Beacon 10 1910	30 17 30.057 88 08 28.483	925.5 761.2	302 22 57.1 355 24 53.3 113 27 44.7	122 23 40.3 175 25 00.5 293 25 43.4	Little Dauphin Dauphin Island east base Cat	2710.6 4747.3 7002.8	3.433073 3.676451 3.845273
Grants Pass Beacon 8 1910	30 17 31.020 88 08 18.373	955.2 491.0	306 16 13.2 358 41 10.0 112 23 50.5	126 16 51.3 178 41 12.1 292 21 44.1	Little Dauphin Dauphin Island east base Cat	2504.1 4703.0 7240.1	3.398653 3.677885 3.859745
Grants Pass Beacon 6 1910	30 17 32.247 88 08 05.409	993.0 146.1	312 13 32.4 2 48 44.6 111 08 10.1	132 14 04.0 182 48 40.2 291 05 57.2	Little Dauphin Dauphin Island east base Cat	2260.6 4805.4 7546.4	3.354231 3.681727 3.877738
Grants Pass Beacon 4 1910	30 17 36.874 88 07 55.705	1135.4 1488.6	319 37 29.7 5 44 26.3 109 27 26.6	139 37 56.3 185 44 16.9 289 25 08.7	Little Dauphin Dauphin Island east base Cat	2181.3 4967.0 7741.7	3.338724 3.696000 3.888836
Grants Pass Beacon 2 1910	30 17 45.608 88 07 50.781	1404.4 1357.0	326 25 37.6 6 52 36.1 107 16 04.3	146 26 01.8 186 52 24.3 287 13 44.0	Little Dauphin Dauphin Island east base Cat	2317.3 5248.7 7781.9	3.364982 3.720054 3.891083
Bar 1910	30 19 11.187 88 11 00.190	344.5 5.1	330 31 04.6 34 41 07.5 82 08 03.9	150 32 28.2 214 39 11.1 262 07 19.1	Dauphin Island east base Dauphin Island west base Cat	9012.3 10846.2 2393.2	3.954836 4.035278 3.378986
Mid 1910	30 14 49.606 88 11 30.527	1527.5 816.1	80 50 26.7 168 35 05.1 267 42 35.6	260 48 45.8 348 34 35.7 87 44 14.5	Dauphin Island west base Cat Dauphin Island east base	5430.3 7883.0 5250.7	3.734826 3.896693 3.720216
Tree 1910	30 20 24.483 88 10 38.535	753.9 1029.3	48 48 21.3 106 09 12.3 262 15 40.6	228 45 25.6 286 05 10.9 82 17 22.9	Cat Pins Cedar	3921.4 13280.0 5458.4	3.593438 4.123197 3.737064
Y Tree 1910	30 20 37.941 88 10 38.189	1168.3 1020.0	44 36 45.8 104 24 41.9 266 36 07.0	224 35 49.9 284 20 40.3 86 37 49.1	Cat Pins Cedar	4212.5 13179.7 5408.9	3.624542 4.119904 3.733112
Herb 1910	30 19 19.491 88 15 25.307	600.2 676.1	138 08 11.7 277 02 46.2 354 17 49.4	318 06 35.2 97 04 15.3 174 18 06.7	Pins Cat Dauphin Island west base.	7639.8 4748.2 9221.8	3.883082 3.676529 3.964815

¹No check on this position.

Mississippi Sound and Lake Borgne—Continued

Station	Latitude and longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Supplementary points—Con.</i>							
	° ' "		° ' "	° ' "		<i>Meters</i>	
Murder	30 20 18.193	560.2	21 35 19.3	201 35 01.4	Cat	2571.4	3.410177
1910	88 11 53.511	1429.3	72 17 46.7	252 15 59.7	Herb	5939.5	3.773747
			109 52 07.3	289 48 43.7	Pins	11434.3	4.058211
Negro	30 21 45.437	1399.1	15 24 03.3	195 23 36.9	Cat	5266.6	3.721530
1910	88 11 38.574	976.7	53 40 10.7	233 38 44.5	Herb	7584.3	3.879916
			96 06 46.4	276 03 14.2	Pins	11270.0	4.051925
In	30 22 17.509	539.2	337 24 01.2	157 24 48.9	Cat	6569.3	3.817520
1910	88 14 03.417	91.2	21 45 26.3	201 44 44.9	Herb	5901.9	3.770993
			91 38 41.3	271 36 23.3	Pins	7288.0	3.862610
Shack No. 1	30 20 35.639	1097.4	303 37 53.2	123 39 16.4	Cat	5285.6	3.723093
1910	88 15 13.649	364.0	7 33 57.3	187 33 51.4	Herb	2365.4	3.373908
			121 43 45.6	301 42 03.2	Pins	6360.4	3.803482
Shack No. 2	30 20 46.654	1436.6	306 04 41.1	126 06 05.9	Cat	5547.0	3.744056
1910	88 15 16.728	446.8	4 52 49.7	184 52 45.4	Herb	2693.8	3.430358
			119 25 53.1	299 24 12.3	Pins	6117.0	3.786535
East chimney (3-decker)	30 22 50.516	1555.5	327 47 55.3	147 49 19.6	Cat	8367.8	3.922610
1910	88 15 15.830	422.7	2 13 52.3	182 13 47.5	Herb	6503.0	3.813115
			81 24 38.2	261 22 56.8	Pins	5412.2	3.733375
West gable	30 22 45.379	1397.4	322 34 58.2	142 36 38.4	Cat	8715.4	3.940288
1910	88 15 47.139	1258.6	354 44 37.0	174 44 48.9	Herb	6386.0	3.80910
			81 48 09.0	261 46 43.5	Pins	4562.2	3.659170
Port	30 22 47.214	1453.9	322 44 56.3	142 46 36.7	Cat	8767.1	3.942858
1910	88 15 47.558	1269.8	354 41 25.8	174 41 37.0	Herb	6423.9	3.807801
			81 04 46.4	261 03 21.1	Pins	4559.5	3.658916
Hotel, center gable	30 22 19.116	588.6	327 20 40.5	147 23 25.3	Dauphin Island east base	16188.5	4.209207
1910	88 13 41.014	1095.1	342 30 58.6	162 31 35.0	Cat	6410.6	3.806902
			7 15 16.4	187 14 41.0	Dauphin Island west base	14825.9	4.171020
			26 44 13.6	266 43 20.8	Herb	6193.0	3.791900
Shack No. 3 ¹	30 21 18.27	562.6	312 38 57	132 40 24	Cat	6258.1	3.796441
1910	88 15 21.21	566.4	111 19 03	291 17 25	Pins	6590.3	3.747438
Light ¹	30 22 29.76	916.4	315 27 59	135 29 58	Cat	9035.3	3.955943
1910	88 16 26.11	697.2	87 11 54	267 10 48	Pins	3479.2	3.541478
Lit	30 23 18.144	558.7	314 34 37.6	134 37 09.8	Cat	11297.4	4.052980
1910	88 17 30.131	804.4	345 33 48.7	165 35 09.0	Dauphin Island west base.	17082.9	4.232053
			46 45 37.2	228 45 03.7	Pins	2423.5	3.384442
West	30 13 55.059	1695.4	78 40 54.2	258 37 04.5	Petit	12446.9	4.095062
1910	88 17 37.152	993.4	127 59 12.8	307 55 11.1	Grand	16247.6	4.210789
			174 15 09.3	354 14 39.5	Pins	15757.9	4.197497
			259 36 16.8	79 37 40.5	Dauphin Island west base	4515.8	3.654730
Miss	30 13 00.949	29.2	83 19 26.8	263 17 21.2	Petit	6721.6	3.827471
1910	88 21 03.872	103.6	148 00 47.2	327 58 29.8	Grand	13748.6	4.138260
			192 48 09.8	12 49 24.3	Pins	17787.7	4.250119
			256 00 17.0	76 03 24.8	Dauphin Island west base	10273.8	4.011731
Bat	30 21 54.575	1680.5	260 24 17.1	80 25 59.5	Pins	5485.1	3.739186
1910	88 21 58.803	1570.3	16 49 45.9	196 48 07.7	Petit	17984.2	4.254891
			50 37 55.6	230 36 05.6	Grand	7522.4	3.876357
Rain	30 24 09.269	285.4	314 37 32.6	134 38 34.7	Pins	4604.0	3.663135
1910	88 20 38.969	1040.2	27 12 13.9	207 11 33.6	Bat	4683.3	3.668689
			41 42 36.8	221 40 06.5	Grand	11945.7	4.077213
Stir	30 22 56.245	1732.0	278 18 03.5	98 20 11.2	Pins	6815.2	3.833480
1910	88 22 48.816	1303.3	824 52 47.9	144 53 13.2	Bat	2321.5	3.365776
			33 52 47.3	213 61 22.6	Grand	8036.4	3.905007
Lost	30 19 33.043	1017.5	277 28 54.8	97 29 54.4	Grand	3182.2	3.502727
1910	88 27 34.588	924.0	343 38 25.7	163 39 36.8	Petit	13398.9	4.127068
Jose	30 21 36.173	1113.9	261 55 52.7	81 59 10.9	Pins	10577.3	4.024373
1910	88 25 08.463	226.0	0 27 43.4	180 27 40.8	Petit	16270.1	4.211390
			10 05 32.8	190 05 18.6	Grand	4272.4	3.630676
			45 50 23.0	225 49 09.8	Lost	5441.4	3.735711
Clear	30 21 20.445	814.3	336 34 02.3	156 34 34.3	Grand	4257.8	3.629187
1910	88 26 39.867	1064.6	351 57 22.2	171 58 05.8	Petit	10511.2	4.217779
			22 42 57.6	202 42 30.0	Lost	3785.5	3.578126
Brown	30 20 29.678	913.7	317 20 30.9	137 21 14.5	Grand	2934.9	3.467598
1910	88 26 50.928	1360.3	349 52 44.6	169 53 33.7	Petit	14831.3	4.171180
			33 46 39.6	213 46 17.6	Lost	2097.9	3.321776

¹ No check on this position.

Mississippi Sound and Lake Borgne—Continued

Station	Latitude and longitude	Sec- onds in meters	Azimuth	Back azimuth	To station	Distance	Loga- rithm
<i>Supplementary points—Con.</i>							
Grande Batture Island Shoal beacon 8 1910	30 16 12.938	398.4	352 45 07.0	172 45 23.1	Petit	6749.2	3.829250
	88 25 45.319	1211.3	124 20 14.1	304 16 26.0	Pascagoula	14622.1	4.165011
			182 21 04.1	2 21 08.6	Grand	5751.8	3.759803
Aux 1910	30 19 20.777	639.8	270 16 48.3	90 19 02.8	Grand	7113.2	3.852064
	88 30 02.743	73.3	328 11 51.7	148 14 17.5	Petit	14680.5	4.166742
			42 55 05.2	222 52 01.3	Horn	13322.4	4.156015
Green 1910	30 20 19.659	605.4	325 51 39.1	145 54 41.7	Petit	17262.9	4.237115
	88 31 15.711	419.7	32 22 44.2	212 20 17.0	Horn	14568.4	4.163412
			101 13 01.6	281 12 00.1	Pascagoula	3312.8	3.520190
Pascagoula River Entrance Light B 1910	30 18 47.146	1451.8	264 38 06.5	84 41 28.4	Grand	10735.1	4.030807
	88 32 10.561	442.5	315 18 29.0	135 22 02.2	Petit	16089.3	4.206538
			33 08 38.0	213 06 41.5	Horn	11293.1	4.052612
Pascagoula River Entrance Light A 1910	30 17 11.454	352.7	244 17 17.0	64 19 51.9	Grand	9100.4	3.959061
	88 30 43.402	1159.9	313 54 25.0	133 57 11.2	Petit	12247.5	4.088049
			53 05 48.1	233 02 59.8	Horn	10836.9	4.034905
Horn Island L. H. 1910	30 13 22.194	683.4	153 57 06.0	333 55 01.4	Pascagoula	15027.2	4.176877
	88 29 10.309	275.7	207 25 48.0	27 27 35.8	Grand	12400.2	4.093427
			282 46 18.4	102 48 17.6	Petit	6494.8	3.812564
Wet 1910	30 12 42.864	1319.9	159 35 04.3	339 33 20.9	Pascagoula	15697.2	4.195822
	88 29 52.365	1400.6	209 13 37.6	29 15 46.6	Grand	14000.1	4.140131
			271 43 13.9	91 45 34.2	Petit	7462.3	3.872872
Lot 1910	30 13 15.412	474.6	97 10 27.5	277 08 33.9	Horn	6078.5	3.783793
	88 32 21.930	586.5	173 50 03.7	353 49 35.7	Pascagoula	13787.5	4.139484
			223 59 38.4	44 03 02.8	Grand	15594.3	4.192966
		276 05 28.0	96 09 03.6	Petit	11524.2	4.061611	
Round Island L. H. 1910	30 17 30.451	937.7	299 33 58.5	119 38 59.7	Petit	18382.3	4.264400
	88 35 11.285	301.6	11 57 11.1	191 56 42.8	Horn	7252.9	3.860514
			71 24 56.8	251 20 58.1	Club	13356.8	4.125701
			113 25 25.8	293 21 21.7	Belle	14070.4	4.148306
Ned 1910	30 17 57.045	1756.6	8 36 39.6	188 36 17.0	Horn	8004.8	3.903353
	88 35 22.640	605.0	110 44 25.3	290 40 26.9	Belle	13481.2	4.129729
			213 35 57.6	33 37 00.8	Pascagoula	6046.1	3.781475
Grave 1910	30 21 40.731	1254.2	283 18 12.0	103 20 40.0	Pascagoula	8038.3	3.905164
	88 38 10.253	273.9	326 57 45.3	146 59 10.0	Ned	8215.3	3.914623
			347 29 32.9	167 30 34.9	Horn	15161.9	4.180755
			33 20 50.9	213 18 22.3	Club	14327.0	4.156156
Scranton power house stack 1910	30 22 17.122	527.2	3 08 01.3	183 07 58.2	Pascagoula	2977.5	3.473853
	88 33 11.278	301.1	23 40 10.8	203 39 04.5	Ned	8743.5	3.941685
			82 01 51.8	261 59 20.7	Grave	8061.9	3.906435
Pascagoula River Entrance Light C 1910	30 20 24.282	747.7	16 21 25.5	196 20 16.6	Horn	12973.0	4.113040
	88 33 50.834	1357.8	28 25 06.7	208 24 20.4	Ned	5154.7	3.712207
			108 47 04.1	288 44 53.0	Grave	7317.4	3.864359
			240 41 42.9	60 41 59.8	Pascagoula	1024.9	3.010683
			316 11 38.5	136 15 59.4	Petit	19989.3	4.300797
Pascagoula River Entrance Light D 1910	30 20 36.890	1135.9	24 46 41.5	204 45 58.6	Ned	5420.9	3.734072
	88 33 57.617	1538.9	106 15 42.0	280 13 34.3	Grave	7027.7	3.846813
			263 58 35.8	83 58 56.1	Pascagoula	1080.9	3.033776
			316 34 50.8	136 39 15.1	Petit	20395.4	4.309532
Pascagoula River Entrance Light E 1910	30 20 47.006	1447.4	23 06 16.2	203 05 34.0	Ned	5689.7	3.755090
	88 33 59.086	1578.1	103 52 19.4	283 50 12.4	Grave	6908.8	3.839404
			280 04 48.3	100 05 09.3	Pascagoula	1131.6	3.053695
			317 05 44.1	137 10 09.1	Petit	20649.4	4.314907
Pascagoula River Front Range 1910	30 20 34.628	1066.3	23 17 10.1	203 16 30.7	Ned	5282.5	3.722841
	88 34 04.489	119.9	107 14 48.8	287 12 44.6	Grave	6872.0	3.837084
			261 43 17.2	81 43 41.0	Pascagoula	1271.7	3.104388
			316 04 21.7	136 08 49.4	Petit	20471.7	4.311154
Pascagoula River Rear Range 1910	30 20 57.770	1778.9	285 53 28.0	105 54 03.1	Pascagoula	1933.5	3.286340
	88 34 26.996	721.0	316 14 02.6	136 18 41.6	Petit	21402.1	4.330456
			14 57 33.9	194 57 05.8	Ned	5760.1	3.760432
			102 31 32.2	282 29 39.3	Grave	6107.4	3.785853
Scranton Water Tank 1910	30 22 03.536	108.9	322 08 57.7	142 13 13.9	Petit	22140.8	4.345193
	88 33 41.441	1106.6	345 52 32.9	165 52 45.0	Pascagoula	2634.3	3.420668
			19 36 38.5	199 35 47.4	Ned	8057.2	3.906183
			84 25 53.9	204 23 38.0	Grave	7212.6	3.858090
Keeper's house, south chim- ney ¹ 1910	30 20 56.95	1753.7	291 16 44.2	111 17 08.7	Pascagoula	1389.4	3.142840
	88 34 05.85	156.2	20 19 34.3	200 18 55.6	Ned	5907.4	3.771398
Round Island North Spit Light 1910	30 19 34.738	1069.7	173 49 32.1	353 49 24.2	Grave	3902.3	3.591323
	88 37 54.535	1456.9	254 40 02.3	74 42 22.3	Pascagoula	7676.0	3.885136
			306 32 13.7	126 33 30.4	Ned	5051.7	3.703436
			345 18 38.4	165 19 32.4	Horn	11291.6	4.052756
Round Island South Spit Light 1910	30 15 36.283	1117.2	354 33 53.7	174 34 00.1	Horn	3596.4	3.555871
	88 36 20.198	539.9	86 04 11.1	266 00 47.2	Club	10843.5	4.035168
			120 26 33.0	309 23 03.8	Belle	14334.7	4.156389

¹ No check on this position.

Mississippi Sound and Lake Borgne—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Supplementary points—Con.</i>							
Cut 1910	30 14 01.332	41.0	152 57 11.3	332 55 45.3	Belle	<i>Meters</i> 13503.6	4.130450
	88 39 24.707	662.3	218 35 13.7	38 38 19.0	Pascagoula	15733.2	4.196817
			226 26 28.5	46 28 37.3	Round Island L. II.	9347.6	3.970701
Shoe 1910	30 14 06.142	189.1	79 20 36.9	259 20 22.0	Cut	636.1	2.803526
	88 38 55.336	1479.6	223 34 31.5	43 36 24.4	Round Island L. H.	8686.1	3.938826
			280 08 59.4	100 10 23.9	Horn	4560.5	3.659015
Dog 1910	30 15 16.953	522.0	87 44 53.9	267 43 12.2	Ship	5402.8	3.732618
	88 47 48.090	1285.6	216 58 47.4	37 01 05.3	Belle	12141.2	4.084261
			271 08 25.3	91 10 48.0	Club	7573.6	3.879303
Island House, south gable 1910	30 23 22.908	705.4	312 38 06.1	132 38 46.3	Bill	2890.6	3.460955
	88 48 32.120	857.5	4 07 42.4	184 07 37.5	Deer	3572.0	3.552906
			39 43 01.5	219 42 27.1	Ox	2940.2	3.453354
			40 01 58.7	220 01 52.4	Marsh	511.5	2.708860
Greenhouse, chimney 1910	30 23 50.353	1550.5	354 01 46.0	174 01 48.4	Marsh	1243.5	3.094653
	88 48 49.289	1315.8	357 23 04.3	177 23 08.1	Deer	4412.4	3.644675
			24 07 02.8	204 06 37.1	Ox	3319.7	3.521097
Camp, oyster watchman's shack ¹ 1910	30 22 32.19	991.2	274 47 38.9	94 49 08.2	Bill	4731.3	3.674978
	88 50 09.05	241.6	308 51 55.8	128 52 10.5	Ox	903.2	2.997033
Ocean Springs hotel, north- western end of ridge piece on roof 1910	30 24 21.274	655.1	323 08 31.6	143 09 02.7	Marsh	2735.6	3.437052
	88 49 45.906	1225.3	342 16 22.1	162 16 54.6	Deer	5027.0	3.750278
			357 45 57.5	177 46 00.5	Ox	3985.2	3.600449
			90 36 06.0	270 35 09.1	Cad	3004.9	3.477826
Biloxi stack 1910	30 23 25.632	780.3	215 25 37.0	35 26 06.9	Plum	2720.0	3.434576
	88 51 25.541	681.9	276 17 63.7	96 19 15.2	Marsh	4327.1	3.630195
			286 47 52.8	106 50 00.8	Bill	7058.4	3.848706
			308 51 15.4	128 52 08.8	Ox	3615.9	3.558216
Grinding mill stack, sky scraper 1910	30 23 24.603	757.6	215 40 07.5	35 40 38.1	Plum	2707.3	3.442050
	88 51 26.922	718.7	275 49 52.0	95 51 14.2	Marsh	4360.4	3.639526
			280 27 58.8	106 30 07.5	Bill	7084.6	3.850318
			308 05 54.8	128 06 48.9	Ox	3625.0	3.559314
Stack, second largest ¹ 1910	30 23 29.02	893.6	276 33 56.3	96 35 31.6	Marsh	5061.8	3.704303
	88 51 52.80	1409.6	285 58 56.4	106 01 18.2	Bill	7785.9	3.891307
Eastern cupola 1910	30 23 31.451	968.5	219 06 41.0	39 07 13.3	Plum	2825.6	3.419234
	88 51 28.524	761.5	278 29 21.2	98 30 44.2	Marsh	4429.1	3.646319
			287 58 53.3	108 01 02.8	Bill	7188.0	3.858606
			310 12 27.3	130 13 22.2	Ox	3791.4	3.578796
Western cupola 1910	30 23 31.268	962.8	219 16 29.1	39 17 00.8	Plum	2639.0	3.421444
	88 51 20.059	775.8	278 23 23.6	98 24 46.9	Marsh	4442.4	3.647619
			287 54 12.9	107 56 22.7	Bill	7199.8	3.857320
			310 00 12.9	130 01 08.1	Ox	3798.6	3.579629
Center light on railroad bridge 1910	30 24 30.028	924.7	76 28 00.2	256 27 41.4	Cad	1018.7	3.008055
	88 51 01.367	36.5	120 29 29.1	300 28 40.1	Can	2994.5	3.476324
			170 18 49.4	350 18 43.8	Fort	1747.2	3.242354
			255 56 00.9	75 56 18.5	Plum	960.3	2.982403
Ice-factory stack 1910	30 24 42.042	1294.6	72 09 08.4	252 08 32.6	Cad	1984.4	3.297637
	88 50 27.700	739.5	90 54 33.1	270 53 23.0	Barn	3696.4	3.567775
			108 17 21.2	288 16 15.2	Can	3663.8	3.563933
			138 36 03.8	318 35 41.2	Fort	1803.0	3.255993
Chimney on large house 1910	30 24 58.847	1812.1	56 21 50.3	236 21 18.2	Cad	2032.3	3.307989
	88 50 35.083	936.4	82 31 42.1	262 30 35.7	Barn	3529.0	3.547652
			100 54 13.2	280 53 10.9	Can	3342.2	3.524033
North chimney 1910	30 25 40.012	1232.1	35 22 50.3	215 22 17.7	Cad	2973.2	3.473221
	88 50 33.980	906.8	63 31 32.1	243 30 25.2	Barn	3941.8	3.595699
			65 40 09.7	245 39 50.3	Fort	1124.8	3.051075
			78 37 30.5	258 36 27.7	Can	3377.7	3.528615
Fireplace chimney 1910	30 25 48.143	1482.5	40 51 10.0	220 50 58.8	Fort	903.0	2.955696
	88 50 50.250	1341.0	57 25 27.3	237 24 28.6	Barn	3071.9	3.564886
			72 53 09.8	252 52 15.2	Can	3010.4	3.478621
East chimney 1910	30 25 29.086	895.7	273 28 43.0	93 29 13.0	Fort	1683.9	3.199718
	88 52 11.622	310.2	299 27 06.6	119 27 59.8	Plum	3223.2	3.508290
			336 43 27.4	156 43 44.2	Cad	2239.2	3.350090
Light on road bridge, center of turntable ¹ 1910	30 25 13.46	414.5	262 19 37.7	82 20 03.3	Can	1362.0	3.134193
	88 53 28.63	764.1	308 44 46.8	128 45 08.3	Barn	1452.9	3.162239
North gable, galvanized- iron roof ¹ 1910	30 24 43.95	1353.4	229 42 42.9	49 43 07.3	Can	1686.4	3.226971
	88 53 26.26	700.9	250 05 14.0	70 06 21.8	Fort	3799.9	3.579776
Sawmill stack 1910	30 24 43.371	1335.5	104 23 38.4	344 23 38.3	Barn	17.8	1.249508
	88 52 45.999	1227.8	190 49 50.7	10 49 54.7	Can	1128.4	3.052455
			242 17 54.4	62 18 41.8	Fort	2821.8	3.450528

¹ No check on this position.

Mississippi Sound and Lake Borgne—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Supplementary points—Con.</i>							
	° ' "		° ' "	° ' "		<i>Meters</i>	
Fertilizer-factory cupola 1910	30 24 51.158 88 52 42.409	1575.3 1131.9	187 37 23.8 245 57 17.8 297 30 49.6	7 37 26.0 65 58 03.4 117 31 22.0	Can Fort Cad	876.2 2630.9 1924.3	2.942626 3.420102 3.284262
Planing-mill stack 1910	30 24 41.670 88 52 38.843	1283.2 1036.8	181 02 23.1 239 24 33.2 272 01 08.0	1 02 23.5 59 25 17.0 92 02 15.0	Can Fort Plum	1160.8 2680.5 3535.4	3.064774 3.428210 3.548443
Small leaning stack 1910	30 24 41.671 88 52 37.665	1283.2 1005.3	106 59 48.9 179 29 15.0 239 03 52.0	286 59 44.6 359 29 14.8 59 04 35.2	Barn Can Fort	237.6 1160.7 2653.4	2.375832 3.064707 3.423808
Stack, in operation 1910	30 24 37.090 88 52 37.855	1142.1 1010.4	133 27 48.7 179 45 57.5 236 34 51.6	313 27 44.5 359 45 57.4 56 35 34.9	Barn Can Fort	306.1 1301.7 2732.9	2.485820 3.114517 3.436619
Stack near water tower ¹ 1910	30 23 55.40 88 53 11.65	1705.9 311.0	198 07 26.3 228 46 15.4	19 07 43.3 48 47 15.8	Can Fort	2736.7 4232.1	3.437223 3.625559
Biloxi water tower 1910	30 23 55.507 88 53 10.818	1709.2 288.8	314 50 19.9 348 42 49.1 70 42 21.4	134 55 25.8 168 43 50.1 250 41 54.0	Club Ship Biloxi L. H.	22846.0 16499.9 1499.1	4.358810 4.217482 3.175828
Cook 1910	30 14 31.144 88 53 14.846	959.0 396.9	66 41 58.7 175 34 18.9 235 15 19.2 250 15 32.2	246 39 36.4 355 33 54.2 55 20 21.8 70 16 35.1	Ship Island L. H. Biloxi L. H. Belle Ship	8229.8 16933.6 19509.5 3545.3	3.915388 4.228748 4.290246 3.549650
Ship Island water tank 1910	30 13 43.257 88 53 44.892	1332.0 1200.5	75 13 39.4 178 25 23.7 209 32 01.7 233 11 47.7 237 09 33.6 260 53 07.9	255 11 32.2 358 25 14.1 29 34 34.6 53 17 05.4 57 10 51.6 80 58 30.2	Ship Island L. H. Biloxi L. H. Deer Belle Ship Club	6985.9 18364.4 16423.3 21023.5 4927.7 17329.6	3.844225 3.263977 4.215460 4.322706 3.692643 4.238789
East Ballast Ground bea- con, B G ¹ 1910	30 13 13.36 88 55 07.62	411.4 203.8	79 15 30.1 231 31 58.3	259 14 04.6 51 32 55.1	Ship Island L. H. Cook	4623.4 3851.2	3.664960 3.585591
West Ballast Ground bea- con, B G ¹ 1910	30 13 11.15 88 56 22.62	343.3 604.9	72 36 44.3 243 51 16.5	252 35 56.6 63 52 51.1	Ship Island L. H. Cook	2658.1 5592.7	3.424575 3.747621
Chandeleur L. H. 1910	30 02 52.412 88 52 17.910	1613.8 479.8	153 33 31.0 184 34 06.2 212 58 58.7	333 30 40.5 4 34 40.3 33 03 36.5	Ship Island L. H. Ship Club	20394.6 22784.8 27159.7	4.309515 4.357045 4.433925
Biloxi Harbor Light, A 1910	30 22 28.692 88 54 05.971	883.5 159.4	181 30 38.3 282 18 43.2 340 47 59.0 354 41 21.0	1 30 39.3 102 21 27.1 160 49 27.8 174 41 46.7	Biloxi L. H. Deer Ship Cook	2178.7 8862.4 14302.6 14768.3	3.338190 3.947652 4.155414 4.169330
Biloxi Harbor Light, B 1910	30 23 04.087 88 54 04.854	125.9 129.6	181 27 09.5 289 03 03.2 342 14 43.0 355 09 40.9	1 27 10.0 109 05 46.6 162 16 11.3 175 10 06.1	Biloxi L. H. Deer Ship Cook	1088.4 9128.7 15326.9 15851.3	3.036774 3.960411 4.185455 4.200064
Biloxi Harbor Light, C 1910	30 23 11.830 88 54 03.022	364.3 80.7	178 33 50.9 290 33 37.8 342 41 07.3 355 24 24.6	358 33 50.4 110 36 20.2 162 42 34.6 175 24 48.8	Biloxi L. H. Deer Ship Cook	849.8 9163.5 15539.6 10084.9	2.929322 3.962063 4.191439 4.206418
Biloxi Harbor Light, D 1910	30 23 19.446 88 53 56.715	598.8 1514.1	162 51 32.9 292 19 04.8 343 31 36.8 356 03 48.6	342 51 29.3 112 21 44.0 163 33 01.0 176 04 09.7	Biloxi L. H. Deer Ship Cook	643.6 9092.5 15715.1 16300.3	2.808627 3.958683 4.196316 4.212356
Gulfport Channel Light, No. 2 1910	30 16 12.625 89 00 50.175	388.8 1341.1	218 14 38.9 277 02 43.7 284 21 57.1 324 06 09.6	38 18 04.1 97 07 36.1 104 25 46.5 144 07 36.5	Biloxi L. H. Ship Cook Ship Island L. H.	17524.6 15027.7 12567.1 7878.0	4.243647 4.193896 4.099234 3.896418
Gulfport Channel Light, No. 4 1910	30 16 50.724 89 01 29.929	1839.1 799.9	224 02 31.0 281 28 47.1 289 02 09.1 324 02 11.2	44 06 16.3 101 33 59.6 109 06 18.0 144 03 58.2	Biloxi L. H. Ship Cook Ship Island L. H.	17131.0 16910.8 14002.8 9675.9	4.233782 4.228163 4.146214 3.985691
Gulfport Channel Light, No. 6 1910	30 17 49.998 89 02 12.486	1539.6 333.7	230 27 50.3 293 02 25.8 323 58 29.2	50 31 57.2 113 06 56.8 144 00 37.7	Biloxi L. H. Cook Ship Island L. H.	16915.0 15621.0 11596.8	4.228273 4.193709 4.064338
Gulfport Channel Light, No. 8 1910	30 18 53.386 89 03 06.180	1643.9 165.1	238 39 31.8 297 01 20.8 323 55 02.4	58 44 05.9 117 06 19.0 143 57 38.0	Biloxi L. H. Cook Ship Island L. H.	16952.3 17748.1 14019.2	4.229228 4.249152 4.146724
Gulfport Channel Light, No. 10 1910	30 20 01.348 89 04 03.810	41.5 101.8	247 13 07.2 300 20 10.9 323 52 10.8	67 18 10.5 120 25 38.2 143 55 15.5	Biloxi L. H. Cook Ship Island L. H.	17372.4 20104.1 16617.2	4.239859 4.303285 4.220559
Gulfport powerhouse stack 1910	30 21 51.684 89 05 49.485	1591.5 1321.4	259 57 51.6 303 52 39.4 323 06 12.8	80 03 48.5 123 59 00.2 143 10 10.9	Biloxi L. H. Cook Ship Island L. H.	19130.9 24302.7 21027.3	4.281735 4.385054 4.322784

¹ No check on this position.

Mississippi Sound and Lake Borgne—Continued

Station	Latitude and longitude	Sec-onds in meters	Azimuth	Back azimuth	To station	Distance	Loga-rithm
<i>Supplementary points—Con.</i>							
Gulfport Southern Hotel cupola ¹ 1909	30 21 13.75	423.4	28 25 56	208 23 37	Cat Island L. H.	15514.4	4.190736
	89 05 05.10	136.3	51 42 08	231 37 10	Merrills Shell Bank L. H.	20124.3	4.303721
Jesuits' Rest cupola ¹ 1909	30 20 05.72	176.3	351 46 57	171 47 29	Cat Island L. H.	11670.6	4.067093
	89 10 43.72	1168.0	32 58 45	212 56 38	Merrills Shell Bank L. H.	12381.7	4.092781
Pass Christian Catholic church spire ¹ 1909	30 18 54.56	1680.2	319 18 51	139 21 23	Cat Island L. H.	12339.0	4.091281
	89 14 42.16	1126.5	2 32 47	182 32 40	Merrills Shell Bank L. H.	8205.5	3.914106
Bay St. Louis St. Stanislaus College, highest cupola 1909	30 18 23.261	716.3	297 33 17	117 38 21	Cat Island L. H.	18123.6	4.258244
	89 19 42.232	1128.4	313 21 18	133 23 43	Merrills Shell Bank L. H.	10532.7	4.022539
			25 23 34	205 20 40	Grand Island	21650.5	4.335467
Bay St. Louis Church, bell tower 1909	30 18 27.623	850.6	298 02 07	118 07 08	Cat Island L. H.	18123.7	4.258247
	89 19 39.588	1057.7	314 08 52	134 11 14	Merrills Shell Bank L. H.	10574.6	4.024262
			25 24 35	205 21 39	Grand Island	21802.1	4.338498
East 1909	30 09 01.451	44.7	156 05 28.8	330 04 04.8	Merrills Shell Bank L. H.	11011.6	4.041852
	89 12 08.886	237.8	203 53 48.5	23 55 02.7	Cat Island L. H.	9739.3	3.988526
			243 59 00.1	64 00 16.2	Pitre	4518.5	3.654990
West 1909	30 08 33.079	1018.6	161 51 33.3	341 50 25.9	Merrills Shell Bank L. H.	11512.3	4.061161
	89 12 41.740	1117.2	206 15 27.9	26 16 58.6	Cat Island L. H.	10903.5	4.037504
			239 57 54.1	59 59 26.7	Pitre	5705.8	3.756319
Shell 1909	30 10 07.196	221.6	187 50 46.3	7 51 04.1	Cat Island L. H.	6944.3	3.841628
	89 10 10.796	449.4	137 09 28.7	317 07 08.3	Merrills Shell Bank L. H.	10970.6	4.040229
Malheureux Point ¹ 1903	30 04 49.57	1528.5	226 33 20	46 35 09	Grand Island	7989.7	3.902531
	89 29 05.80	155.2	297 58 57	118 00 08	Bayou	4279.8	3.631425
			249 36 35.3	69 41 55.9	Merrills Shell Bank L. H.	18174.6	4.259465
St. Joseph Island Beacon 1909	30 11 03.135	96.5	359 00 39.2	179 00 41.2	Grand Island	6011.0	3.778947
	89 25 32.957	881.7	26 10 55.7	206 15 09.3	Malheureux Point 2	12821.7	4.107944
			74 02 08.1	253 59 19.3	Pearl River L. H.	9350.6	3.970841
Miss 1909	30 11 43.618	1343.1	344 15 46.2	164 16 24.6	Grand Island	7539.1	3.877319
	89 26 45.472	1216.3	16 20 11.7	196 19 01.7	Malheureux Point 2	13279.8	4.123190
			61 32 56.9	241 30 44.5	Pearl River L. H.	8017.9	3.904063
Heron 1909	30 10 38.159	1175.0	323 41 42.8	143 42 55.1	Grand Island	6502.7	3.813094
	89 27 52.917	1415.8	10 11 36.3	190 11 00.2	Malheureux Point 2	10900.5	4.037447
			71 00 26.4	250 58 47.9	Pearl River L. H.	5548.8	3.744041
Moon 1909	30 08 26.161	805.6	36 35 16.5	218 33 43.9	Malheureux Point 2	8298.3	3.918990
	89 26 00.255	6.8	105 18 36.0	285 16 01.0	Pearl River L. H.	8563.5	3.932649
			142 52 54.2	322 52 02.1	Lake Borgne L. H.	4597.4	3.662513
Half 1909	30 08 43.210	1330.5	43 02 11.0	223 00 05.2	Malheureux Point 2	9832.9	3.992682
	89 24 54.374	1455.3	99 50 08.8	279 47 00.6	Pearl River L. H.	10172.0	4.007405
			124 41 59.3	304 40 34.1	Lake Borgne L. H.	5518.5	3.741823
Pearl 1909	30 10 51.276	1578.9	276 53 47.4	90 55 51.8	Lake Borgne L. H.	6069.0	3.824060
	89 31 51.402	1375.2	298 51 39.8	118 54 51.8	Grand Island	11685.1	4.067631
			338 10 35.1	158 11 58.6	Malheureux Point 2	11091.0	4.078855
River 1909	30 10 58.856	1812.3	279 00 06.2	99 02 08.9	Lake Borgne L. H.	6010.1	3.820205
	89 31 47.900	1283.1	300 04 41.8	120 07 52.1	Grand Island	11719.7	4.068917
			338 59 15.0	159 00 36.9	Malheureux Point 2	12174.6	4.085456
Start 1909	30 09 05.242	161.4	34 59 22.3	214 57 39.2	Malheureux Point 2	9601.6	3.982343
	89 25 39.361	1053.4	96 50 32.5	276 47 47.0	Pearl River L. H.	8881.9	3.948506
			126 27 25.9	306 26 23.4	Lake Borgne L. H.	4144.5	3.617467
Pearl River Beacon B 1909	30 10 23.147	712.8	269 22 19.4	80 24 10.8	Lake Borgne L. H.	5928.3	3.772932
	89 31 25.509	682.4	296 35 10.2	116 38 09.2	Grand Island	10668.7	4.028111
			339 51 46.9	159 52 57.4	Malheureux Point 2	10934.1	4.038784
Dunbar factory lower stack 1909	30 10 59.593	1835.1	276 39 42	96 42 31	Lake Borgne L. H.	9065.9	3.958848
	89 33 21.618	578.2	294 59 02	115 03 00	Grand Island	13954.3	4.144708
			304 46 41	124 47 47	Pearl River L. H.	4323.1	3.635797
			328 52 54	148 55 03	Malheureux Point 2	13300.4	4.123866
Dunbar Church spire 1909	30 10 59.192	1822.7	276 45 04.8	96 47 50.3	Lake Borgne L. H.	8872.0	3.948021
	89 33 13.245	354.3	295 19 58.5	115 23 51.7	Grand Island	13746.3	4.138185
			306 24 36.2	126 25 38.7	Pearl River L. H.	4133.7	3.616340
			320 41 21.3	149 43 25.9	Malheureux Point 2	13175.3	4.119762

¹ No check on this position.

Mississippi Sound and Lake Borgne—Continued

Station	Latitude and longitude	Seconds in meters	Azimuth	Back azimuth	To station	Distance	Logarithm
<i>Supplementary points—Con.</i>							
	° ' "		° ' "	° ' "		<i>Meters</i>	
Rigolets Church spire 1909	30 08 50.153 89 38 39.216	1544.4 1049.5	262 46 57.0 295 40 17.6 333 30 42.8	82 50 43.2 115 45 05.7 153 33 18.6	Pearl River L. H. Malheureux Point 2 Biloxi Bayou	12145.7 17063.5 18687.5	4.084421 4.232068 4.271552
Rigolets factory highest stack 1909	30 08 50.730 89 38 32.160	1562.2 860.7	262 45 15.5 296 00 15.2 334 03 26.3	82 48 58.2 116 04 59.8 154 05 58.6	Pearl River L. H. Malheureux Point 2 Biloxi Bayou	11956.1 16901.3 18620.1	4.077589 4.227920 4.269682
L. & N. drawbridge, Pearl River center light 1909	30 11 40.061 89 32 03.572	1233.6 95.6	288 20 25.7 338 29 56.2 339 15 40.6	108 22 36.3 158 30 23.7 159 17 10.3	Lake Borgne L. H. Pearl River L. H. Malheureux Point 2	7318.1 3990.1 13509.0	3.864399 3.600983 4.130623
L. & N. drawbridge, Rigo- lets, center light 1909	30 09 14.741 89 37 53.172	453.9 1422.9	265 56 29.1 299 57 00.6 337 53 46.8	85 59 52.2 120 01 25.7 157 55 59.6	Pearl River L. H. Malheureux Point 2 Biloxi Bayou	10844.5 16326.3 18870.7	4.035211 4.212889 4.275789
Rabbitt Island Shoal Bea- con 1909	30 07 49.844 89 35 48.835	1534.9 1307.2	116 45 33.3 245 43 10.4 297 07 24.0	296 43 55.4 65 45 31.0 117 10 46.6	East Rigolets unused L. H. Pearl River L. H. Malheureux Point 2	5847.9 8217.1 12152.8	3.767002 3.914718 4.084676
Long Point L. H. 1909	30 08 50.469 89 35 38.332	1554.0 1025.8	258 09 19.6 305 06 45.0 348 14 00.4	78 11 35.0 125 10 02.4 168 15 05.6	Pearl River L. H. Malheureux Point 2 Biloxi Bayou	7366.0 12878.6 17097.5	3.867233 4.109870 4.232932

For the convenience of the draftsman in coordinating the old triangulation with the new, there are here given the latitudes and longitudes only of a number of points, which were established between the years 1846 and 1874, and which are now lost.

Station	Latitude and longitude	Seconds in meters	Station	Latitude and longitude	Seconds in meters
East Gulf Shore 1848	30 14 08.66 87 43 00.73	266.7 19.5	Apalacha River 1848	30 39 46.73 87 57 19.92	1439.0 530.4
East Gulf Shore, 1868 1868	30 14 32.23 87 43 18.25	992.4 488.0	Little Point Clear 2 1846	30 15 27.37 87 57 01.51	842.8 40.4
Bon Secours Harbor 1849	30 17 44.78 87 45 42.25	1378.9 1129.1	Upper Tensaw 1848	30 44 40.98 87 57 33.00	1262.0 877.8
New Bon Secours Harbor 1848	30 17 45.33 87 45 42.46	1395.8 1134.7	Azimuth 1 1847	30 13 50.53 87 57 36.72	1555.9 982.0
West Gulf Shore 1849	30 13 47.96 87 48 17.34	1476.8 463.7	Mobile Beach 1846	30 13 50.15 87 57 37.45	1544.2 1001.5
West Gulf Shore, 1869 1869	30 13 47.89 87 48 17.33	1474.6 463.4	Navy Cove 1846	30 14 39.81 87 57 45.17	1225.8 1207.7
Cypress Point 1840	30 19 57.43 87 48 35.24	1768.4 941.4	Middle Tensaw 1848	30 43 06.66 87 58 40.97	205.1 1090.0
Shell Bank Bayou 1849	30 15 07.76 87 49 41.07	239.0 1097.9	Tensaw River 1848	30 41 29.50 87 59 34.63	908.5 921.6
Azimuth 3 1847	30 13 40.21 87 50 25.79	1238.2 689.7	Crab Creek 1848	30 42 57.06 87 59 55.00	1757.2 1463.6
Fish River 1848	30 22 52.97 87 51 39.25	1631.1 1048.0	Beach A 1847	30 13 28.98 88 00 38.69	882.4 1032.0
Oyster Cove 1848	30 14 19.82 87 52 31.54	610.3 843.3	Spanish River 1848	30 43 26.26 88 01 01.82	808.7 48.4
Alabama City 1848	30 31 48.30 87 54 26.41	1487.3 704.1	Mobile Point L. H., 1868 1868	30 13 39.43 88 01 27.17	1214.1 726.6
Azimuth 2 1847	30 13 52.04 87 54 35.43	1602.5 947.5	Mobile Point 1847	30 13 18.73 88 01 21.90	570.7 585.6
Blakely 1848	30 44 10.04 87 55 51.30	309.1 1364.6	Mobile Point L. H., 1846-47 1846	30 13 39.59 88 01 26.70	1219.1 714.0
Minetta Bay 1848	30 42 22.96 87 55 56.95	707.1 1515.4	Mobile River 1848	30 46 14.81 88 01 38.15	456.1 1014.6
Little Point Clear 1846	30 15 44.86 87 56 05.24	1351.3 140.1	Opposite Mobile Island 1848	30 41 56.58 88 02 05.25	1742.4 139.7
Middle Apalacha 1848	30 42 44.87 87 56 28.41	1381.8 750.0	Opposite Chickasaw Bayou 1848	30 44 20.81 88 02 20.62	640.8 548.5

Station	Latitude and longitude	Seconds in meters	Station	Latitude and longitude	Seconds in meters
St. Louis Point 1848	° ' '' 30 43 58.59 88 02 45.00	1804.3 1197.2	Round Island L. H. 1855	° ' '' 30 17 24.51 88 35 07.55	754.7 201.8
Barton Academy, Mobile 1848	30 41 17.65 88 02 51.39	543.5 1367.7	Round Island 1846	30 17 58.17 88 35 23.98	1791.2 640.8
Sand Island L. H., 1868 1868	30 11 11.47 88 02 52.95	353.2 1416.5	Horn Island 1 1847	30 13 40.76 88 36 08.42	1255.1 225.2
Sand Island L. H., 1846-47 1846	30 11 11.63 88 02 56.41	358.1 1509.0	Bayou Graveline 1846	30 21 38.18 88 38 10.55	1175.7 281.7
Garrows Bend 1848	30 39 00.93 88 03 42.92	28.6 1142.7	Horn Island 2 1847	30 14 08.55 88 38 54.94	263.3 1469.1
East Dauphin Island 1846	30 14 53.80 88 04 27.77	1656.6 742.3	Monks Point 1851	30 20 56.07 88 45 00.50	1726.6 13.4
East Dauphin Island 2 1847	30 14 50.15 88 04 31.45	1544.2 840.9	Marsh Point 1850	30 23 00.85 88 48 15.06	26.2 402.0
Deer River Point 1848	30 32 19.11 88 04 52.44	588.5 1397.8	Deer Island east 1850	30 21 25.05 88 48 35.86	771.4 957.6
Pelican Island 1868 1868	30 13 12.40 88 05 51.03	381.8 1364.6	Deer Island middle 1850	30 21 30.34 88 49 01.94	934.3 51.8
Pelican Island 1846	30 13 13.94 88 05 51.65	429.2 1381.2	Deer Island 1846	30 21 30.85 88 49 03.88	950.0 103.6
Little Dauphin Island 1846	30 16 47.73 88 07 03.98	1469.7 106.4	Plummer 1851	30 24 45.98 88 50 28.94	1415.9 772.3
Grants Pass 1846	30 17 35.56 88 08 02.72	1095.0 72.7	Point Cadde 1851	30 24 17.74 88 51 32.22	546.3 860.0
Johns House 1846	30 18 38.56 88 08 03.73	1187.4 99.7	Ship Island east 1846	30 14 41.61 88 51 32.99	1281.3 882.1
Camp Dauphin 1846	30 14 50.52 88 08 07.55	1555.7 201.9	Chandeleur L. H. 1855	30 03 01.74 88 52 35.73	53.6 957.2
Grants Light 1846	30 17 31.22 88 08 27.35	961.4 730.9	Jolis Point 1851	30 25 18.49 88 52 38.56	569.4 1029.1
Pass Baron 1846	30 19 14.22 88 10 48.89	437.9 1306.0	Rhodes Ship Yard 1851	30 24 42.54 88 52 40.02	1309.9 1068.2
Murder Point 1846	30 20 17.95 88 11 53.67	552.7 1433.5	Ship Island Main 1851 1851	30 14 28.90 88 53 19.06	889.9 509.6
Bayou Coq d'Inde 1846	30 22 16.39 88 14 02.11	504.7 56.3	Biloxi Pier 1846	30 22 53.02 88 53 52.58	1632.7 1403.9
Marsh Island 1846	30 19 18.03 88 15 23.33	555.2 623.2	Point Pierre 1851	30 25 43.98 88 54 43.44	1354.2 1159.3
Petit Bois east 1846	30 13 55.24 88 17 11.30	1701.0 302.2	Point Blanc 1851	30 25 15.39 88 54 45.74	473.9 1220.7
Petit Bois west 1846	30 12 10.49 88 27 13.34	323.0 358.8	Harvey 1851	30 24 59.92 88 56 39.10	1845.1 1043.7
East Grand Bay 1846	30 24 07.34 88 20 30.93	226.0 825.6	Marsh Island 1850	30 25 19.27 88 56 46.10	593.4 1230.3
Bayou La Fourche 1846	30 23 12.29 88 21 55.04	378.4 1469.3	Montgomery 1851	30 23 30.02 88 57 52.62	924.4 1404.7
East Grand Batture 1846	30 20 53.47 88 23 24.85	1646.5 663.7	Fowler 1851	30 24 53.24 88 58 15.69	1639.4 418.8
West Grand Bay 1846	30 21 57.92 88 24 42.91	1783.5 1145.9	Hawley 1851	30 25 27.50 88 58 29.07	846.8 775.8
Point aux Chenes 1846	30 18 59.11 88 28 59.84	1820.1 1598.7	Saw Mill 1850	30 26 05.72 88 59 26.64	176.1 710.9
Beeble 1846	30 20 16.97 88 30 28.53	522.5 702.0	Bernards Bayou 1850	30 24 50.02 89 00 08.08	1725.0 215.7
Horn Island Pass L. H. 1840	30 13 17.83 88 30 58.09	549.0 1553.4	Point Blanc 1852	30 21 21.53 89 06 53.63	663.0 1432.2
Little Bayou Casotte 1840	30 20 25.53 88 31 19.47	786.1 520.0	Cuevas Tree 1846	30 13 54.96 89 07 11.10	1692.3 296.8
Horn Island east 1847 1847	30 13 15.19 88 31 56.45	467.7 1509.6	Pitcher Point 1 1852	30 19 56.15 89 10 53.98	1729.0 1441.9
Ship Yard 1846	30 20 39.20 88 33 37.85	1207.1 1011.0	Pass Christian 1850	30 18 24.08 89 16 06.31	741.2 168.6
East Pascagoula River L. H. 1855	30 20 56.98 88 34 05.90	1764.6 157.6	Merrills Coquille 1850	30 13 39.57 89 16 50.46	1218.4 1349.4

Station	Latitude and longitude	Seconds in meters	Station	Latitude and longitude	Seconds in meters
Delectable Point 1851	30 19 31.33 89 17 32.20	964.7 860.2	St. Josephs Island L. H. 1857	30 11 03.27 89 25 31.20	100.7 834.6
Hendersons Point 1850	30 18 18.59 89 17 35.31	572.4 943.4	Heron 1856	30 10 21.55 89 27 42.59	663.6 1139.5
Cedar Hammock 1850	30 21 59.81 89 17 58.48	1841.7 1581.7	Lower Point Clear. 1852	30 10 20.65 89 27 46.38	635.9 1240.9
Cowards Point 1850	30 20 13.20 89 19 56.56	406.5 1510.7	Gull 1856	30 07 23.34 89 27 50.86	718.7 1602.5
Shieldsboro 1850	30 17 51.18 89 20 13.14	1576.0 351.2	Grassy Island 1852	30 07 12.98 89 28 08.58	399.7 229.7
St. Louis Bay 1850	30 21 48.88 89 21 25.65	1505.2 685.0	Mouth of Pearl River 1852	30 11 03.06 89 31 28.14	94.2 752.8
Fisher 1856	30 11 10.21 89 25 28.40	314.4 759.7	Pearl River Island 1852	30 10 01.32 89 34 19.11	40.6 511.3
St. Josephs Island 1852	30 11 10.21 89 25 27.97	314.4 748.2	Claiborne 1852	30 13 15.16 89 34 30.19	466.8 807.3

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 these 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. All distances to reference marks are horizontal unless otherwise stated.

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

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

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

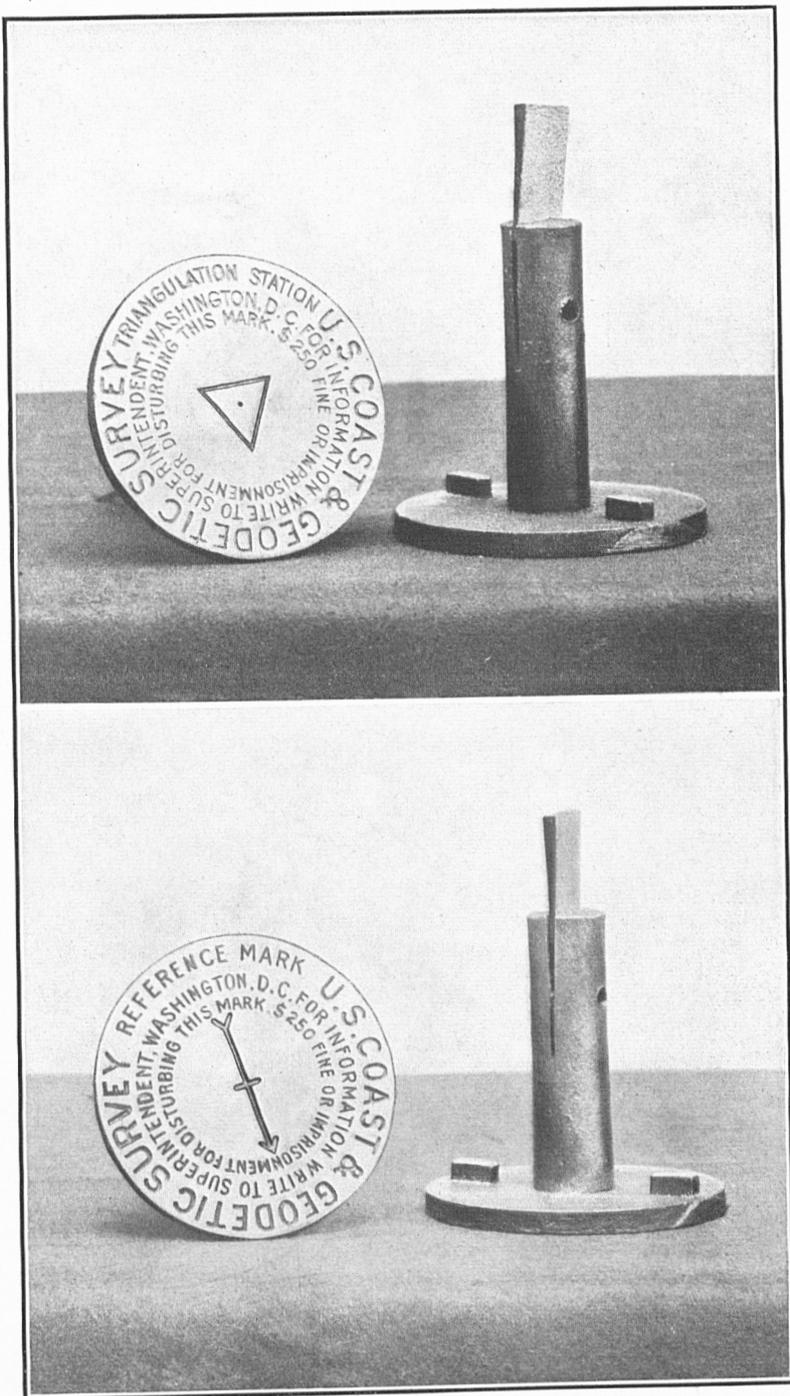
MARKING OF STATIONS.

The standard triangulation disk station mark referred to in the following notes and descriptions consists of a disk and shank, as shown in illustration No. 1, made of brass and cast in one piece. The disk is 90 millimeters in diameter, with a small hole at the center surrounded by a 20-millimeter equilateral triangle, and has the following inscription: "U. S. Coast and Geodetic Survey triangulation station. For information write to Superintendent, Washington, D. C. \$250 fine or imprisonment for disturbing this mark." The shank is 25 millimeters in diameter and 80 millimeters long, with a slit at the lower end, into which a wedge is inserted when it is driven into a drill hole in the rock so that it will bulge at the bottom and hold the mark securely in place.

GENERAL NOTES IN REGARD TO STATION AND REFERENCE MARKS.

NOTE 1.—The surface mark is a cross cut on a granite post 5 by 5 inches square, buried with the top covered with earth and rock. The letters U. S. C. S. are also cut on the post. The reference marks are four similar granite posts with lines cut diagonally, the intersection of which is 6 feet from the center. Arrowheads are also cut on one line of each post and point to the center, and are due north, south, east, and west of the station. The underground mark is a glass bottle filled with ashes, buried neck downward to a depth of about 3 feet.

NOTE 2.—The surface mark is a cross cut on a granite post 5 by 5 inches square, buried with the top projecting above the ground. The letters U. S. C. S. are also cut on the post. The reference marks are four similar granite posts with



STANDARD TRIANGULATION STATION AND REFERENCE MARKS.

lines cut diagonally, the intersection of which is 6 feet from the center of the station. Arrowheads are also cut on one line of each post and point to the center of the station, and are due north, south, east, and west of the station. The underground mark is a cross on a copper bolt driven in a hole drilled in solid rock about 2 feet below the surface of the ground.

NOTE 3.—The station is marked by an irregular-shaped limestone, measuring approximately 2 by 2 feet and weighing 500 or 600 pounds. The top of the rock is 8 or 9 inches below the surface, and in it a three-fourths-inch hole is drilled 6 inches deep in the center of a triangle, marking the center of the station. The underground mark is a 1-gallon jug, 6 by 11 inches, buried mouth upward 2 or 3 feet below the surface of the ground, the center of the mouth of the jug marking the center of the station.

NOTE 4.—The station is marked by a Bedford stone post $2\frac{1}{2}$ feet long and dressed 6 inches square. The top of the post is even with the surface of the ground, and on it are cut two perpendicular lines and the letters U. S. C. & G. S. The intersection of the cross lines marks the station. The underground mark is a 1-gallon jug, buried bottom upward with a small hole in the center, 3 feet below the surface of the ground.

NOTE 5.—The station is marked by two terra-cotta pipes, 2 feet long and 4 inches in diameter, placed vertically one above the other with the larger ends down, and sunk in the ground so that the top of the upper pipe sticks 3 inches above the surface of the marsh.

NOTE 6.—The station is marked by a terra-cotta pipe, $2\frac{1}{2}$ feet long and 4 inches in diameter, cemented in the ground. About 3 inches of the pipe projects above the ground.

NOTE 7.—The station is marked by a tenpenny nail cemented head up into the concrete cap over the piling.

NOTE 8.—The station is marked by a twentypenny nail cemented point up into the concrete cap over the piling.

NOTE 9.—The station is marked by two forty penny nails cemented heads up into the concrete cap over the piling.

NOTE 10.—The surface mark is a standard disk station mark embedded in a core of concrete about 2 feet in diameter. The underground mark is a bottle embedded in a core of concrete $2\frac{1}{2}$ feet below the surface.

NOTE 11.—The surface mark is a 2-inch iron pipe, 16 feet long, set vertically in a core of concrete with 4 feet projecting above the ground.

NOTE 12.—The surface mark is a bottle embedded in a core of concrete, flush with the surface. The underground mark is a bottle embedded in a core of concrete, directly under the surface mark, and $2\frac{1}{2}$ feet below the surface. This type of marking was used chiefly as a reference mark and should not be confused with the station mark.

NOTE 13.—The station is marked by a copper nail in the top of a 4-inch or 6-inch tile which is filled and surrounded with concrete and projects a few inches above the ground. The underground mark is the center of the mouth of a small earthen jug which is filled with cement or is the center of the mouth of a bottle set in cement. Four reference posts, with a copper nail in the top of each, are each 4 feet from the station, north, east, south, and west, respectively.

NOTE 14.—The surface mark is a round concrete post in the top of which is set a standard disk station mark. The underground mark is a bottle set in concrete 3 feet below the surface.

NOTE 15.—The surface mark is a round concrete post with a bottle embedded in the center flush with the top. No underground mark was used. This type of marking was used chiefly as a reference mark.

NOTE 16.—The surface mark is a square concrete post with diagonal lines on top or with a bottle or a copper nail embedded in it flush with the surface. No underground mark was used. This type of marking was used chiefly as a reference mark.

NOTE 17.—The surface mark is a concrete post finished square above the surface of the ground with a standard disk station mark set in the top. The underground mark is a bottle set in concrete 3 feet below the ground.

OBLIQUE ARC.

PRINCIPAL POINTS.

Indian (Cherokee County, Ala., F. P. W., 1875; 1885).—On the highest part of Indian Mountain, about $1\frac{1}{2}$ miles west of Georgia and Alabama State line, about $4\frac{1}{2}$ miles from Priors station, Georgia, and about 2 miles north of Tecumseh station, Alabama, on the Southern Railway. The station was marked by a cross on a copper bolt driven in a hole drilled in solid rock 2 feet 1 inch below the surface of the ground. The surface mark is a cross cut on a granite post 5 by 5 inches square buried with the top covered with earth and rock. The letters U. S. C. S. are also cut on the post. The reference marks are four similar granite posts with lines cut diagonally, the intersection of which is 6 feet from the center. Arrowheads are also cut on one line of each post and point to the center and are due north, south, east, and west of the station. In 1885 the central and west stones were found in place but their tops were chipped off. The north and east stones had been removed and broken up. A hole about three-fourths inch deep was drilled in the outcropping ledge of rock to the northeast, distant 19.97 feet from the center, and a cross was cut on the ledge to the eastward, distant 16.75 feet from the center.

Gulf Point (Walker County, Ga., F. P. W., 1875).—On the highest part of Lookout Mountain, at the head of McLamores Cove. The nearest post office is Valley Head, DeKalb County, Ala., on the Alabama Great Southern Railroad, 40 miles from Chattanooga, Tenn. The mountain is accessible from three different places, namely, Chattanooga, Tenn.; Summerville, Chattooga County, Ga., distant about 15 miles; and Valley Head, Ala., distant about 12 miles. The best approach is from Valley Head. Take the road leading up Winstons Gap to the top of the mountain, then take the road leading to McLamores Cove as far as the residence of M. J. Kington, distant about 6 miles from Valley Head, then take the road to Mr. Wither's house via the old Buffington place, which is in sight of the station. There are three springs, one south, one west, one northwest, all within one-half mile of the station. The station derives its name from a

large cove in the mountain south of the station called the Gulf by the settlers of the mountain. The station was marked according to note 2.¹

Brandon (De Kalb County, Ala., F. P. W., 1875).—On the highest part of Lookout Mountain, near Collbran station on the Alabama Great Southern Railroad, 57 miles from Chattanooga, Tenn., in section 36, township 7 south, range 8 east, Huntsville Meridian. When the station was established the nearest post office was Brandon, distant about 3 miles. There are two springs south of the station about one-half mile and one spring west of the station about one-fourth mile. The station was marked according to note 2¹ except that a stone jug was buried instead of setting a copper bolt.

Aurora (Etowah County, Ala., F. P. W., 1877; 1886).—On the highest part of Sand Mountain at the head of Bristoe's Cove, about 1 mile east of where the main road from Gadsden to Guntersville reaches the summit of the mountain and about 15 miles from Attalla, Ala., on the Alabama Great Southern Railroad. Aurora, with rural free delivery from Boaz, is about 3 miles distant. There is a spring about one-half mile northeast of the station. The station is marked according to note 1.¹ In 1886 the east stone was found lying on the ground. The other three stones were found in place but their tops had been broken off so as to destroy all the diagonal lines and letters. The east stone was restored to its former place.

Gunter (Marshall County, Ala., F. D. G. 1877; 1900). On a ridge near the center of Gunter Mountain, in township 5 south, range 4 east, Huntsville meridian, about 2 miles west and south of Jackson County line, and about one-fourth mile east and north of Woodville and Guntersville road, about 3 miles west of Dodsonville. About 1½ miles north 75° east from main roads crossing at Swearingin (Wright's store), one-fourth mile north 85° east from Prospect Church (Missionary Baptist), 350 feet south 70° east from the Carlisle and Henderson road to Salt Peter Cave or Lim Rock, from a point 1170 feet east from where it leaves the Scottsboro road; said fork is about 4800 feet north 70° east from road crossing at Swearingin. The station is located on the land of Luvenie Gideon, on top of a gently rounded hill covered with a dense growth of brush and small timber. The station was marked according to note 1.¹ In 1900 the top of the center stone over the station marked U. S. C. S. was one-half inch above the surface of the ground; the tops of the reference stones were about 4 inches above the surface of the ground. On December 3, 1900, a square mortise three-fourths inch on a side was cut to a depth even with the bottom of cross in the southwest quarter of the cross in each of the five stones and taken as a precise level bench mark.

Summit (Blount County, Ala., F. D. G., 1877; 1878). On a knob about 1 mile north and east of the town of Summit, about 41½ miles from Huntsville, Ala., via Whitesburg and Oleander, about 27 miles from Blountsville, and about 20 miles from Guntersville. The station is marked according to note 1.¹

Rowe (Madison County, Ala., F. D. G., 1877; 1907). On the south end and highest part of a long ridge called Rowes Mountain, in section 3, township 6 south, range 1 east, Huntsville meridian. About one-fourth mile north of the station is a house occupied by Mr. J. B. Stogner; about one-fourth mile northeast there is a pond of water, and at or near Mr. Stogner's there is a spring. The station is marked according to note 1.¹ In 1907 the station mark was found in good condition. The surface mark and the south and west reference marks were found with the tops broken off, while the north and east reference marks were found in good condition. The surface mark was taken up and reset with top projecting 3 inches above the ground. Cross lines were cut on top and the intersection marks the center.

Wilson (Morgan County, Ala., F. P. W. 1877; 1878). On the highest part of Wilson Mountain, at the northwest end of a long ridge, one-fourth mile west of Wilson Gap, 5 miles south-southwest of Somerville, and about 10 miles east-southeast of Hartsells, a railroad and telegraph station on the Louisville & Nashville Railroad. There is a spring on the Blountsville road about one-fourth mile east of the station. The station was marked according to note 1,¹ except that the reference marks are 5 feet from the center instead of 6 feet.

Wornock (Blount County, Ala., C. O. B., 1878). On the highest part of Wornocks Knob, on the northwest part of the mountain between 4 and 5 miles east of Bangor, a small station on the Louisville & Nashville Railroad, about 1½ miles northeast of Mr. Ratliff's house at the foot of the mountain. There is a spring about one-half mile south of the station. The station is marked according to note 1.¹

Cahaba (St. Clair County, Ala., O. H. T., 1886). On the highest part of the ridge, in a cultivated field about 4 miles west of Springfield. A small orchard about one-half mile north of the station is the southeast quarter of the southwest quarter of section 3, township 15, range 1 east. There is another point about as high 200 yards in a south-westerly direction. The station mark is the center of the mouth of a beer bottle, filled with ashes and set in a block of cement 8 by 10 by 12 inches. The top of the bottle barely projects above the block and is about 2½ feet below the surface of the ground. A foot of earth was filled in, and a box about 12 by 12 by 30 inches was put over the underground mark. A 6-inch vitrified earthenware pipe 2 feet long was set perpendicularly in the box so that the center of the pipe coincided with the station point. The box and the pipe were filled with cement, leaving about a foot of the pipe above the box, and about 6 inches of it above the ground. A 4-inch earthenware pipe was set in the line of the fence to the eastward of the station, and 67.75 feet from the station in the direction to Alpine.

Cheehaw (Talladega County, Ala., O. H. T., 1886). On the highest part of the mountains among rocky outcroppings, about 9 miles south of Oxford, Ala. There is a precipitous bluff on the western side of the mountain known as the "Pulpit." The station is on a turning point of the boundary line between Talladega and Clay Counties. The station was marked by a cross cut on a stone buried about a foot below the surface in a cleft between the ledges. Another stone with a cross cut on top was set over this and projects 1 foot above the surface. To the eastward and southward shallow holes were drilled into the centers of triangles cut into outcropping rocks. The south mark bears south 30½° west

¹ See pp. 40 and 41.

and is distant from the center of the station 4.17 feet or 1.27 meters. The east mark bears north $101\frac{1}{2}^\circ$ east and is distant from the center of the station 5.48 feet or 1.67 meters.

Alpine (Talladega County, Ala., O. H. T., 1886; 1887). On the southern peak of the high double-topped mountain about 6 miles west of the town of Talladega. The station was marked by a hole drilled in solid rock about 2 feet below the surface of the ground. On this was placed a beer bottle mouth upward the center of which marks the station. The top of the bottle is about 15 inches below the surface of the ground. This was covered with earth and over it was placed a dressed sandstone, 5 by 8 by 18 inches, on which was cut a cross and the letters U. S. C. S. Three similar stones were placed so that the intersection of the diagonals cut in the top of each stone is 6 feet from the center of the station. The true azimuth of Horn is $315^\circ 33'$ and the azimuths of the reference marks are 330° , 90° , 210° . The other reference marks are four nails driven in stumps and with bearings and distances as follows: First nail (magnetic) north $60\frac{1}{4}^\circ$ east, 11.89 feet; second nail (magnetic) north 4° east, 17.59 feet; third nail (magnetic) south 82° west, 26.04 feet; fourth nail (magnetic) south $87\frac{1}{2}^\circ$ east, 14.17 feet.

Laurel (Shelby County, Ala., O. H. T., 1886; 1888). In the southwest quarter of the southeast quarter of the northwest quarter of the southwest quarter of the northeast quarter, section 7, township 19 south, range 1 east, Huntsville meridian, about one-fourth mile east of the United States land survey Huntsville meridian on the highest part of the mountain south of Bear Creek Valley and west of the valley known as the "Penitentiary." It rises very abruptly some 1100 feet from the Bear Creek Valley on the northwest but the ascent is much more gradual from the eastward. The station was marked by a 1-inch hole drilled $6\frac{1}{2}$ inches deep in solid ledge about a foot below the surface of the ground. The surface mark is a 1-inch hole drilled one-half inch deep in an irregular block of hard white sandstone, 12 by 15 by 10 inches placed level with the surface. A few feet southeastward from the station the ledge stands on edge and rises about 3 feet above the station mark. The reference marks are six crosses cut in the surrounding outcropping rocks, at distances and in azimuths from the station as follows: Cross 1, 13.15 feet, $346^\circ 49'$; cross 2, 5.44 feet, $47^\circ 49'$; cross 3, 5.22 feet, $166^\circ 49'$; cross 4, 12.10 feet, $175^\circ 09'$; cross 5, 5.95 feet, $243^\circ 59'$; cross 6, 10.69 feet, $251^\circ 14'$.

Horn (Talladega County, Ala., O. H. T., 1886; 1889). On the boundary line between Talladega and Clay Counties, about 10 miles southeasterly from the town of Talladega, in section 18, township 20 south, range 6 east, or in section 13, township 20 south, range 5 east. The station was marked by a hole drilled in solid rock about 2 feet below the surface of the ground. Above this hole was placed a beer bottle, the center of the mouth of which marks the station point, the top of the bottle being about 15 inches below the surface of the ground. Over the bottle was planted a dressed stone (sandstone), 8 by 5 by 18 inches, on which was cut a cross and the letters U. S. C. S. Three similar, but unlettered, stones were planted so that the intersection of the diagonals cut on the top of each stone is 6 feet distant from the center of the station. Stone 1 is the most western; was planted in line toward Alpine; the others are each about 120° from it in direction. The distance from stone 1 to stone 2 is 10.4 feet, from stone 2 to stone 3 is 10.05 feet, from stone 3 to stone 1 is 10.05 feet. The other reference marks are four nails driven in stumps and situated as follows: First nail bears (magnetic) north 82° east at a distance of 8.44 feet from the center; second nail bears (magnetic) north $41\frac{1}{4}^\circ$ east at a distance of 23.69 feet from the center; third nail bears (magnetic) south 13° west at a distance of 23.22 feet from the center; fourth nail bears (magnetic) south $21\frac{1}{2}^\circ$ east at a distance of 17.92 feet from the center.

Kahatchee (Talladega County, Ala., O. H. T., 1887). On the highest peak of the Kahatchee Range, about 4 miles due south of Childersburg and about three-fourths mile southwest from Mr. Albert J. Crumpler's house. The station was marked by a bottle buried mouth upward in a hole about 2 feet deep. The center of the mouth of the bottle is the center of the station. Over this was placed 2 inches of earth and on this was placed a large stone having a base nearly 2 feet square. About 2 feet of the stone is under ground and about 6 inches of it projects above the surface. The stone has a single line running in a northerly and southerly direction cut in the top, the intersection of which with the apex of the stone marks the center of the station. The letters U. S. are cut in the south face of the stone. The reference marks are three crosses cut in the outcropping ledge and situated as follows: First cross 5.42 feet from the station in azimuth $55^\circ 53'$; second cross, 7.95 feet from the station in azimuth $301^\circ 40'$; third cross, 8.33 feet from the station in azimuth $180^\circ 51'$. Crumpler's house is in azimuth $214^\circ 03'$.

Weogufka (Coosa County, Ala., O. H. T., 1887; 1889). About 20 meters east of northwest corner of southwest quarter of northwest quarter of southwest quarter, section 14, township 23 north, range 17 east, St. Stephens meridian. On the highest part of Weogufka Mountain, the highest mountain in the neighborhood, 500 or 600 feet above the surrounding country and commanding an extensive view in all directions. The station is $2\frac{1}{4}$ miles south-southwest of James C. Mooney's house. The station was marked by a beer bottle, sunk into the soft micaceous shale, which underlies the soil, until its mouth was 2 feet under ground, tamping it in place with a mixture of surface soil, clay, and charcoal. A hole was then dug about the center, 6 feet in diameter and 2 feet deep. Into this was placed an irregular rock about 2 feet in either cross section and from 10 to 15 inches thick with its upper surface 6 inches below the general level of the ground. The center was then marked by a 1-inch hole drilled 7 or 8 inches deep. Charcoal was freely mixed with the soil in filling in. The reference marks are four nails driven in stumps of trees and situated as follows: One 12.1 feet west of the station; one 14.72 feet northeast of the station; one 15.76 feet east of the station; and one 19.42 feet southeast of the station.

Jamison (Chilton County, Ala., O. H. T., 1887; 1889). In the northeast corner of the southwest quarter of the southwest quarter of the northeast quarter of section 35, township 23 north, range 14 east, St. Stephens meridian. The nearest railroad station is at Clanton, distant about 6 miles in a straight line or about 8 miles by the road passing Sidney Weldon's house. The station was marked by a common square junk bottle buried mouth upward 2 feet 9 inches below the surface of the ground the center of the mouth being the center of the station. A circular hole

6 feet in diameter and $2\frac{1}{2}$ feet deep was dug about the center in which an irregular mass of stone common to the locality 2 by $1\frac{1}{2}$ by $1\frac{1}{4}$ feet was placed with its upper surface 1 foot below the top of the ground. A 1-inch hole was drilled near the center of this stone, marking the center of station. The reference marks are four nails situated as follows: One in the foot of a pine tree 29.69 feet southwest of the station; one in a red oak tree 23.04 feet north of the station; one in the foot of a blackjack tree 31.14 feet northeast of the station; one in the foot of a hickory tree 41.9 feet southeast of the station.

Wilder (Autauga County, Ala., F. W. P., 1890). Near the northwest corner of the northeast quarter of the northwest quarter of the northeast quarter of section 18, township 19 north, range 16 east, St. Stephens meridian, on the property of Oloff S. Wilder. It is about 1000 meters east of the western line of the section and 16 or 18 meters south of the northern line, on the northeast edge of a flat-topped hill or plateau, the view being quite extensive, comprising the Coosa Valley from Clanton to Wetumpka. The soil is a loose gray sand to an unknown depth. The center was a square green glass bottle buried mouth up $3\frac{1}{2}$ feet below the surface of the ground, the center of the mouth being the center of the station. On this was thrown a layer of earth and on the earth was placed an irregular block of ferruginous rock, $3\frac{1}{2}$ by $2\frac{1}{2}$ by 1 feet, the upper surface being 9 inches below the surface of the ground. A hole was drilled 1 inch deep marking the center of the station. Wadsworth post office is about $4\frac{1}{2}$ miles northeast of the station. Rollins switch on the Louisville & Nashville Railroad is about 4 miles from the station. Deatsville on the Louisville & Nashville is about 9 miles southeast.

Wetumpka (Elmore County, Ala., F. W. P., 1892). In the southeast corner of the southwest quarter of the southeast quarter of section 18, township 18 north, range 19 east, St. Stephens meridian, 420.55 meters W. $0^{\circ} 32' N.$ from marble section corner, about 1 kilometer east of the city of Wetumpka and some 400 feet above it, on one of the highest points in the cluster of hills which at this point rise abruptly from the river. The very top of the hill has no trees upon it, which accounts for its local name of Bald Knob. The station was marked by a claret bottle buried mouth up 3 feet below the surface of the ground, the center of the mouth marking the center of the station. Above this was placed an irregular mass of quartz rock $2\frac{1}{2}$ by $1\frac{1}{2}$ by 1 feet, with its upper surface 10 inches below the surface of the ground. A hole was drilled in the top of the rock marking the center of the station. A ditch was dug some 5 feet from the center and filled with loose stone and covered with earth.

Perry (Chilton County, Ala., F. W. P., 1890; 1907). On the southernmost high point of the highest part of the ridge at the head of Valley (Ockmulga) Creek in the northeast quarter section 34, township 21 north, range 11 east, St. Stephens meridian, being the crest of the divide between the Cahawba River and Mulberry Creek, which flows into the Alabama River. The station is about 2 miles due south of Joseph Whately's house. The logging railway of the Twin Tree Lumber Company runs to the foot of the ridge about three-fourths mile east of the station. The wooden latitude pier of 1907 is 4.70 meters north of the station and in line extended to Parker triangulation station. The station was marked by a bottle buried neck up about 3 feet below the surface of the ground, the mouth marking the center of the station. Over this was placed an irregular rock, the top being about 1 foot below the surface of the ground. A hole was then drilled 1 inch deep marking the center of the station. In 1907 several pieces of charred wood and stones were placed about the rock and covered.

Parker (Autauga County, Ala., F. W. P., 1890; 1907). In section 2, township 18 north, range 12 east, St. Stephens meridian, in the Parker peach orchard, the property of William M. Parker. The station is $1\frac{1}{2}$ miles north of the Milton road and 2 miles from William M. Parker's house. The ground at the orchard is quite level but falls off very sharply to the west toward Polecat Creek and rather abruptly eastward to the Little Mulberry. The orchard is practically abandoned and the top of the hill is mostly bare except a small cluster of trees near the station. The station is 10 feet south of an old plantation road and 30 feet west of where the road turns north to the house of Monroe Parker. The station was marked by a bottle buried below the surface of the ground. Over this was placed a large, heavy block of red sandstone, heavily charged with iron, the upper surface of the stone being about 1 foot below the surface of the ground. In 1907 the station was found in good condition and an 8 by 8 inch post, projecting 2 feet above the ground, was placed over the station. A hole was then drilled in the rock marking the center of the station. The house chimney of Monroe Parker bears south $210^{\circ} 30'$ west (magnetic) and is about 150 meters from the center. The new well of Monroe Parker bears south $189^{\circ} 30'$ west (magnetic) and is about 175 meters from the center.

Lowndesboro (Lowndes County, Ala., F. W. P., 1892). In section 13, township 15 north, range 14 east, St. Stephens meridian, on the property of L. H. McCurdy in the village of Lowndesboro and 153 meters north-northwest of his house. From the center of the station it is north $27\frac{1}{2}$ feet to the near fence and $57\frac{1}{2}$ feet to the far fence bounding lane leading to the house, which is about 400 yards west of the station. The station was marked by a block of dressed Alabama limestone, 8 by 8 by 37 inches. The top of the stone is about 1 inch above the surface of the ground, and on it are cut the letters U. S. C. S. and two cross lines running north and south and east and west. The underground mark is a block of Alabama limestone, 8 by 8 by 5 inches, the top of the stone being 4 feet 1 inch below the surface of the ground. On the top are cut two diagonal lines, the intersection of which marks the center. The north fence, the east fence, and the north side of lane are at the following distances and magnetic azimuths: 27.38 feet, $353^{\circ} 38'$; 26.9 feet, $86^{\circ} 38'$; 56.88 feet, $353^{\circ} 38'$.

Lovers Leap (Lowndes County, Ala., F. W. P., 1892). In the western edge of the county, on the highest and most southern of the three hills known as the Collirene Hills. It is about one-half mile south of Collirene Hill proper and the post office of the same name, and about 11 miles almost due south from the town of Benton, the Benton-Gordonville road passing east of the station about 200 yards. The hill is a sharp rounded one, the apex being not more than 30 feet in diameter, and the station is in the center of the highest part. About 60 feet east of the station is a cliff, a drop of

about 40 feet. Mr. A. Edwards's house on Todd's hill is about three-fourths mile northwest of the station. The station was marked according to note 3,¹ except that the underground mark is a glass bottle instead of a stone jug.

Mount Carmel (Crenshaw County, Ala., F. W. P., 1892). In the northeast quarter of the northeast quarter of section 15, township 12 north, range 17 east, St. Stephens meridian, on the property of W. E. Davis. La Pine on the Luverne branch of the Atlantic Coast Line Railroad is 7 miles distant, Sellers on the same railroad is 4 miles distant, and Mount Carmel post office is about 3 miles distant. The station was marked according to note 3,¹ except that between the gallon jug and the lime rock a 3-quart jug, 5½ by 9 inches, was buried mouth upward.

Bargenier (Lowndes County, Ala., F. W. P., 1892). In the southeast corner of southeast quarter of the northwest quarter of section 25, township 12 north, range 14 east, St. Stephens meridian, about 2¼ miles west from Fort Deposit, a station on the Louisville & Nashville Railroad, on the highest point of land in this section, and well known as the Bargenier Hill. Monroe Bargenier's house is about one-half mile northeast from the station. The station was marked according to note 3.¹

County Line (Lowndes County, Ala., F. W. P., 1892). In the northeast corner of southwest quarter of the southwest quarter of section 31, township 12 north, range 13 east, St. Stephens meridian, in the southwest corner of the county, about 300 yards north of the Butler County line, and on the highest part of the hill known as the County Line Hill. The top of the hill is owned by the S. W. Zill estate, the residence being within 200 yards of the station. Greenville on the Mobile & Montgomery Railroad is about 14 miles distant. The station was marked according to note 3.¹

Ethridge (Dallas County, Ala., F. W. P., 1892). On the highest point of a range of thickly wooded hills, about 2 miles southwest of Carlowville. Minter, a station on the Louisville & Nashville Railroad, is about 4 miles distant, and Snow Hill on the same railroad is about 9 miles distant. The station was marked according to note 3.¹

Fatama (Wilcox County, Ala., F. W. P., 1895). Near the southwest corner of the northwest quarter of the southwest quarter of the southeast quarter of section 26, township 11 north, range 8 east, St. Stephens meridian, on a prominent but small hill on land belonging to Mr. R. U. L. Watson and about one-third mile a little east of south of his house, which is near the southeast corner of the southeast quarter of the northwest quarter of section 26. The station was marked according to note 4.¹ A stub marking the first quarter of a mile south of the center of the section is 434 feet distant from the station and bears N. 21° 33' 45" W. The north and south line dividing the section in half is about 50 yards west of the station.

Midway (Monroe County, Ala., F. W. P., 1895). In the northwest corner of the northwest quarter of the southeast quarter of the northeast quarter of the southeast quarter of section 27, township 9 north, range 10 east, St. Stephens meridian, on an open common belonging to J. J. Simpkins close to the old Federal Road from Montgomery to Mobile, on the crest of the divide between the Alabama and Escambia watersheds. Claiborne on the Alabama River is 37 miles distant, Evergreen on the Louisville & Nashville Railroad is 25 miles distant, and Pineapple on the Southern Alabama Division of the Louisville & Nashville Railroad about 10 miles distant. The station was marked according to note 4.¹ A locust, a short-leaf pine, a water oak, and an old chinaberry tree are at the following distances and magnetic azimuths from the station: 63.9 feet, 102½°; 76.5 feet, 158½°; 51.1 feet, 216°; 45.5 feet, 283½°.

Pollard (Monroe County, Ala., F. W. P., 1895). In the southwest corner of the northeast quarter of the northeast quarter of the northeast quarter of section 28, township 6 north, range 6 east, St. Stephens meridian, at the head of the waters of Rawdons Creek. The station is 25 paces east of the old Pollard road and 5½ miles southeast of Perdue Hill. Claiborne on the Alabama River is 7½ miles northwest. The land is owned by Sidney Blanton, the north chimney of whose house is 302.7 feet distant in azimuth 57° 39'. The station was marked according to note 4.¹

Creagh (Clarke County, Ala., F. W. P., 1895). Near the northeast corner of the northeast quarter of the southeast quarter of section 5, township 7 north, range 4 east, St. Stephens meridian, on land belonging to G. W. Creagh, whose house is about one-half mile a little east of south of the station. It is about 40 feet south of the New Gosport road from Suggsville to Gosport, and about one-half mile from the colored church at the junction of the New Gosport road and a road leading from Suggsville to Peach Tree. Mr. Creagh's house is near the northwest corner of section 9, near the junction of lines dividing sections 4, 5, 8, and 9. The station was marked according to note 4,¹ except that the underground mark is an inverted earthenware flower pot, instead of a jug.

White (Clarke County, Ala., F. W. P., 1895). A little southeast of the center of the northeast quarter of section 30, township 6 north, range 3 east, St. Stephens meridian, on the land of W. W. White, whose house is at Walkers Spring, about 4 miles from the station. The station is a short distance southwest of the Gainstown and Jackson road, and is about 7 miles from Jackson and 9 miles from Gainstown. A one-room cabin with several log outbuildings surrounded by a fence is about 150 yards from the station. The station was marked according to note 4,¹ except that the underground mark is a common black bottle, 9 inches high, filled with white sand.

Red Hill (Baldwin County, Ala., F. W. P., 1895). Near the northeast corner of the county in the southwest quarter of section 22, township 3 north, range 4 east, St. Stephens meridian, on a spur of the divide between the Alabama and Escambia watersheds that lies between the headwaters of Horseneck and Turkey Creeks, about a mile east of "the big sassafras," a name surviving from the time of the first settlement of the country and the only one that seems to identify the region. Little River post office is about 8 miles northwest, Dixie on the Alabama River is 11 miles northwest, and McCulloughs on the Gulf, Florida & Alabama Railroad is about 8 miles S. 80° E. The station is 20 paces south

¹ See pp. 40 and 41.

of the road and 50 paces south of the tracks. About one-fourth mile to the westward a small stream from an iron and sulphur spring crosses the road. The station was marked according to note 4.¹

Coon (Washington County, Ala., F. W. P., 1895). At the southwest corner of the northwest quarter of the northeast quarter of the northeast quarter of section 8, township 3 north, range 1 west, St. Stephens meridian, on the crest of the ridge between Bilbows and Bates Creeks. McIntosh on the Southern Railway is $6\frac{1}{2}$ miles east-northeast. The point is about 40 paces north of the road between Citronelle and McIntosh Bluff, and 88 paces west-northwest from the 16-mile post. The station was marked according to note 4.¹

Dean (Baldwin County, Ala., F. W. P., 1895; 1897). In the southeast corner of the southwest quarter of the southeast quarter of the southeast quarter of section 29, township 1 north, range 3 east, on a spur known as Gopher Hill, at the western edge of the divide between the Alabama and Escambia watersheds, 6 miles east-northeast from Stockton by the old Federal Road. Bay Minette on the Louisville & Nashville is 12 miles south. The station point is 65 paces north of the old Federal Road. The station was marked according to note 4.¹

Cold Creek (Mobile County, Ala., F. W. P., 1895; 1897). In the northeast corner of the northeast quarter of the northwest quarter of the southwest quarter of the southwest quarter of section 16, township 1 south, range 1 west, St. Stephens meridian. The station is in a school section and the nearest house is that of Mr. Louis Laurendim, about $1\frac{1}{2}$ miles to the west, and it is on the highest point in the section in the midst of the piney woods. Cold Creek on the Southern Railway is $4\frac{1}{2}$ miles distant, and Creola on the same railroad is 6 miles southeast. The station was marked according to note 4.¹ The southwest corner of section 16 bears true S. $26^{\circ} 03' W.$ and is 1483 $\frac{1}{2}$ feet distant.

Minette (Baldwin County, Ala., W. B. F., 1897; 1911). In the northwest quarter of the northeast quarter of the southeast quarter of the southwest quarter of section 14, township 2 south, range 2 east, St. Stephens meridian, on the highest point in the section and about 250 feet south of the old road through the piney woods leading to Bay Minette, on the land belonging to Daniel Prior, whose house is on the north side of the road northwest of the station and about one-fourth mile distant. Carpenter on the Louisville & Nashville Railroad is about $1\frac{1}{2}$ miles from the station. The station was marked according to note 4,¹ but with jug bottom up and small hole in center. The station is about 1300 feet distant and bears magnetic 337° from the half-section post in the southeast corner of the southwest quarter and is about 1500 feet distant and bears magnetic 192° from the center post at the northeast corner of the southwest quarter.

Spring Hill (Mobile County, Ala., W. B. F., 1897; 1911). On the highest part of Spring Hill, a high point about 7 miles northwest of Mobile, on the land of Judge H. Austill, about 40 feet north of the fence line (main road) and about 200 yards west of the road going to Whistler and also of the Spring Hill electric station. On the opposite side of the main road is Forest Park. The station was marked according to note 4.¹ One oak tree and two oak stumps and the fence line are at the following distances from the station: 103 feet, N. $62^{\circ} 33' E.$; 44.58 feet, S. $95^{\circ} 46' W.$; 39.75 feet, N. $18^{\circ} 17' W.$; 39.9 feet, S. $29^{\circ} 47' E.$ In 1911 the surface mark had been removed. The underground mark might have been found by digging, but it was hard to decide where to dig.

Daphne (Baldwin County, Ala., W. B. F., 1897; 1911). In the southwest corner of the southwest quarter of the southwest quarter of the northeast quarter of the northeast quarter of section 19, township 5 south, range 2 east, on the land of Wm. Dryer and about one-half mile northeast from the courthouse at Daphne. The station was marked according to note 4,¹ jug bottom up. The station is 882 feet distant and bears true S. $44^{\circ} 17' W.$ from the northeast corner of section 19.

St. Elmo (Mobile County, Ala., W. B. F., 1897; 1911). In the northwest corner of the northeast quarter of the southeast quarter of the southeast quarter of the southeast quarter of the northwest quarter of section 19, township 6 south, range 2 west, St. Stephens meridian. It is about 2 miles east of the St. Elmo station on the Louisville & Nashville Railroad, on land belonging to the Bancroft estate, and about one-half mile south of the old mill site on the railroad, on the highest point within a mile of the mill. F. M. Van Houten's house is about 1 mile southeast of the station. The station was marked according to note 4,¹ except that the underground mark was a limestone post, 6 by 6 by 18 inches, with two perpendicular lines and the letters U. S. C. S. cut on the top, the intersection of the lines marking the station. In 1911 the station was not found, but it may be found by further search.

Fort Morgan (Baldwin County, Ala., F. H. G., 1846; 1911). On the northwest bastion of Fortress No. 2. The station was marked by a section of a drain tile pipe inclosed by a nail keg, the pipe and the keg being filled with hydraulic cement concrete and two spikes being placed one over the other. The head of the uppermost nail is just beneath the brick floor of the northwest bastion of the fortress. The underground mark is an earthenware cone filled with concrete, a spike being inserted in the center as station mark, the top of the nail being $2\frac{1}{2}$ feet below the surface of the ground. In 1906 the uppermost nail had been uncovered and a concrete mortise, about 6 inches square, made about it. There are four other mortises around this. In 1907 the Fort Morgan longitude pier was located 6.89 meters north and 4.01 meters west of the station. A concrete pier was built on top of the old gun carriage and may be moved.

Dauphin Island east base (Mobile County, Ala., F. H. G., 1847; 1911). On Dauphin Island, at the entrance of Mobile Bay, about 7 miles from the west end of the island and $3\frac{1}{2}$ miles from the east end, near the western edge of the pine woods which cover the eastern end of the island. The station is marked as follows: In a bed of cement $5\frac{1}{2}$ feet square, extending 6 feet below the surface, are two pieces of drain tile 2 feet long and 4 inches in diameter, each placed with its axis vertical, one above the other, the lower extending 7 inches below the bottom of the cement. A

¹ See pp. 40 and 41.

pine pole 6 feet long and 2 inches in diameter is driven down through the pipes until its top is 16 inches below the top of the upper tile. Above this pole in the upper pipe are placed vertically, one above the other, two copper bolts, each 8 inches long and $3\frac{1}{4}$ inches in diameter, a cross on each bolt marking the station, the upper mark being 3 feet below the surface. The bolts are held in place by cement, with which the remaining space of the pipes is filled. Above the top of the upper pipe a cavity 1 foot square and 6 inches deep is left in the cement. Over this cavity, still embedded in cement, the four original granite blocks of the base of the monument of 1847 are built, as originally, in two courses, the top of the upper course projecting 2 inches above the surface. A copper bolt in the top of one of the blocks of the upper course is directly over the cross on the bolt in the pipe and marks the station. The original granite shaft is placed on this foundation and cemented down over the copper bolt, its apex again marking the station. On the north, east, south, and west faces of the shaft are inscribed, respectively: A. D. Bache, Suptdt.; U. S. Coast Survey; 1847; Base No. 5. The station is witnessed by two marks in the same vertical line, one on the surface and one underground, in prolongation of the base line, 144.1025 meters east of the extremity and just in the edge of the pine woods. The underground mark is a cross in an iron bolt in the top of a tile pipe 2 feet long embedded vertically in a mass of cement 2 feet in diameter, the top of the pipe being 3 feet below the surface. Above this pipe is placed a granite block 1 foot square and $2\frac{1}{2}$ feet long, the top of the block being flush with the surface and containing a copper bolt as the surface mark. In 1911 the lettered shaft had either been taken off or washed away, and the surface reference mark was covered with about 2 feet of sand.

Dauphin Island west base (Mobile County, Ala., F. H. G., 1847; 1910). On the western end of Dauphin Island, about $2\frac{1}{2}$ miles from the extremity of the island. The station is marked the same as Dauphin Island east base, except that the cement at this station is 6 feet square and 5 feet deep and only one piece of tile pipe was put in.

Cedar Point (Mobile County, Ala., F. H. G., 1846; 1910).—Lost.

Cat Island (Mobile County, Ala., F. H. G., 1846; 1855).—Lost.

Point Aux Pins (Mobile County, Ala., F. H. G., 1846; 1910).—Lost.

Grand Batture (Jackson County, Miss., F. H. G., 1846; 1910).—Lost.

Petit Bois (Jackson County, Miss., F. H. G., 1846; 1910).—Lost.

Horn Island East (Jackson County, Miss., J. E. H., 1855; 1910).—Lost.

Bayou Casotte (Jackson County, Miss., F. H. G., 1846; 1910).—Lost.

East Pascagoula (Jackson County, Miss., F. H. G., 1847; 1910).—Lost.

Horn Island West (Jackson County, Miss., J. E. H., 1855; 1910).—Lost.

Bellefontaine (Jackson County, Miss., J. E. H., 1855; 1910).—Lost.

Deer Island 1 (Jackson County, Miss., J. E. H., 1855; 1910).—Lost.

Ship Island (Harrison County, Miss., J. E. H., 1855; 1910).—Lost.

Mississippi City (Harrison County, Miss., S. A. G., 1851; 1902).—Lost.

Cat Island (Harrison County, Miss., J. E. H., 1855; 1857). Near the eastern end of the summit of the highest sand hill on the island and about 60 feet above high-water mark. The station is marked by a granite block which has a cross on its upper face and is surrounded by a box whose transverse section is a little larger than that of the stone and which extends about 4 feet above it to the surface of the sand.

Pitcher Point 2 (Harrison County, Miss., S. A. G., 1851; 1902).—Lost.

Cat Island Lighthouse (Harrison County, Miss., S. A. G., 1850; 1857). On the western extremity of Cat Island. The station is the center of the light tower.

Bayou Pierre (St. Bernard County, La., S. A. G., 1852; 1857). On the mainland on the southern side of the sound, about 5 miles south of the lightship at Pass Marian, and a little less than one-half mile east of the northern entrance to the Grand Pass from Mississippi Sound to Chandeleur Sound, on a shell bank near the east bank of a bayou. The center is marked by a cross cut on the top of a granite stone sunk $2\frac{1}{2}$ feet below the surface of the ground. The reference marks are three cedar posts each having a copper tack in the top 6 feet from the station east, west, and north.

Point Clear (Hancock County, Miss., J. E. H., 1855). On the mainland north of Mississippi Sound, about 4 miles west of the town of Shieldsboro and about one-fourth mile east of the house of Mr. Russ, on an earth bluff about 10 feet above high water. The center is marked by a granite block. The reference marks are four posts, each 6 feet from the center, and north, east, west, and south of the station. Two oak trees and two pine trees, each marked with a copper nail, are at the following distances from the station: 100 feet southwest; 54.6 feet northwest; 56.9 feet northeast; 57.1 feet southeast.

Grand Island 1855 (St. Bernard County, La., J. E. H., 1855; 1857). On the eastern coast of Grand Island about one-half mile southeast of the most northern point of the island, on the edge of a bayou running parallel to the shore, from which the station stands back 30 feet. The center is marked by a cross cut on the top of a marble block. The reference marks are two stakes driven in the ground on opposite sides of and equidistant from the center. Grand Island triangulation station of 1852 is about 500 meters southeast. In 1857 the stone was found lying on the beach and the position of the center of the station is doubtful.

Grand Island 1852 (St. Bernard County, La., S. A. G., 1852). The center is marked by a cross in the top of a granite stone sunk $2\frac{1}{2}$ feet in the ground. The reference marks are three posts, two in range with the station and one at right angles, each with a copper tack in the top equidistant from the station.

Oyster Bayou (St. Bernard County, La., J. E. H., 1855; 1857).—Lost.

Nine Mile Bayou (St. Bernard County, La., S. A. G., 1852; 1855). On a hummock on the east side of Nine Mile Bayou nearly 2 miles from its mouth. The center is marked by a copper nail in the top of a granite block sunk

2½ feet in the ground. The reference marks are three cedar posts, two in range with the center and the other at right angles, each having a copper nail in the top and all equidistant from the center.

Malheureux Point (St. Bernard County, La., J. E. H., 1855; 1857).—Lost.

East Pearl River (Hancock County, Miss., J. E. H., 1855; 1857).—Lost.

East Rigolets Unused Lighthouse (Orleans County, La., J. E. H., 1855). On Rabbit Island on the south side of Rigolet Pass and opposite the western mouth of Pearl River. The station is the center of the tower of the lighthouse.

Shell Point (Orleans County, La., J. E. H., 1855). On the western side of Lake Borgne, about 6 miles south and west of Rigolets Lighthouse. On the shell bank on the edge of the marsh and about 3 feet above high-water mark, from which it stands back about 15 feet. The center is marked by a marble block, disturbed by a storm. The reference marks are two stakes 8 feet apart marked with copper nails, and in range between them and 4 feet from each is an iron screw pile around which, in an equilateral triangle and 2 feet distant, are driven two short pieces of scantling. For reducing the screw pile, used as an eccentric station, to the probable center, the following distance and eccentric angle are given: Screw pile to probable center, 4.3 feet; angle, Rigolets Light to center, 50°.

Fort Wood (Orleans County, La., J. E. H., 1855). On the Chef Menteur Pass between Lake Pontchartrain and Lake Borgne, in the northwest angle of the rampart 37½ feet from its outer corner and 2¾ feet from the inner corner. The flagstaff on which some observations were made is in the southwest angle of the rampart.

Proctor Point (St. Bernard County, La., J. E. H., 1855). About 7 miles northwest of the town of Proctorville, on a narrow shell ridge about 10 feet back of ordinary high-water mark. The center is marked by a cross cut in the top of a granite stone sunk 2½ feet in the ground. The reference mark is a screw pile in the marsh to the southward at a distance of about 10 meters, and in line to the gable of a house 1¼ or 2 miles distant and to the southward and westward.

Martello Tower (St. Bernard County, La., S. A. G., 1853; 1873). The cupola was the object observed upon.

Battery Bienvenue (St. Bernard County, La., S. A. G., 1852; 1873). The southwest chimney of the battery was the object observed upon.

Ducros (St. Bernard County, La., C. H. B., 1873). On the east side of the Mississippi River about 3 miles above Lake Borgne, on the northern boundary of the pecan grove plantation belonging to Messrs. Du Cros, 6 meters south of the fence and 8 meters east of the back ditch in the small growth of timber. The center is marked by a cross on an iron screw pile.

Caernarvon (Orleans County, La., C. H. B., 1873). At Caernarvon about 1½ miles above the residence at Orange Grove on the east side of the Mississippi River and about the center of English Turn. The station is the chimney of the sugar house. The center is marked on the platform with a copper tack.

New Orleans St. Patrick's Church (Orleans County, La., S. H., 1858; 1873). The object observed upon was the south turret, which is 4.521 meters south of the central station between the four turrets.

SUPPLEMENTARY POINTS.

Smithers (Madison County, Ala., C. O. B., 1878; 1907). On *Smithers Mountain*, about 6 or 7 miles from Huntsville, Ala. The top of the mountain is wooded with trees about 40 feet high and the approaches on all sides are very rough. The road to the station is the Pulaski road, to the point where the road crosses the gap between *Smithers* and *Pond Mountains*. There is a gate between the sixth and seventh mileposts on the north or *Smithers* side. Turn in at the gate and in one-third mile is the site of an encampment in a cedar grove, from whence a well-marked bridge path leads to the top, three-fourths mile from camp. The general direction of the road up the mountain is east by north. About a foot beneath the surface are large, flat rocks, 6 inches thick. Just at the station is a crevice between two rocks extending west-northwest. This crevice was enlarged and a copper bolt was placed in the ledge beneath with a stone ink bottle filled with ashes over it, the nose of the bottle marking the station. The top of the bottle is level with the top of the crevice, and the crevice is filled up solidly with earth. Over the rocks a brick platform 5 feet square and consisting of three courses was laid in cement, coming to the surface of the ground. The diagonals of the square are north, south, east, west from the station, where a hole 8 inches square allows the mark to be seen. In 1907 only the copper bolt was found, the ink bottle and brick platform having been destroyed. No surface mark was put in, but the wooden pier used in latitude work was filled with rock and brick, which will leave a cairn when the wood rots away. The station is the center of a triangle 28 paces on a side, formed by three mounds of stone used to anchor the legs of the 1878 tripod. These mounds are not very high, but are 6 feet in diameter and of whitish stone easily distinguished from the surrounding rock.

Capshaw (Madison County, Ala., F. P. W., 1877; 1907).—Lost.

Penit (Lawrence County, Ala., C. O. B., 1878). Sixteen miles direct or 21 miles by road south of Courtland, a town on the Southern Railway, 6 miles by road southwest of Moulton, one-fourth mile northeast of the Penitentiary Gap wagon road, and one-fourth mile northeast of Gus White's house, on the highest knob of the most northern spur of the Penitentiary Mountain. The station is marked by a stub in a hole 3 inches in diameter, which is in the center of a triangle whose sides are 28 feet and which is formed by three piles of rocks. In 1911 the stub had rotted away.

Moores Hill (Marshall County, Ala., F. P. W., 1877). On the highest part of *Moores Hill*, in an old field on the west side of the hill, 1 mile northeast of Guntersville. The hill is connected with *Sand Mountain* by a low ridge. There is a good spring one-half mile southwest of the station. The station was marked by a stub with nail. There are four reference marks 6 feet from the center and north, south, east, west of the station.

Weisner (Cherokee County, Ala., F. P. W., 1875). On the highest part of *Weisner Mountain*, about 12 miles northwest of Cross Plains, Ala., on the Southern Railway. From Cross Plains take the road to Natville church, then take

the right-hand road to the house of Mr. Parker; about one-half mile from his house on the left of the main road a road has been cut to the ridge on the south side of the mountain. This ridge leads to the top of the mountain; then the ridge to the right leads to the station. There is a good spring about $1\frac{1}{2}$ miles south of the station. The station is marked according to note 2.¹

Bald Rock or Backbone Mountain (St. Clair County, Ala., O. H. T., 1887). The highest mountain in the southern part of the county, about 7 miles west of Cropwell.

Peak A (Trefoil) (Calhoun County, Ala., F. P. W., 1877; 1886). About 3 miles east of Anniston.

Peak D (Hursts Peak) (Calhoun County, Ala., F. P. W., 1875; 1886). Near section 30, township 15 south, range 9 east, Huntsville meridian. About 6 miles northeast of Anniston.

Mount Parnassus (Talladega County, Ala., O. H. T., 1887). A notable hill in the same range as Alpine but about 3 miles north of Talladega.

Talladega Negro College (Talladega County, Ala., O. H. T., 1887). The main building of the institution standing at the head of North Street prolonged at the west end of town. The building is of brick and has Greek columns at its eastern front.

Talladega Presbyterian Church (Talladega County, Ala., O. H. T., 1887). A brick church on the north side of North Street east of the public square. The spire is over the main entrance.

Talladega City School (Talladega County, Ala., O. H. T., 1887). On a hill north of the Southern Railway. The cupola observed upon it is over the main entrance.

Lewis House (Talladega County, Ala., O. H. T., 1887). A private residence just east of the town limits and north of the Oxford Road or North Street continued.

Penitentiary Mountain (Shelby County, Ala., O. H. T., 1885; 1887). About $2\frac{1}{2}$ miles northeast of Laurel.

Childersburg Methodist Church (Talladega County, Ala., O. H. T., 1887). In the town of Childersburg about three-fourths mile south of the depot of the Southern Railway, on a little eminence east of the road to Sylacauga. The church has a steeple which was the point observed upon. There is a graveyard near to and south of the church.

Childersburg Baptist Church (Talladega County, Ala., O. H. T., 1887). In the town of Childersburg, south of the Southern Railway and west of the tracks of the Central of Georgia Railway. It is a frame building with a wooden steeple, painted white.

Hickock Mountain (Talladega County, Ala., O. H. T., 1887). On a hill known as the Pope or Polk. It is not very high, but is quite a feature in the landscape seen from the stations from which pointings were made. It is about $7\frac{1}{2}$ miles from Childersburg, a little south of east.

Columbiana (Shelby County, Ala., O. H. T., 1887). About in sections 18 and 19, township 21, range 1 east, Huntsville meridian. On the highest of the ranges of hills about 2 miles east of Columbiana. The station was marked by a beer bottle buried mouth upward 18 inches below the surface of the ground. A large flat stone was laid on the surface. The three reference marks are nails driven in stumps of trees and situated as follows: First nail bears (magnetic) N. 20° W. at a distance of 16.09 feet from the center of the station; second nail bears (magnetic) N. 88° W. at a distance of 23.22 feet from the center of the station; third nail bears (magnetic) S. 37° E. at a distance of 12.55 feet from the center of the station.

Bryant (Coosa County, Ala., F. W. P., 1888; 1890). In the southeast quarter of the southeast quarter of the north-east quarter of section 4, township 21 north, range 17 east, St. Stephens meridian. About 2 miles, a little north of west from Travelers Rest crossroads, called also the Devil's Half Acre, on the land of Mr. James Bryant. The station was marked by a black square bitters bottle buried 3 feet below the surface of the ground. Above this was placed a 2-inch lightwood stick 2 feet long, the top about 2 inches above the surface, with a nail in it marking the center. Four pine trees, blazed, with a nail in the blaze, are at the following distances and magnetic azimuths from the station: 55.5 feet, 32° ; 7.8 feet, 38° ; 75.5 feet, 87° ; 45.8 feet, 170° . The station is at a distance of 255 feet and bears $346\frac{1}{2}^{\circ}$ (magnetic) from a stake on a section line one-half meter south of a corner (a quarter section post).

Lookout Hill (Monroe County, Ala., F. W. P., 1895). In the southeast quarter of section 35, township 10 north, range 7 east, St. Stephens meridian. On the flat top of a conical lime hill with very precipitous sides. The old hill road between Buena Vista and Bells Landing passes along the side of Lookout Hill about 100 yards north and 100 feet below the station. Tinela is 5 miles west of the station.

Lower Peach Tree longitude (Wilcox County, Ala., G. W. D., 1857; 1895). In the northeast quarter of the northwest quarter of section 14, township 10, range 5, St. Stephens meridian. The station was recovered February 7, 1893, and the underground mark found undisturbed. McConnell's west chimney is 3.26 chains distant and bears (magnetic) N. 56° W. In 1895 the station was marked by a Bedford post 6 by 6 by 30 inches, having two perpendicular lines and the letters U. S. C. & G. S. cut on the top.

Mobile grain elevator, tank on top (Mobile County, Ala., W. B. F., 1897; 1911).—Lost.

Mobile brewery flagstaff (Mobile County, Ala., F. W. P., 1895; 1911).—Lost.

Mobile Transit Pier (Mobile County, Ala., E. G., 1856; 1911). In the public square, Mobile. The pier is a block of granite, sunk 3 feet in the ground and surrounded by a curb to prevent, as far as possible, the transmission of vibrations from passing vehicles. The center of the pier is the point of reference for latitude and longitude. In 1860 the public square had been handsomely laid out and inclosed with an iron railing. The center of the pier was marked by a drill hole in the middle of the excavation made to admit the reversing apparatus of the transit. The transit is

¹ See pp. 40 and 41.

placed in the meridian by means of the line traced in the square, the extremities of which are marked by the intersection of cross lines in the tops of marble pillars sunk in the ground to nearly a level with the surface. The northern one of these pillars is near the gate on St. Francis Street, and the southern one is near the gate at the corner of Conception and Dauphin Streets. In 1907 the pier was still standing, but was not available, as trees had grown up about it. The station of 1907 is on the east side of Bienville Square and is marked by a concrete pier, consisting of a solid block of concrete 2 by 3 feet and 2 feet in the ground, upon which is built a block of solid concrete 14 by 28 inches by 3 feet high. The distance from the point on which the transit was set and the center of the pier of 1856-57 is 55.54 meters. The station of 1907 is 18.29 meters north and 53.15 meters east of the station of 1856-57.

Mobile, St. Francis Street Baptist Church spire (Mobile County, Ala., W. B. F., 1897; 1911).—Lost.

Mobile post office, Weather Bureau thermometer box (Mobile County, Ala., W. B. F., 1897; 1911).—Lost.

Point Aux Pins (Mobile County, Ala., W. B. F., 1897; 1911).—Lost.

MOBILE BAY.

PRINCIPAL POINTS.

Mullet Point (Baldwin County, Ala., C. M. E., 1848; 1911).—Lost.

Point Juliet (Mobile County, Ala., F. H. G., 1846; 1911).—Lost.

Fowl River Point (Mobile County, Ala., C. M. E., 1848). On the west side of Mobile Bay.

Great Point Clear (Baldwin County, Ala., C. M. E., 1848). On the east side of Mobile Bay.

Dog River Point (Mobile County, Ala., C. M. E., 1848). On the west side of Mobile Bay.

Ragged Point (Baldwin County, Ala., C. M. E., 1848). On the east side of Mobile Bay.

Point Zeb (Baldwin County, Ala., C. M. E., 1848). On the east side of Mobile Bay.

Choctaw Point (Mobile County, Ala., C. M. E., 1848). The station is marked by a stone pot buried 15 inches deep at the foot of the signal on the levee.

Vessel Point (Baldwin County, Ala., C. M. E., 1848). The station is marked by a stone pot buried 15 inches deep at the foot of the signal.

Dauphin Island East Base (Mobile County, Ala., J. B. B., 1892; 1908).—Lost.

Dauphin Island West Base (Mobile County, Ala., J. B. B., 1892; 1908).—Lost.

Grass (Mobile County, Ala., J. W. M., 1908; 1911).—Lost.

Beach (Mobile County, Ala., J. W. M., 1908; 1911).—Lost.

Fort Gaines (U. S. E.) (Mobile County, Ala., J. W. M., 1908; 1911). On the top of the east bastion of the old fort on a line from the point of the bastion to the sally port and about 5 feet back from the point of the bastion. The station was marked by a 2½-foot iron car axle cemented into the brick, above which it protrudes about 1 foot.

Dolphin (Mobile County, Ala., J. W. M., 1908; 1911). The station is the center of the lantern of the third channel beacon north of Fort Morgan.

Clear (Baldwin County, Ala., J. W. M., 1908; 1911). On the north shore of Mobile Point about 5 miles east of Fort Morgan and 1 mile west of Little Point Clear, on a lightly-wooded point just west of a tidal stream about 100 feet in width. The station was marked by a concrete pier, 5 feet long, 6 inches square with a conical top, 8 inches high and 20 inches in diameter. Imbedded in this cone and projecting 1½ inches above it is the neck of a brown glass bottle filled with sand and cement with a 20-penny spike projecting about an inch above the bottle. On the south side of the cone are the letters and figures U. S. C. & G. S. 1908. On the north side is the word Signal. Three blazes in triangular form and marked with nails are at the following distances from the station: 143 feet, 61 feet, 87 feet.

Sure (Baldwin County, Ala., J. W. M., 1908; 1911).—Lost.

Cedar Point (U. S. E.) (Mobile County, Ala., J. W. M., 1908; 1911). On the south side of Cedar Point north of Dauphin Island. The station is marked by an iron pipe 1 inch in diameter and projecting about 8 inches above the ground. The reference marks are two pieces of scantling 3 by 4 inches, 12.6 feet on each side of the station and nearly in line with the station and Fort Morgan. A shell pile is nearly in the same line and is 63 feet from the station. The northeast corner of a small hut belonging to the United States Army Engineers is 102 feet southeast of the station.

Little Dauphin (U. S. E.) (Mobile County, Ala., J. W. M., 1908; 1911). On the northwesternmost point of Little Dauphin Island on the highest portion of the sand area and about 30 meters northwest of the marsh. The station was marked by an iron pipe 1 inch in diameter projecting 6 inches above the ground. Nearly in line with triangulation station, Fort Morgan, and 7.3 feet on each side of the station are two pieces of scantling 3 by 4 inches and projecting about 1 foot above the ground. From high tide water the station is distant 131 feet on the north, 211 feet on the west, and 104 feet on the south. In 1910 a regulation bronze station mark was inserted into the top of the iron pipe and the pipe and disk were then embedded in a core of concrete about 2 feet in diameter. The reference mark, 2 bottles embedded in concrete cores, one level with the surface and the other 2 feet below the surface, was placed in the marsh and is 51.33 meters from the station in azimuth 353° 50'.

Juliet (Mobile County, Ala., J. C. G., 1910). About one-half mile north of the old pier at Alabama Port, and on top of the 10-foot clay bank and 9 meters back from high-water mark. The station is marked according to note 10. A reference mark, described in note 12, is 27.76 meters from the station in azimuth 81° 51'. A triangle blaze with 4 nails 4 feet above the ground on a 14-inch pine tree is 20.64 meters from the station in azimuth 76° 22'. A triangle blaze with 4 nails, 3 feet above the ground on a 13-inch gum tree, growing 4 meters back from the edge of the bank, is 32.61 meters from the station in azimuth 171° 28'. The end of the old pier is in azimuth 310° 27' from the station.

Alabama Port (U. S. E.) (Mobile County, Ala., U. S. E., 1910). About 2,000 feet from the shore on a shell pile near the end of the old canning factory wharf. The station is marked by a piece of copper rod, $\frac{1}{4}$ by 3 inches, cemented flush with the top in the center of a 10-foot piece of 2-inch iron pipe which was driven in the ground until the top just projected above the surface of the shell pile. A filled form 12 inches square surrounds the upper 1 foot of the pipe. Three reference monuments, concrete columns 4 by 4 inches by 3 feet, with the center of each marked by a piece of copper rod, $\frac{1}{4}$ by 3 inches, were placed on the shore near the eastern edge of the road running parallel to the shore, one of the three being placed in the center of the railroad and dirt-road crossing.

Mullet Point (U. S. E.) (Baldwin County, Ala., U. S. E., 1910). On Mullet Point. The station is marked by a $\frac{1}{4}$ -inch copper bolt placed in a 12-inch tile pipe filled with concrete.

Point Clear (U. S. E.) (Baldwin County, Ala., U. S. E., 1910). On the ridge of the roof of the Point Clear Hotel, 6 feet from the western gable end. The station is marked by a copper tack driven in the center of the ridge. The reference marks, concrete monuments, 4 by 4 inches by 3 feet, with a 4 by $\frac{1}{4}$ inch copper bolt in the center buried flush with the ground, are located near the tram track which runs from Point Clear Wharf to Point Clear North Wharf.

Fowl River (U. S. E.) (Mobile County, Ala., U. S. E., 1910). On the point above the mouth of Fowl River. The station is marked by a copper rod, $\frac{1}{4}$ by 3 inches, placed in the center of a 2-inch pipe 10 feet long, filled with concrete, and driven in the bottom of a hole dug to a depth of 6 feet, so that the top of the pipe was flush with the original surface of the ground. About a barrel of concrete was then placed in the hole, and a 5 by 5 inch form placed around the pipe and this filled with concrete to the top of the pipe. The reference marks, two concrete monuments, 8 by 8 inches by 3 feet, with a copper bolt in the center, are at a distance of 80.45 feet from each other and are located back in the woods.

Dog River (U. S. E.) (Mobile County, Ala., U. S. E., 1910). Above the mouth of Dog River on Dog River Point on the property of Maj. Hannon, about 1 mile below South End. The station is marked by a copper bolt, $\frac{1}{4}$ by 3 inches, in the center of a 10-foot piece of 2-inch black pipe which is in the center of a column of concrete, 10 by 10 inches by 6 feet, the top of the pipe and column being flush with the ground. The reference marks are two concrete monuments, 4 by 4 inches by 3 feet, located 59.18 and 58.15 feet from the station.

Daphne (U. S. E.) (Baldwin County, Ala., U. S. E., 1910). On the edge of the bluff about 400 feet south of Daphne Wharf. The station is marked by a $\frac{1}{4}$ by 3 inch copper bolt in the center of a 10-foot piece of 2-inch iron pipe which is in turn in the center of a 5-inch iron pipe, both pipes being filled with concrete and driven flush with the ground. The reference marks are two concrete posts, 4 by 4 inches by 3 feet, with a $\frac{1}{4}$ by 3 inch copper bolt in the center, the distance between them being 100 feet.

Apalachee (U. S. E.) (Baldwin County, Ala., U. S. E., 1910). Near the southern point of the narrow strip of land lying between Duckers Bay and Apalachee River. The station is marked by a $\frac{1}{4}$ by 3 inch copper bolt in the center of a 10-foot central pipe driven vertically along with a tripod of 2-inch black iron pipe into the ground at various depths. The pipes project $2\frac{1}{4}$ feet above the ground and around this cluster is constructed a pentagon of 12-inch sides filled with concrete.

Choctaw Point (U. S. E.) (Mobile County, Ala., U. S. E., 1910; 1911). Near the end of and on the north side of the M. J. & K. C. wharf. The reference marks are two concrete monuments, 3 by 3 inches by 3 feet, with copper bolts in the center. In 1911 an eccentric station was established and was marked by a galvanized tack in a small hole bored in the wharf, surrounded by a circle of galvanized tacks.

SUPPLEMENTARY POINTS.

Do (Mobile County, Ala., J. W. M., 1908; 1911). On West Sand Island, 200 meters from the southeast end. The station consists of three piles driven in the form of a triangle, their bases being about 6 feet apart and their tops drawn together by chains. The piles are about 15 meters out in the water from high-water line and project from 8 to 12 feet above the surface. In 1911 the station was probably lost.

Quar (Baldwin County, Ala., J. W. M., 1908; 1911). On the north shore of Mobile Point. The station is the flagpole on the north end of the quarantine station at the end of the quarantine wharf.

New (Baldwin County, Ala., J. W. M., 1908; 1911). The station is the center of a steel water tank about 135 feet high and about 930 meters east by north of Fort Morgan triangulation station, 270 meters southwest from the quarantine wharf and 170 meters from the high-water line.

Sig (Baldwin County, Ala., J. W. M., 1908; 1911). The west gable of the signal house on the top of the earthwork at Battery Dearborn, 1,080 meters east of Fort Morgan triangulation station, and 320 meters south of the quarantine wharf.

Red (Baldwin County, Ala., J. W. M., 1908; 1911). The station is Mobile Point Beacon, 224 meters southwest of Mobile Point Lighthouse.

Hant (Baldwin County, Ala., J. W. M., 1908). The flagpole on a small unpainted shed on Mobile Point, 645 meters south of the steel water tank and 320 meters north of the high-water line.

Out (Mobile County, Ala., J. W. M., 1908; 1911).—Lost.

Little Point Clear (Baldwin County, Ala., J. B. B., 1892; 1908).—Lost.

Wharf (Mobile County, Ala., J. C. G., 1910). A 2 by 4 inch scantling spiked to a pile on the northeast corner of the old abandoned wharf at Alabama Port. All the crossties are gone, but the piling will undoubtedly remain for many years to come.

Drury (Mobile County, Ala., J. C. G., 1910). On Dauphin Island on the south side of Drury Pass, 35 meters south of the high-water line, and in such a position that Grants Pass house shows just clear of the pines on Little Dauphin Island. The station is marked according to note 10.¹ The reference mark is a bottle embedded in a core of concrete flush with the surface of the ground, 38.40 meters, S. 31° 53' W. of the station.

Pine (Mobile County, Ala., J. C. G., 1910). A pole in the top of the tallest pine tree growing approximately in the center of Little Dauphin Island, about 1 mile northwest from Drury Pass. A triangle was blazed on the Mobile Bay side of the tree and another on the Dauphin Island Bay side.

Blakely (U. S. E.) (Mobile County, Ala., U. S. E., 1910; 1911). On the south point of Blakely Island facing Pintos Pass. The station is marked by a $\frac{1}{4}$ by 3 inch copper bolt placed in the center of a piece of 2-inch pipe 8 feet long, which is in turn placed in a 4-inch pipe 3 feet long. Both pipes are filled with concrete and driven flush with the ground.

Battery Mackintosh (Mobile County, Ala., E. S., 1911). On the west side of Battery Mackintosh Island, near Mobile, Ala., and 12 meters from high water. The station is marked by a copper disk triangulation mark set in a concrete post. The underground mark is a bottle set in concrete 3 feet below the surface. A post, 10 inches in diameter and 12 feet high, in which a triangle of nails was driven, is 10.04 meters from the station in azimuth 236° 33'.

Boat Club House (Mobile County, Ala., E. S., 1911). The finial on the cupola of a boathouse at the end of the wharf southwest from Choctaw Point.

Monroe Park Water Tower (Mobile County, Ala., E. S., 1911). The center of the tank of the water tower at Monroe Park, south of Mobile, Ala.

Wireless (Mobile County, Ala., E. S., 1911). The light on the western tower of the wireless telegraph on the Battle House, corner of Royal and St. Francis Streets, Mobile, Ala.

Van Antwerp Building, chimney (Mobile County, Ala., E. S., 1911). At the corner of Dauphin and Royal Streets, Mobile, Ala.

Pinto Island, stack (Mobile County, Ala., E. S., 1911). The smokestack of the works on Pinto Island opposite Mobile, Ala.

Pinto Island, water tank (Mobile County, Ala., E. S., 1911).—The water tank of the works on Pinto Island opposite Mobile, Ala.

Mobile stack (Mobile County, Ala., E. S., 1911). The smokestack of the Mobile Light & Power Co., Canal and Water Streets, Mobile, Ala.

Mobile Light & Power Plant stack (Mobile County, Ala., E. S., 1911). The middle stack of the Mobile Light & Power works (new), Theater and Water Streets, Mobile, Ala.

MOBILE BAY TO FLORIDA.

PRINCIPAL POINTS.

Jacob (Baldwin County, Ala., J. B. B., 1892; 1908). On the Gulf shore of Mobile Point, 500 meters south of Navy Cove, Mobile Bay, and three-fourths mile southwest of Pilot Town, on the last sand hill east of Fort Morgan and 4,200 meters distant from Fort Morgan triangulation station. This hill is about 15 feet above high water and 133 meters back from high-water shore line of the Gulf of Mexico, and is covered with a heavy growth of scrub and bushes. A very tall lone pine tree stands 160 meters north-northwest of the station near the edge of a strip of fresh-water marsh, which is 100 meters northeast of the station at its nearest point. The station is marked by a cross cut on the head of an iron rod, 10 inches long, embedded in the center of a drain-tile pipe, 2½ feet long, which is placed in the center of a barrel, both pipe and barrel being placed in an upright position and filled with hydraulic cement concrete. A mound of cement just covering the pipe and leaving the head of the rod exposed, is spread over the surface inclosed by the barrel. The underground mark is the cork of a bottle which stands upright in the sand 3½ feet below the surface of the hillock. In 1908 the station was not found, but it may be covered with sand.

Roy (Baldwin County, Ala., J. B. B., 1892; 1911). On the Gulf shore, 4½ miles east of Jacob triangulation station, 6½ miles east of Fort Morgan triangulation station, 1½ miles south-southeast of Three Rivers, 3 miles east of the head of St. Andrews Bay. On a sand ridge about 30 feet above high-water mark and 60 meters back from the shore line of the Gulf of Mexico. A heavy growth of bushes and scrub protects the base of the ridge and a narrow strip of marsh of small extent lies a short distance back. The station is marked by a spike set in concrete in the center of a terra-cotta drain-tile pipe, 2½ feet long, which is placed in the center of a small barrel placed upright in the ground. The barrel and pipe are filled with hydraulic cement concrete. The top of the barrel is even with the surface of the ground, and a mound of cement just covers the drain-tile pipe, leaving the head of the pipe exposed. This station was not found in 1911, but it may be found by further search.

Perdido Range (Baldwin County, Ala., A. T. M., 1889). On a sand hill about 25 feet high on the island south of Perdido Entrance. The station is marked according to note 13,¹ except that the reference posts are each 6 feet distant, northeast, southeast, southwest, and northwest, respectively.

Johnson (Baldwin County, Ala., A. T. M., 1889; 1911). On the north shore of a small bay north of the old entrance to Perdido Bay, on a sand ridge covered with oak and palmetto scrub about 100 meters from the shore and about 100 meters southwest of the abandoned house belonging to Mr. Johnson. The station is marked by a standard disk station

¹ See pp. 40 and 41.

mark in a block of concrete 10 inches square on top and underground by a jug. A reference mark, a square concrete post marked with an inscribed triangle with a nail at each vertex and the center, is on the sand ridge 25.85 meters from the station in azimuth $105^{\circ} 21'$. Another reference mark, a round concrete post marked with an inscribed circle with a nail at the center, is on the sand ridge 10.71 meters from the station in azimuth $285^{\circ} 05'$.

Perdido III (Escambia County, Fla., A. T. M., 1889). On the neck of land between Old River and the Gulf, on the second sand ridge back from the Gulf shore. The station is marked according to note 13,¹ except that the reference posts are each 6 feet distant. A pine tree near the river shore is about 300 meters N. 53° W. from the station, and the river shore at the west end of the woods is about 300 meters N. 27° E.

Bear Point (Baldwin County, Ala., A. T. M., 1889; 1911).—Lost.

Perdido II (Escambia County, Fla., A. T. M., 1889). On the neck of land which separates Old River from the Gulf, on the second sand ridge back from the Gulf shore. The station is marked according to note 13,¹ except that the reference posts are each 9 feet distant.

Hummock (Escambia County, Fla., A. T. M., 1889; 1911). On Inerarity Peninsula a few meters south of the highest part of a hill which is about 25 feet high and about one-fourth mile west of the narrow neck of the peninsula. To reach the station, land on the Inner Bay shore of the narrow neck and follow the edge of the woods until a large pine tree marked with a triangular blaze is reached just south of an old road, and then follow a blazed trail up the hill. The station is marked by a standard disk station mark in a mass of concrete 10 inches square on top, in the lower part of which is embedded a tile. The underground mark is a stone jug filled and surrounded with concrete. A pine tree and an oak tree, each marked with a triangular blaze, are, respectively, 14.15 meters N. 70° W. and 12.98 meters N. 65° W. from the station.

Goat (Escambia County, Fla., A. T. M., 1889; 1911). This station is 82.32 meters from *Goat 2* (see p. —) in azimuth $95^{\circ} 08'$. It is marked by a spike at the center of a tile which is filled and surrounded with concrete and underground by a bottle set in concrete. Three pine trees, each marked with a triangular blaze, are at the following distances and azimuths from the station: 41.21 meters, $24^{\circ} 27'$; 31.02 meters, $184^{\circ} 10'$; and 20.77 meters, $215^{\circ} 06'$.

Perdido I (Escambia County, Fla., A. T. M., 1889). On the second ridge of sand hills back of the Gulf shore south of the east end of Ono Island. The station is marked by a spike in the top of a tile which is filled and surrounded with concrete and underground by a bottle set in concrete 3 feet below the surface. Four hard pine posts, each about 7 feet distant, form a square about the station.

Nelson (Escambia County, Fla., A. T. M., 1889; 1911). About 30 paces from the edge of a bluff, which is about 35 feet high and is covered with a dense growth of small trees, on the south shore of Inerarity Peninsula northeast of the eastern end of Ono Island. A little mound, the remains of an old house, is about 6 paces east by north from the station, and an oleander is 10 paces north by east. Two magnolias about 150 meters apart can be seen from Old River, and, together with the oleander, they are the best marks for finding the locality. The station is marked by a standard disk station mark in a block of concrete 10 inches square on top and projecting about 1 foot, in the lower part of which is embedded a tile. The underground mark is a bottle. Three trees, each marked with a triangular blaze, and two old oak stumps are at the following distances from the station: Oak, 19.83 meters N. 39° E.; pine, 7.92 meters N. 46° E.; stump, 26.65 meters S. 62° E.; magnolia, 24.36 meters S. 54° E.; and stump, 12.88 meters S. 37° W.

Inerarity west (Escambia County, Fla., A. T. M., 1889; 1911). This station has been destroyed.

Rockwood (Baldwin County, Ala., A. T. M., 1889). Near the northeastern extremity of the point just south of the entrance to Bay La Launch, on a bluff just south of a wharf which extends to the northward from the end of the point, and about 300 meters northeast of Mr. Rockwood's house. The station is marked according to note 13,¹ except that there are no reference posts. A live oak tree and two live oak stumps, each marked with a blaze, are at the following distances, respectively, from the station: 4.2 meters S. 87° E., 4.3 meters S. 13° W., and 4.2 meters N. 45° E.

Ross (Baldwin County, Ala., A. T. M., 1889; 1911). In the water at the end of Ross Point, on the west side of Perdido Bay. The station is marked according to note 13,¹ except that the reference posts are each about 6 feet distant. A stump is in the water 13.5 meters south of the station and another stump is at the water's edge 4.5 meters west.

Red Bluff (Baldwin County, Ala., A. T. M., 1889; 1911). On the northwest shore of Perdido Bay, on a bluff about 50 feet high known as Red Bluffs, about 4 meters from the edge of the bluff midway between two cottages owned by Mr. M. P. LeGrand. The station is marked by a brass cartridge case in the top of a tile which is filled and surrounded with concrete. A driven well is 68.48 meters from the station in azimuth $130^{\circ} 41'$. A reference mark, a bottle at the center of a square block of concrete, is in line to the well 23.35 meters from the station. Three small pines, each marked with a triangular blaze, are at the following distances and azimuths from the station: 5.61 meters, $122^{\circ} 07'$; 9.34 meters, $125^{\circ} 39'$; and 8.17 meters, $153^{\circ} 14'$.

Manuel (Baldwin County, Ala., A. T. M., 1889; 1911).—Lost.

Dupont (Escambia County, Fla., A. T. M., 1889; 1911). On Dupont Point, a long, sandy point on the east side of Perdido Bay, near the middle of the point about 15 meters west of the woods and grass line. The station is marked according to note 14.¹ A reference mark, a round block of concrete inscribed with a triangle with a nail at the center and each vertex, is on hard land in the palmetto scrub 25.05 meters from the station in azimuth $291^{\circ} 47'$. Another reference mark, a nail at the center of a piece of tile embedded in a round block of concrete, is 46.51 meters from the station in the same azimuth as the first reference mark. Four pine trees, each marked with a triangular blaze, are at the following distances and azimuths from the station: 16.23 meters, $239^{\circ} 28'$; 21.75 meters, $259^{\circ} 26'$; 20.10 meters, $284^{\circ} 31'$; and 20.73 meters, $312^{\circ} 22'$.

¹ See pp. 40 and 41.

Suarez (Baldwin County, Ala., A. T. M., 1889; 1911). At high-water mark on a sand ridge on Suarez Point, on the west side of Perdido Bay. The station is marked according to note 17.¹ A reference mark, an iron pipe at the center of a round block of concrete, is back of the sand ridge 14.64 meters from the station in azimuth $74^{\circ} 35'$. Another reference mark, a square block of concrete inscribed with a triangle, with a nail at the center and each vertex is back of the sand ridge 20.97 meters from the station in azimuth $123^{\circ} 43'$. A pine tree and a bay tree, each marked with a triangular blaze, are, respectively, 22.65 meters from the station in azimuth $78^{\circ} 40'$ and 24.92 meters in azimuth $111^{\circ} 23'$. A dead tree is 15.32 meters distant in azimuth $160^{\circ} 50'$, and a stump is 4.28 meters distant in azimuth 324° .

Nix (Escambia County, Fla., S. F., 1890; 1911).—Lost.

Chagrin (Baldwin County, Ala., S. F., 1890; 1911).—Lost.

Cummings (Escambia County, Fla., S. F., 1890; 1911).—Lost.

Grassy (Baldwin County, Ala., S. F., 1890; 1911). In the water at the end of Grassy Point, on the northwest side of Perdido Bay. The station is marked by a galvanized iron pipe 7 feet long which projects about 2 feet above low water. A reference mark, a galvanized iron pipe 11 feet long projecting 2 feet above the ground and surrounded by a mass of concrete, is in line to station *Double* 21.20 meters from the station in azimuth $329^{\circ} 17' 42''$. Four stumps are at the following distances from the station: 1.9 meters N. 74° E., 7.2 meters S. 59° E., 5.7 meters S. 35° W., and 1.7 meters S. 65° W.

Double (Escambia County, Fla., S. F., 1890; 1911). In the water at the end of the western one of two points known as Double Point, on the southeast side of Perdido Bay. Just back of the station is a small area of hard ground on which there are some small trees and palmetto scrub. The station is marked by a galvanized iron pipe 12 feet long projecting 2 feet above high water and surrounded by a square block of concrete from 1 foot below ground to within 1 foot of the top. A reference mark, a galvanized iron pipe 6 feet long projecting 2 feet above the ground and surrounded by a mass of concrete which extends from 6 inches above the ground to 2 feet below, is on hard ground in line with station *Grassy*, 28.02 meters from the station in azimuth $149^{\circ} 17' 57''$. Another reference mark, described in note 16,¹ is on hard ground 36.6 meters from the station in azimuth $358^{\circ} 35'$. Five stumps are at the following distances from the station: 12.6 meters N. 80° E., 1.2 meters S. 5° E., 1.0 meter S. 80° W., 1.7 meters N. 5° W., and 3.7 meters N. 49° W. A pine tree and a pine stump, each marked with a triangular blaze, are, respectively, 2.44 meters and 3.50 meters from the first reference mark.

River East (Escambia County, Fla., S. F., 1890; 1911).—Lost.

River West (Baldwin County, Ala., S. F., 1890; 1911). In the water at the end of the point on the southwest side of the mouth of the Perdido River. The station is marked by a galvanized iron pipe 6 feet long surrounded by concrete. A reference mark, a galvanized iron pipe 12 feet long projecting 2 feet above the ground and surrounded by concrete, is in the marsh 26.45 meters from the station in azimuth $63^{\circ} 57'$. Two old stumps are, respectively, 6.1 meters from the station in azimuth 256° and 3.7 meters in azimuth 355° .

Boom (Escambia County, Fla., S. F., 1891; 1911). On the southern part of a point on the northeast side of Perdido River, about a mile from the mouth of the river. The station is marked by a nail in the top of a cypress stub 6 inches in diameter and 5 feet long which projects 6 inches above the ground. A dead cypress tree, a pine tree, and a cypress stump, each marked with a triangular blaze, are at the following distances, respectively, from the station: 17.86 meters N. 46° W., 25.52 meters N. 7° W., and 4.10 meters S. 12° W.

Squid (Baldwin County, Ala., S. F., 1891; 1911).—Lost.

Juniper (Baldwin County, Ala., S. F., 1891; 1911).—Lost.

Hirse (Escambia County, Fla., S. F., 1891; 1911). On a small point known as *Hirse's Landing* on the northeast shore of Perdido River, about 2 miles above the mouth. The station is marked by a nail in the top of a 4-inch tile filled with concrete. Three pine trees, each marked with a triangular blaze, are at the following distances from the station: 7.98 meters N. 6° W., 19.10 meters N. 19° E., and 6.55 meters N. 32° E.

Hard (Escambia County, Fla., S. F., 1891; 1911).—Lost.

Wire (Baldwin County, Ala., S. F., 1891; 1911).—Lost.

Steamboat (Escambia County, Fla., S. F., 1891; 1911). On a small, narrow point on the northeast shore of Perdido River, opposite the upper end of Steamboat Island. The station is marked by a nail in the top of a juniper stub 6 inches in diameter and about 4 feet long which is surrounded with concrete. A pine stump is 5.5 meters west of the station.

Roots (Baldwin County, Ala., S. F., 1891; 1911). On the southwest shore of Perdido River, about three-fourths mile above Steamboat Island and about 60 yards above the mouth of a small stream that empties into the river. The station is marked by a nail in the top of a juniper stub 6 inches in diameter and 5 feet long. A pine stump, a cypress tree, and two pine trees, each marked with a triangular blaze, with a nail at the center of the blaze, are at the following distances, respectively, from the station: 1.83 meters, 9.30 meters, 10.67 meters, and 7.92 meters.

Kee (Escambia County, Fla., S. F., 1891; 1911). On soft ground on the northeast side of Perdido River, about three-fourths mile above Steamboat Island. The station is marked by a nail in the top of a tile which is filled with concrete. Three small pine trees, each marked with a triangular blaze, with a nail at the center of the blaze, are at the following distances from the station: 5.20 meters northeast, 5.67 meters south-southeast, and 1.98 meters north-northeast.

Alabama Cut-off (Baldwin County, Ala., S. F., 1891; 1911). On soft ground on the southwest point of the island which is between the main channel of Perdido River and Alabama Cut-off. The station is marked by a nail in the top of a juniper stub 6 inches in diameter and 5 feet long. A pine tree, a pine stump, and a juniper stump, each marked

¹ See pp. 40 and 41.

with a triangular blaze, with a nail at the center of the blaze, are at the following distances from the station: 3.35 meters north, 2.13 meters west-northwest, and 1.98 meters east-southeast.

Florida Cut-off (Escambia County, Fla., S. F., 1891; 1911). On firm ground on the northeast side of Perdido River just below the mouth of a creek known as Florida Cut-off. The station is marked by a nail in the top of a tile which is filled with concrete. A pine stump, a dead pine tree, and a juniper tree, each marked with a triangular blaze with a nail at the center of the blaze, are at the following distances, respectively, from the station: 2.01 meters west-northwest, 6.35 meters north-northeast, and 5.60 meters northwest.

Titi (Baldwin County, Ala., S. F., 1891; 1911). On the west shore of Perdido River just north of the entrance to Alabama Cut-off and about one-fourth mile south of the mouth of Blackwater River. The station is marked by a nail in the top of a tile which is filled with concrete. Two juniper trees and a cypress tree, each marked with a triangular blaze with a nail at the center of the blaze, are at the following distances, respectively, from the station: 4.49 meters north, 4.27 meters northeast, and 5.03 meters southeast.

Bay (Escambia County, Fla., S. F., 1891; 1911).—Lost.

Log (Baldwin County, Ala., S. F., 1891; 1911). On soft ground near the southwest extremity of the point between Blackwater and Perdido Rivers. The station is marked by a nail in the top of a juniper stub 6 inches in diameter and 5 feet long. A pine tree, a juniper stump, and a dead juniper tree, each marked with a triangular blaze with a nail at the center of the blaze, are at the following distances, respectively, from the station: 3.89 meters north, 3.20 meters southeast, and 6.25 meters southwest.

Goat 2 (Escambia County, Fla., E. S., 1911). On the north shore of Ono Island just in front of a clump of small oak trees about 20 meters from the extremity of Goat Point. The station is marked according to note 14.¹ A reference mark, described in note 15,¹ is 10.48 meters from the station in azimuth 280° 43'. Five pine trees and one oak tree, each marked with a triangular blaze, are at the following distances and azimuths from the station: 18.52 meters, 101° 34'; 18.46 meters, 105° 27'; 20.90 meters, 184° 51'; 22.04 meters, 189° 03'; (oak) 12.30 meters, 295° 55'; and 16.89 meters, 3° 55'.

Ross 2 (Baldwin County, Ala., E. S., 1911). At the western end of Perdido Bay, on a sand ridge just back of the marsh on Ross Point and about one-fourth mile from Josephine post office. The station is marked according to note 17.¹ Three pine trees, each marked with a triangular blaze, are at the following distances and azimuths from the station: 19.75 meters, 29° 05'; 19.77 meters, 51° 17'; and 22.02 meters, 132° 18'.

Inerarity west 2 (Escambia County, Fla., E. S., 1911). At the southwest end of Perdido Bay, on the high part of a hummock about 50 meters from the northwest extremity of Inerarity Peninsula and about midway between the shore to the north and the marsh to the south. The station is marked according to note 17.¹ A reference mark, described in note 15,¹ is 7.39 meters from the station in azimuth 284° 12'. Four pine trees and one magnolia, each marked with a triangular blaze, are at the following distances and azimuths, respectively, from the station: 17.66 meters, 39° 04'; 10.79 meters, 110° 15'; 9.33 meters, 175° 01'; 18.10 meters, 271° 36'; and 38.50 meters, 283° 28'.

Bear Point 2 (Baldwin County, Ala., E. S., 1911). On a sand ridge near the shore on Bear Point and separated by a marsh from a high sand hill back of the station covered with oaks and palmettos. The station is marked according to note 17.¹ A reference mark, described in note 15,¹ is on the hill mentioned above, 57.90 meters from the station in azimuth 150° 09'.

Inlet (Escambia County, Fla., E. S., 1911). On a bluff on the south shore of Ono Island directly opposite the inlet to Perdido Bay that was opened in the storm of 1906. The station is marked by a standard disk station mark in the top of a galvanized-iron pipe 7 feet long which projects 6 inches above the ground and is surrounded by a block of concrete 10 inches square and 2 feet deep. Two pine trees, each marked with a triangular blaze, are, respectively, 70 meters from the station in azimuth 152° 41' and 57 meters in azimuth 180° 28'.

Ala (Baldwin County, Ala., E. S., 1911). On the most easterly sand hill on Alabama Point. The station is marked by a standard disk station mark in the top of a galvanized-iron pipe 7 feet long which projects 8 inches above the surface and is surrounded at the upper end by a round block of concrete 2 feet deep. The only pine tree on the point, marked with a triangular blaze, is 50.50 meters from the station in azimuth 226° 45'.

SUPPLEMENTARY POINTS.

Tarkill (Escambia County, Fla., A. T. M., 1889). On a rounded point, just south of Tarkill Bay on the east side of Perdido Bay, on a hard sand hill about 5 feet high. The station is marked by a nail in the top of a stake. A burnt stump and a pine stump, each marked with a blaze and a spike, are, respectively, 7.6 meters S. 44° E. and 5.9 meters N. 41° W. from the station.

Bend (Escambia County, Fla., S. F., 1890; 1911).—Lost.

Fell (Baldwin County, Ala., S. F., 1890; 1911). On the west side of Perdido Bay about a mile north of Suarez Point and about one-half mile north of Fells Point, on the beach below a bluff just north of a break in the bluff, and about 15 meters from high-water mark. The station is marked according to note 17,¹ except that there is a standard disk station mark in the bottle of the underground mark. It was reported in 1913 that the disk had been removed from the surface mark. A reference mark, a nail in the top of a juniper stake embedded in a square block of concrete, is on the bluff 61.84 meters from the station in azimuth 210° 16'. Another reference mark, similar to the first except that the concrete is finished round, is below the bluff 50.45 meters from the station in azimuth 236° 46'. A pine tree

¹ See pp. 40 and 41.

marked with a triangular blaze with a spike at the center of the blaze is on the bluff in azimuth $120^{\circ} 07'$ from the station. A dead juniper tree, similarly marked, is 9.21 meters from the station in azimuth $323^{\circ} 44'$. Other distances and azimuths were measured as follows: Stump, 13.30 meters, $40^{\circ} 15'$; pine tree, 9.16 meters, $219^{\circ} 43'$; and stump, 3.46 meters, $294^{\circ} 20'$.

May (Baldwin County, Ala., S. F., 1890; 1911).—Lost.

Cove (Escambia County, Fla., S. F., 1890; 1911).—Lost.

Powell (Escambia County, Fla., S. F., 1890; 1911).—Lost.

Head (Escambia County, Fla., S. F., 1890; 1911).—Lost.

Hester (Escambia County, Fla., S. F., 1890; 1911).—Lost.

Marcus (Escambia County, Fla., S. F., 1890; 1911).—Lost.

MISSISSIPPI SOUND AND LAKE BORGNE.

PRINCIPAL POINTS.

Cedar (Mobile County, Ala., J. C. G., 1910). On the western shore of Mobile Bay, $1\frac{1}{2}$ miles south of Alabama Port, and about 420 meters (paced) south of the southernmost trees of the pine forest in that vicinity, and on the center of the sand ridge which traverses the shore line. The station is marked according to note 10.¹ Two reference marks described in notes 11¹ and 12¹ are, respectively, 17.30 meters from the station in azimuth $107^{\circ} 39'$, and 55.54 meters from the station in azimuth $196^{\circ} 49'$.

Cat (Mobile County, Ala., J. C. G., 1910). On the southeastern part of Cat Island, and on the highest part of the island on the second shell ridge when approaching from the eastward. The station is marked according to note 10.¹ Two reference marks, described in notes 11¹ and 12¹ are, respectively, 11.83 meters from the station in azimuth $185^{\circ} 37'$, and 15.31 meters from the station in azimuth $48^{\circ} 44'$.

Pins (Mobile County, Ala., J. C. G., 1910). On Point aux Pins, 140 meters S. 40° W. (true) from the grove of scrub oaks growing on the south ridge of the timber. The station is best approached from the west, landing at the lone clump of bushes on the western shore of the point and following the bayou that opens into Grand Bay a few meters south of the bushes. This bayou or tidal slough runs dry at extreme low water. When the scrub oaks at the edge of the timber bear N. 40° E. the station is about 15 meters north of the bayou. The station is marked according to note 10.¹ Two reference marks, described in note 12¹ are, respectively, 22.36 meters from the station in azimuth $142^{\circ} 24'$, and 42.28 meters from the station in azimuth $209^{\circ} 50'$. A third reference mark, consisting of a bottle embedded in a core of concrete flush with the surface, and an underground mark, a 100-penny spike embedded in a core of concrete 3 feet below the surface, is 139.39 meters from the station in azimuth $220^{\circ} 18'$, and is on the south edge of a grove of scrub oaks on the edge of the timber line.

Grand (Jackson County, Miss., J. C. G., 1910). On the sand ridge about 500 meters east of the western end of Grand Batture Island. The station is marked according to note 10.¹ Two reference marks, described in notes 11¹ and 12¹ are, respectively, 73.02 meters from the station in azimuth $167^{\circ} 57'$, and 39.64 meters from the station in azimuth $253^{\circ} 21'$.

Petit (Jackson County, Miss., J. C. G., 1910). On the north side of Petit Bois Island at its widest point, which is about 5 miles from its western end, on top of a sand hill in the first row of hillocks when approaching from the north, and is practically due north of the center of the largest lagoon on the island. The station is marked according to note 10.¹ Two reference marks described in note 12¹ are, respectively, 42.25 meters from the station in azimuth $306^{\circ} 03'$, and 71.98 meters from the station in azimuth $7^{\circ} 01'$. A lone pine tree off the eastern end of the pine forest is in azimuth $2^{\circ} 37'$. The western tangent to the forest is in azimuth $68^{\circ} 18'$.

Horn (Jackson County, Miss., J. C. G., 1910). On the north side of Horn Island, about 4 miles from its eastern end, on the top of the sand bank paralleling the shore line. The station is marked according to note 10.¹ Reference marks 2 and 3, described in note 12¹ are, respectively, 49.00 meters from the station in azimuth $352^{\circ} 57'$, and 37.74 meters from the station in azimuth $42^{\circ} 08'$. Reference marks 1 and 4, triangular blazes with 4 nails on pine trees, 4 feet above the ground, are, respectively, 49.38 meters from the station in azimuth $352^{\circ} 14'$, and 37.92 meters from the station in azimuth $44^{\circ} 07'$. The distances between reference marks 1 and 2, between 2 and 3, and between 3 and 4, are, respectively, 0.74 meter, 37.51 meters, and 1.36 meters.

Pascagoula (Jackson County, Miss., J. C. G., 1910). The center of the ball on the top of the water tank of the Pascagoula Beach Waterworks. The tank is mounted on a skeleton, four-legged steel framework 100 feet high, which, together with the concrete foundation and the 25-foot tank, places the station mark about 130 feet above the ground. The whole structure is painted black and is a prominent landmark for all parts of the sound. The balcony around the base is not very rigid and makes the station a rather undesirable one to occupy.

Belle (Jackson County, Miss., J. C. G., 1910). On Belle Fontaine Point, 3 meters from high water, on the westernmost position on the point from which Pascagoula water tank could be seen just clear of the trees to the eastward. The timber in this vicinity consists entirely of live oaks with the exception of one lone pine growing a few meters south of the timber line and about 100 meters west of the station. The station is marked according to note 10.¹ Reference marks 1 and 2, described in note 12¹ are inside of the timber line about 12 meters north of the sand dune paralleling the shore line and are, respectively, 54.15 meters from the station in azimuth $175^{\circ} 19'$, and 76.47 meters from the station

¹ See pp. 40 and 41.

in azimuth $234^{\circ} 06'$. A triangular blaze with 4 nails on an oak is 0.495 meter from reference mark 1 in azimuth $174^{\circ} 51'$, and reference mark 2 is 66.96 meters from reference mark 1 in azimuth $277^{\circ} 34'$. A triangular blaze with 4 nails on an oak, and a similar blaze on a magnolia, are, respectively, 0.78 meter from reference mark 2 in azimuth $195^{\circ} 35'$, and 10.60 meters from reference mark 2 in azimuth 177° .

Club (Jackson County, Miss., J. C. G., 1910). On the northwesternmost point of Horn Island, about 80 meters southwest from the mouth of the bayou, which is the outlet of the large lagoon on the west end of the island. There is a lone pine tree growing at the north edge of the sand dunes and due south from the mouth of the bayou. The station is marked according to note 10.¹ Two reference marks described in note 12¹ are, respectively, 76.70 meters from the station in azimuth $304^{\circ} 26'$, and 25.03 meters from the station in azimuth $356^{\circ} 48'$. Another reference mark, a triangular blaze with 4 nails on the lone pine, is 77.43 meters from the station in azimuth $304^{\circ} 27'$.

Deer (Jackson County, Miss., J. C. G., 1910). About 800 meters from the east end of Deer Island, on the narrow sand neck between the wooded portion of the island and the marsh on the extreme eastern point. The station is marked according to note 10.¹ Reference marks 1 and 2, described in note 12,¹ are, respectively, 44.50 meters from the station in azimuth $116^{\circ} 54'$, and 25.37 meters from the station in azimuth $213^{\circ} 29'$. A lone dead oak is 94.2 meters from the station in azimuth $269^{\circ} 29'$. Reference mark 2 is 53.70 meters from reference mark 1 in azimuth $268^{\circ} 54'$, and the dead oak is from reference mark 1 in azimuth $277^{\circ} 30'$. The dead oak is 82.3 meters from reference mark 2 in azimuth $283^{\circ} 06'$.

Ship (Harrison County, Miss., J. C. G., 1910). On the north side of East Point on Ship Island, abreast of the center and on the north edge of the group of grass-covered sand dunes on the end of the point. The station is marked according to note 10.¹ Reference marks 1 and 2, described in note 12,¹ are, respectively, 15.97 meters from the station in azimuth $331^{\circ} 07'$, and 30.335 meters from the station in azimuth $23^{\circ} 51'$. Reference mark 3, described in note 11,¹ is in azimuth $342^{\circ} 55'$. Reference mark 3 is 24.31 meters from reference mark 1, and reference mark 2 is 24.26 meters from reference mark 1. Reference mark 3 is 26.025 meters from reference mark 2.

Monk (Jackson County, Miss., J. C. G., 1910). On the southwest side of Belle Fontaine Point in a position where the south tangent to Deer Island is S. 95° W., on the sand ridge paralleling the shore and 12 meters back from high water. There is a conspicuous oak in azimuth $166^{\circ} 12'$ at the northwest end of the scrub timber skirting the large marsh. The station is marked according to note 10,¹ except there is no underground mark. A reference mark described in note 12,¹ except there is no underground mark, is 30.76 meters from the station in azimuth $242^{\circ} 17'$.

Bill (Jackson County, Miss., J. C. G., 1910). On the eastern shore of Biloxi Bay, in the center of the sand ridge paralleling the shore line and in a position where the east end of Deer Island is S. 40° W. The station is marked according to note 10,¹ except there is no underground mark. A reference mark, described in note 12,¹ except there is no underground mark, is 23.13 meters from the station in azimuth $159^{\circ} 20'$. The northern end of a narrow strip of scrub growth is in azimuth $204^{\circ} 40'$.

Marsh (Jackson County, Miss., J. C. G., 1910). Near the extreme end of Marsh Point, 6 meters from the northern and 5 meters from the western shore line. The station is marked according to note 10,¹ except there is no underground mark. A reference mark, described in note 12,¹ except there is no underground mark, is 17.95 meters from the station in azimuth $297^{\circ} 21'$. The Biloxi water tank is in azimuth $101^{\circ} 07'$.

Oz (Jackson County, Miss., J. C. G., 1910). On the north shore of Deer Island at a point from which Marsh Point is N. 39° E., 4 meters back from high water. The station is marked according to note 10.¹ A reference mark described in note 12¹ is 26.60 meters from the station in azimuth 21° . A triangular blaze with 4 nails on a pine standing practically on the shore line is 3.63 meters from the station in azimuth $292^{\circ} 06'$. Another triangular blaze with 4 nails, 4 feet above the ground on a large pine tree, is 27.30 meters from the station in azimuth $333^{\circ} 17'$.

Plum (Jackson County, Miss., J. C. G., 1910). On Plummers Point on the east side of Biloxi Bay, on top of the clay bank, 150 meters south of the railroad trestle. The station is marked according to note 10.¹ A reference mark described in note 12¹ is 19.315 meters from the station in azimuth $242^{\circ} 51'$. A triangular blaze with 4 nails on a pine tree is 9.01 meters from the station in azimuth $207^{\circ} 08'$.

Cad (Jackson County, Miss., J. C. G., 1910). On the north side of Point Caddie, Biloxi Bay, on the end of the first clay bank north of the marsh which lies north of the Louisville & Nashville Railroad trestle. An old pine stump is on the extreme end of the clay bank and the station is about 1 meter northwest of it. The station is marked according to note 10.¹ A reference mark, described in note 12,¹ is in a group of small pines a few meters east of the trail paralleling the coast, and is 34.26 meters from the station in azimuth $73^{\circ} 51'$. A triangular blaze with 4 nails on a small lone pine is 24.68 meters from the station in azimuth $339^{\circ} 40'$.

Fort (Jackson County, Miss., J. C. G., 1910). On Fort Point, Biloxi Bay, 6 meters from high water on the sand ridge on the west side. The station is marked according to note 10.¹ A reference mark, described in note 12,¹ is 30.403 meters from the station in azimuth $237^{\circ} 17'$. A triangular blaze with 4 nails on the lone pine is 33.35 meters from the station in azimuth $237^{\circ} 12'$. A triangular blaze with 4 nails on a large lone pine near the shore line and south of the station is 40.20 meters from the station in azimuth $305^{\circ} 41'$.

Can (Harrison County, Miss., J. C. G., 1910). On the north side of the Back Bay of Biloxi, on top of the clay bank on the prominent point north of Barnards Island. On the eastern side of the point a few meters southeast of the easternmost pecan tree in a row of 5 pecan trees on the end of the point. The station is marked according to note 10.¹ A reference mark, described in note 12,¹ is 14.60 meters from the station in azimuth $61^{\circ} 34'$. A triangular blaze with 4 nails on a live oak is 16.02 meters from the station in azimuth $46^{\circ} 34'$.

¹ See pp. 40 and 41.

Barn (Harrison County, Miss., J. C. G., 1910). On the south side of the Back Bay of Biloxi, on Rhodes Point due south of the western part of Barnards Island, about 1 meter north of the old abandoned sawmill opposite the center of the east wing of the main building. The station is marked according to note 10.¹ A reference mark, a triangle with a hole at the center chiseled into the west face of the concrete engine base under the east wing of the sawmill, is 3.995 meters from the station in azimuth 356° 36'.

Wharf (Harrison County, Miss., O. B. F., 1902; 1903).—Lost.

Gulfport front light (Harrison County, Miss., O. B. F., 1902; 1903). The larger beacon at the south end of the west arm of the wharf at Gulfport. It is a wooden pole with a circle made of slats near its top.

Pitcher Point (Harrison County, Miss., J. B. B., 1903). Four or five miles east of the village of Pass Christian on Pitcher Point in a clump of pines on a sand hill between the public road and the beach. The station is 19.1 meters from the center of the public road, 17 meters from the shore line at ordinary water, and 69.5 meters from the mouth of the bayou east of this point and in line to Front Beacon at Gulfport. The station is the center of two terra-cotta pipes, 2 feet long and 4 inches in diameter, placed vertically one above the other and sunk flush with the ground.

Cabbage (St. Bernard County, La., J. B. B., 1903; 1909). Opposite Cabbage Shoal, 75 feet from the shore line when the distance is measured in the direction of Merrills Shell Bank Lighthouse. In 1909 the shore line had washed away so much that the station was only about 15 feet from the shore line measured in this same direction. The whole eastern end of Isle au Pitre is being so rapidly washed away that the station will probably soon be lost. The station is marked according to note 5.¹

Grand Pass (St. Bernard County, La., J. B. B., 1903). At the northwest entrance of Grand Pass Bayou, 22 meters from the north shore and 53 meters from the west shore of the entrance. The station is marked according to note 5.¹

Turkey (St. Bernard County, La., J. B. B., 1903; 1909). Near the northwest entrance of Turkey or Johnson Bayou, 43 meters distant from the west shore line and 28 meters distant from the north shore line. The station is marked according to note 5.¹

Grand Island (St. Bernard County, La., J. B. B., 1903; 1909). On the east shore of Grand Island between Mississippi Sound and Lake Borgne, south of the central east and west line of the island, on the only sand spit in the vicinity, 25 meters from the shore line. The station is marked according to note 5.¹ In 1909 the station was only 33 feet from the high-water line. The sand spit was no longer well marked, the shore line being mostly shell and mud. The top terra-cotta pipe was flush with the ground.

Three Mile (St. Bernard County, La., J. B. B., 1903; 1909). Near the northwest entrance of Three Mile Bayou 17 meters from the west shore line and 75 meters from the north shore line. The station was marked according to note 5.¹

Bayou (St. Bernard County, La., J. B. B., 1903; 1909). About half-way between Malheureux and Three Mile Bayou, in a marsh, 20 meters south of the shore line of Mississippi Sound, east of a pocket in the shore line and about 300 meters east of a small pond. The station was marked according to note 5.¹ In 1909 the station was only 9.2 meters from the high-water line. It was about two-thirds of the way from Malheureux Point to Nine Mile Bayou, and two-fifths of the way from Malheureux Point to Three Mile Bayou. The pocket in the shore line was not well marked.

Malheureux Point 2 (St. Bernard County, La., E. M., 1909). At the point where the most southerly trend of the shore line begins. The station is marked by two terra-cotta pipes, 2½ feet long, 4 inches in diameter, sunk one above the other, flanges down, with concrete packed around them. The top pipe projects 8 inches above the marsh and is filled with concrete. The distance to the north shore high-water line in a line tangent to the west end of Petit Pass Island is 108 feet, and the distance to the west shore high-water line in the direction to Rigolets is 94 feet.

Biloxi Bayou (St. Bernard County, La., E. M., 1909). In the Louisiana marshes in Biloxi Bayou, the mouth of the bayou being about 1¼ miles east of Point aux Marchettes, on the north shore toward Malheureux Point. The bayou forks about 200 feet from the mouth, and the station is on the south bank of the west fork at such a point that the line from the station tangent to the west bank of the mouth of Biloxi Bayou is also tangent to the east bank. The station is marked by two terra-cotta pipes, 2 feet long, 4 inches in diameter, sunk one above the other, flanges down, with concrete packed around them. The upper pipe projects 8 inches above the marsh. The distance to the shore line in the direction to the mouth of Biloxi Bayou is 75 feet, and the distance to the nearest point on the shore line is 42 feet.

Creole (St. Bernard County, La., E. M., 1909; 1910). On the south shore of Isle au Pitre, about 400 meters east of the east shore of Creole Gap and 20 meters from the shore line. The station was marked according to note 7¹ and is a Louisiana and Mississippi boundary range mark.

Pitre (St. Bernard County, La., E. M., 1909; 1910). In a small pocket just south of the eastern extremity of Isle au Pitre. The island is rapidly washing away at this point, due to the severe southeast storms occurring in this vicinity. The station was marked by a 3 by 3 inch block of wood embedded about 2 inches in the concrete cap over the piling. The station is a Louisiana and Mississippi boundary range mark.

Spit (Harrison County, Miss., E. M., 1909; 1910).—Lost.

Middle (Harrison County, Miss., E. M., 1909; 1910). On the south shore of Middle Spit, Cat Island, about three-fourths mile east of Negro Point and about 15 meters from the shore line. The station was marked according to note 6¹ and is a Louisiana and Mississippi boundary range mark.

South (Harrison County, Miss., E. M., 1909; 1910). On the south shore of Cat Island about 1 mile east of Cat Island Lighthouse. It is in the center of a 100-foot vista cut in a northeasterly direction through Cat Island and 25

¹ See pp. 40 and 41.

feet from the shore line. The station was marked according to note 6¹ and is a Louisiana and Mississippi boundary range mark.

North (Harrison County, Miss., E. M., 1909; 1910). On the north shore of Cat Island about 1.6 miles east of Cat Island Lighthouse, and about 50 meters from the shore line in the center of a 100-foot vista cut in a southwesterly direction through the woods on Cat Island. The station was marked according to note 6¹ and is a Louisiana and Mississippi boundary range mark.

SUPPLEMENTARY POINTS.

Ran (Mobile County, Ala., J. C. G., 1910). About 1½ miles north of Cedar Point on the marshy strip of land between Heron Bay and Mobile Bay. The station is marked according to note 10,¹ except that there is no underground mark. The reference mark is a conical mound 3½ feet in diameter and 2½ feet high, thrown up around a 2 by 4 inch scantling projecting 3 feet above the ground and is 48.62 meters N. 8° 30' E. (magnetic) of the station. Two lone piles on the edge of Heron Bay are N. 295° E. (magnetic) of the station. Jewells, or Jules, house in Heron Bayou is N. 279° 30' E. (magnetic) of the station. The left tangent to pine woods on Mon Louis Island is N. 257° 45' E. (magnetic) of the station.

Heron (Mobile County, Ala., J. C. G., 1910). On the top of the low sand ridge traversing the tongue of land known as Barrys Point, and about 75 meters westward from the end of the point. The station is marked according to note 10,¹ except that there is no underground mark. The reference mark is a conical mound 3 feet in diameter, 2 feet high, with a 2 by 4 inch stub in the center and 27.45 meters N. 47° 30' E. (magnetic) of the station.

Pear (Mobile County, Ala., J. C. G., 1910). About 200 meters north of Cedar Point. The station is a pole spiked into the top of the tallest tree in that vicinity. A triangular blaze with four nails 4 feet above the ground on the hackleberry tree bearing the pole is 0.2 meter N. 250° E. (magnetic) of the station. The southwest corner of an old shack is N. 70° E. (magnetic) and the northeast corner of another shack is N. 165° E. (magnetic) of the station.

Bar (Mobile County, Ala., J. C. G., 1910). On Mon Louis Island on the sand ridge traversing the beach, about one-half mile east of Berron Point and 4 meters from high water. The station is abreast of a lone low clump of bushes growing about 60 meters back from the shore line, the only bushes in this general locality. The station is marked according to note 10,¹ except that there is no underground mark. One reference mark is a bottle imbedded in a core of concrete flush with the surface, and 57.66 meters N. 329° 15' E. (magnetic) of the station. Another reference mark is a conical mound with a 2 by 4 inch stub in the center and 58.91 meters N. 7° E. (magnetic) of the station. The first reference mark is 38.17 meters N. 255° 45' E. (magnetic) of the second reference mark.

Mid (Mobile County, Ala., J. C. G., 1910). On Dauphin Island approximately midway between the two Dauphin Island base stations, on the highest grass covered sand knoll in this vicinity. The station is marked according to note 10.¹ A reference mark, described in note 12,¹ is 27.19 meters N. 212° 30' E. (magnetic) of the station.

Herb (Mobile County, Ala., J. C. G., 1910). On the sand ridge paralleling the shore line on the southeastern end of Isle aux Herbes. The station is marked according to note 10,¹ except that there is no underground mark. A reference mark, described in note 12,¹ except that there is no underground mark, is 30.68 meters N. 267° E. (magnetic) of the station. Another reference mark is a conical mound 4 feet in diameter, with a 2 by 4 inch stub in the center projecting 3 feet above the marsh, and 40.65 meters N. 12° E. (magnetic) of the station.

Murder (Mobile County, Ala., J. C. G., 1910). On the western side of Mon Louis Island, on a shell bank near the southwestern extremity of Murder Point and about one-half mile north northeast from Raccoon Island. The station is marked according to note 10.¹ A reference mark, described in note 12,¹ is 8.83 meters N. 344° E. (magnetic) of the station. A second reference mark is a triangular blaze with four nails on a lone hackleberry tree 11.40 meters N. 174° E. (magnetic) of the station.

Negro (Mobile County, Ala., J. C. G., 1910). On the north side of Fowl River Bay, one-fourth mile east of Negro Bayou at the point where the trend of the shore line turns sharply toward the northward, and 7 meters back from the shore line. The station is marked according to note 10,¹ except that there is no underground mark. A reference mark, a bottle imbedded in a core of concrete flush with the surface, is 14.60 meters N. 243° E. (magnetic) of the station.

In (Mobile County, Ala., J. C. G., 1910). On the point about one-half mile east of Bayou Coq d' Inde, 3½ meters south of the road paralleling the beach in this vicinity, and 24 meters west of the point where the road changes its trend from an east and west direction to an east-southeast and west-northwest direction. The station is marked according to note 10.¹ A triangular blaze with 4 nails on the first pine tree west of the turn in the road is 3.39 meters N. 313° 30' E. (magnetic) of the station. A reference mark, described in note 12,¹ is 48.52 meters N. 30° E. (magnetic) of the station. A triangular blaze with 4 nails on a live oak, 1.1 meters in diameter, is 4.13 meters N. 25° E. (magnetic) of the reference mark. Another oak, unmarked, is 9.1 meters N. 52° 30' E. (magnetic) of the reference mark.

Lit (Mobile County, Ala., J. C. G., 1910). One and one-half miles west of Portersville, on a shell pile at the mouth of and on the east bank of Little River. The station is marked according to note 10.¹ The reference mark is a 40-penny nail cemented in the neck of a bottle and slightly projecting above the top, the bottle being imbedded in a concrete core flush with the surface, and 23.16 meters N. 121° E. (magnetic) of the station. Twin pines at Point aux Pins are N. 221° 15' E. (magnetic), Portersville stack is N. 104° E. (magnetic), and a private beacon is N. 125° 30' E. (magnetic) of the station.

West (Mobile County, Ala., J. C. G., 1910). Three hundred meters (paced) east of the western end of Dauphin Island, on the first grass covered sand knoll when approaching from the westward. The station is marked according

¹ See pp. 40 and 41.

to note 10.¹ No reference marks were established as it is highly improbable that any marking on this end of the island will outlast a hurricane season.

Miss (Mobile County, Ala., J. C. G., 1910). Five hundred and fifty meters (paced) from the eastern end of Petit Bois Island, on a lone weed covered hillock. The end of the island is N. 0° 38' E. (magnetic) of the station. The station is marked according to note 10.¹ No reference marks were established as no marking on this end of the island will probably outlast a hurricane season.

Bat (Mobile County, Ala., J. C. G., 1910). On the sand ridge paralleling the southern shore line, and about 50 meters west of the eastern end of Grande Batture Island. The station is marked according to note 10.¹ The reference mark, a 7-inch ash log, set vertically in a core of concrete and projecting 10 feet above the ground, is 17.50 meters from the station in azimuth 159° 47'.

Rain (Mobile County, Ala., J. C. G., 1910). On the point in Grand Bay, lying due north of Marsh Island. The station is the southernmost living pine tree, 8 inches in diameter, and has a triangular blaze with 4 nails on its south side about 4½ feet above the marsh.

Lost (Jackson County, Miss., J. C. G., 1910). On the southeasterly side of Point aux Chenes, on the sand ridge paralleling the shore line, and about 410 meters (paced) east of Bayou Brim. The station is marked according to note 10.¹ A reference mark, a conical mound with a 2 by 4 inch stub at the center, projecting 3 feet above the marsh, is 29.62 meters N. 323° 30' E. (magnetic) of the station.

Jose (Jackson County, Miss., J. C. G., 1910). On the south point of Joses Island on the shell pile. This island lies at the head of the central portion of Point aux Chenes Bay, and is partly covered by a thick growth of scrub oaks, whereas the adjoining regions are marshy and treeless. The station is marked according to note 10.¹ The reference mark, a triangular blaze with 4 nails on a 5-inch oak, is 12.60 meters N. 351° 30' E. (magnetic) of the station.

Clear (Jackson County, Miss., J. C. G., 1910). On a shell pile, on the south end of the island lying east of Point Clear Bayou. The station is marked according to note 10.¹ A reference mark, described in note 12,¹ is 32.75 meters N. 33° 15' E. (magnetic) of the station.

Aux (Jackson County, Miss., J. C. G., 1910). On the sand ridge paralleling the shore line of Point aux Chenes about 1 mile southeast of Priestly Bayou, 25 meters east of the easternmost live oaks in the vicinity, and 10 meters from high water. The station is marked according to note 10.¹ Reference mark 1, described in note 12,¹ is 28.48 meters N. 312° 30' E. (magnetic) of the station. Reference mark 2, a triangular blaze with 4 nails on a live oak, is 64.78 meters N. 323° E. (magnetic) of the station, and is 37.01 meters N. 331° E. (magnetic) of reference mark 1.

Green (Jackson County, Miss., J. C. G., 1910). On Greenwoods Island, on the sand ridge paralleling the shore line, about 50 meters from the Bayou Chico. When approaching from Bayou Chico the station is at the point where the shore line changes from a general southerly trend to an easterly direction. The station is marked according to note 10.¹ A reference mark, described in note 12,¹ except that there is no underground mark, is 17.47 meters N. 327° E. (magnetic) of the station. A lone live oak blown over by storms lies directly over the reference mark. A triangle was cut on the trunk just over the mark.

Wet (Jackson County, Miss., J. C. G., 1910). On the western end of Petit Bois Island. The station is an old survey point established by the port engineer of Pascagoula while making a survey of Horn Island Pass. The station was originally marked by a tack in the top of a 4 by 4 inch stub. This was cut off 2 feet below the surface and the station was marked according to note 10,¹ except that there is no underground mark. Two lone creosote piles are, respectively, 151.80 meters N. 302° E. (magnetic) and 124.65 meters N. 348° E. (magnetic) of the station. Horn Island Pass Lighthouse is N. 38° 30' E. (magnetic) of the station. A temporary pilot's range mark is N. 246° 30' E. (magnetic) of the station.

Lot (Jackson County, Miss., J. C. G., 1910). About 1 mile west of the eastern end of Horn Island, in the approximate center of the second group of dead oaks when approaching from the east. The station is marked according to note 10.¹ A reference mark, described in note 12,¹ is 13.58 meters N. 160° E. (magnetic) of the station.

Ned (Jackson County, Miss., J. C. G., 1910). On the north end of Round Island, about 30 meters north of some young pine trees and 8 meters northeast of a lone large live oak. The station is marked according to note 10.¹ A reference mark, a triangular blaze with 4 nails on the northernmost trunk of the large live oak, is 8 meters N. 241° 15' E. (magnetic) of the station.

Grave (Jackson County, Miss., J. C. G., 1910). On the point lying 1½ miles east of Graveline Bayou, in the westernmost position which will see the shore line trending to the northeast, and 3 meters from high water. The station is marked according to note 10.¹ Reference mark 1, consisting of 2 bottles embedded in concrete cores, one 3 feet below the surface and the other 4 inches above the surface of the ground, is 20.25 meters N. 314° 45' E. (magnetic) of the station. Reference mark 2, a triangular blaze with 4 nails on a giant oak, is 32.17 meters N. 342° 30' E. (magnetic) of the station. Reference mark 3, a triangular blaze with 4 nails on a dying oak, is 3.62 meters N. 346° E. (magnetic) of the station. Reference mark 2 is 17.15 meters N. 16° 30' E. (magnetic) of reference mark 1.

Cut (Jackson County, Miss., J. C. G., 1910). On the north shore of Horn Island on the sand ridge in the center of the cleared line through the timber, marking the cut-off for the deep-water ship channel. The station is marked according to note 10.¹ A reference mark, a triangular blaze with 4 nails on a pine tree on the east side of the cut, is 12.51 meters from the station in azimuth 301° 18'. Another reference mark, a triangular blaze on a pine tree on the west side of the cut, is 8.80 meters from the station in azimuth 71° 47'.

¹ See pp. 40 and 41.

Shoe (Jackson County, Miss., J. C. G., 1910). On the north side of Horn Island, on the point just east of the "Horse-shoe Bend" or "Cove," where the deep water ship channel turns to the northwest. The station is marked according to note 10.¹ Reference mark 1, a triangular blaze with 4 nails on a pine tree, is 18.51 meters from the station in azimuth 332° 19'. Reference mark 2, described in note 12,¹ is 18.12 meters from the station in azimuth 334° 06'. Reference mark 3, a triangular blaze on a pine tree, is 8.23 meters from the station in azimuth 32° 25'. Reference mark 4, a triangular blaze on the outermost pine on the point, is 3.76 meters from the station in azimuth 123° 40'.

Dog (Jackson County, Miss., J. C. G., 1910). On Dog Key on the highest point of the grass covered sand ridge, on the eastern end of the only islet now existing. The three keys which were here originally have disappeared, and this single key has formed in a new position approximately the mean of the other three. The station is marked according to note 10.¹ The reference mark on the south side of the sand ridge is a 6-inch pine post 10 feet long, set vertically in a core of concrete with 5 feet projecting above the sand. A triangular cut with 4 nails on the north side of the post, 1 foot below the top, is 20.65 meters N. 143° 30' E. (magnetic) of the station.

Cook (Harrison County, Miss., J. C. G., 1910). On Ship Island, on the northwest bluff point 7 meters from high water and 16 meters west of the bayou. The station is marked according to note 10.¹ A reference mark, described in note 12,¹ is 38.905 meters from the station in azimuth 350°.

Bay St. Louis Church, Bell Tower (Hancock County, Miss., E. M., 1909; 1910) This is a large square flat-top tower on the church adjoining St. Stanislaus College and is not very much higher than the building proper.

East (St. Bernard County, La., E. M., 1909; 1910). On the north shore of Isle au Pitre in the bight south of the most easterly of three small grassy islands lying off the north shore of the island. It is about 20 meters from the shore line and about 60 meters from a point in the shore line west of the bight. The station was marked according to note 8,¹ and is a Louisiana and Mississippi boundary range mark.

West (St. Bernard County, La., E. M., 1909; 1910). On the north shore of Isle au Pitre about one-fourth mile east of the eastern shore of Creole Gap and 20 meters from the shore line. The station was marked according to note 8,¹ and is a Louisiana and Mississippi boundary range mark.

Shell (St. Bernard County, La., E. M., 1909; 1910). On the north shore of Isle au Pitre at a point where the shore line begins the most pronounced southerly trend into the long bight on the north shore of the island, and 50 meters from the shore line. The station was marked according to note 7,¹ and is a Louisiana and Mississippi boundary range mark.

Malheureux Point (St. Bernard County, La., J. B. B., 1903; 1909).—Lost.

Miss (Hancock County, Miss., E. M., 1909; 1910). On the east shore line of Mississippi Sound about 1½ miles northeast of Lake Borgne Lighthouse. About 150 meters north of the mouth of a bayou which winds inland in a northerly direction and passes within 40 meters of the station, and 20 meters from the shore line. The station was marked according to note 9¹ except that 20-penny nails were used. The station is a Louisiana and Mississippi boundary range mark.

Heron (Hancock County, Miss., E. M., 1909; 1910). On the south shore line of Heron Bay, about 500 meters from Lake Borgne Lighthouse and about 500 meters from the eastern point at the entrance to the bay. About 15 meters from the shore line. The station was marked according to note 9.¹ The station is a Louisiana and Mississippi boundary range mark.

Moon (St. Bernard County, La., E. M., 1909; 1910). At the head of the bight in the northwest shore of Grand Island. It is almost on the line from triangulation station Start, and a point on the north shore of an estuary formed by several bayous at the head of the bight, and is 15 meters from the shore line. The station was marked according to note 9,¹ and is a Louisiana and Mississippi boundary range mark.

Half (St. Bernard County, La., E. M., 1909; 1910). On the northeast point of Grand or Halfmoon Island, about 20 meters from the east shore and about 50 meters from the north shore. The station was marked according to note 9¹ and is a Louisiana and Mississippi boundary range mark.

Pearl (Orleans County, La., E. M., 1909; 1910). On the west shore of the Pearl River, a little south of the point on the east bank where the shore line turns east toward Heron Bay, and 20 meters from the river bank. The station was marked according to note 7¹ and is a Louisiana and Mississippi boundary range mark.

River (Orleans County, La., E. M., 1909; 1910). On the west shore of Pearl River, about 400 meters north-northeast of triangulation station Pearl and just west of the point where the east shore of the river turns eastward toward Heron Bay. The station was marked according to note 7¹ and is a Louisiana and Mississippi boundary range mark.

Start (St. Bernard County, La., E. M., 1909; 1910). In the big bight on the most northerly point of the northwest shore of Grand Island, about 800 meters from the extreme eastern point of the bight, and about 15 meters from the shore line. The center is marked by three 10-penny nails cemented heads up into the concrete cap over the piling. The station is a Louisiana and Mississippi boundary range mark.

COMPUTATION, ADJUSTMENT, AND ACCURACY OF THE ELEVATIONS.

The zenith distances directly observed at each primary triangulation station were first computed. These zenith distances were corrected for height of the object observed and of instrument so as to refer them all to the ground at each station or to the station marks.

¹ See pp. 40 and 41.

The difference of elevation of each pair of stations in the main scheme of primary triangulation was then computed from the observations over the line joining them by the formula

$$h_2 - h_1 = s \tan \frac{1}{2} (\zeta_2 - \zeta_1) \left[1 + \frac{h_2 + h_1}{2\rho} + \frac{s^2}{12\rho^3} \right]$$

in which h_2 and h_1 are elevations of the stations, ζ_2 and ζ_1 are the measured zenith distances, as corrected for height of instrument and of object observed, s is the horizontal distance between the stations, and ρ is the radius of curvature.

As there are always two or more lines to each new station, many rigid conditions exist between the observed difference of elevation, even if the connections with the precise leveling were ignored, and the least square adjustment furnishes the readiest accurate means of deriving the required elevations.

In the adjustment of the elevations there were included the elevations of 16 stations in Georgia and 10 stations in Tennessee. The elevations from the line Brushy-House Mountain, Tenn., to the line Spring Hill-Daphne, Ala., were adjusted in three sets of equations.

The first adjustment involved all the stations of the primary scheme from the line Brushy-House Mountain to the lines Wornock-Aurora and Aurora-Indian.

The second adjustment involved all the stations of the primary scheme from the lines Wornock-Aurora and Aurora-Indian to the line County Line-Midway.

The third adjustment involved all the stations of the primary scheme between the lines Creagh-Pollard and Spring Hill-Daphne.

In the first adjustment the elevations of stations Melton,¹ Tenn., Gunter,¹ Ala., and Stone Mountain,² Ga., were held fixed at 413.11, 412.27, and 513.95 meters, respectively, those at Melton and Gunter being the elevations as fixed by precise leveling, while that at Stone Mountain is the elevation as fixed by spirit leveling from sealevel at Beaufort, S. C. The differences of elevation between the two ends and between the middle and the southwest end and between the middle and northeast-end of the Atlanta base, namely, 7.68, 6.90, and 0.78 meters, were held as determined by spirit leveling.

The elevations of the two ends and of the middle of the base and of the remaining 28 stations connected by the observations are unknowns to be determined by least squares from the 97 observed differences of elevation indicated below.

In the following tabulation the observed differences of elevation treated in the first adjustment are shown, together with their adjusted values. The weight, p , assigned to each observed difference of elevation is inversely proportional to the square of the length, s , of the line between stations in meters and was conveniently computed by the formula $\log p = 9 - 2 \log s$. The observed difference of elevation is given the sign of the elevation of the second station named minus the elevation of the first. The quantity contained in the last column but one is the correction to be subtracted from an observed difference of elevation to obtain the corresponding adjusted difference.

¹ See Special Publication No. 18, pp. 95 and 96.

² See U. S. Coast and Geodetic Survey Report of 1876, p. 372.

Station 1	Station 2	Weight <i>p</i>	Observed difference of elevation h_2-h_1	Adjusted difference of elevation h_2-h_1	Observed minus adjusted <i>v</i>	<i>p</i> ²
Owen	Brushy	0.36	+607.40	+607.22	+0.18	0.012
House Mountain	do	.30	+338.07	+339.39	-1.32	.523
Cockspur	do	.24	+159.84	+161.43	-1.59	.607
Melton	do	2.30	+569.74	+569.92	-.18	.074
House Mountain	Melton	.35	-229.75	-230.83	+ .78	.213
Cockspur	do	.51	-408.01	-408.49	+ .48	.118
Roy	do	.60	- 65.86	- 65.09	+ .77	.296
Owen	do	.71	+ 35.55	+ 37.30	-1.75	2.174
Hinch Mountain	do	.26	-519.24	-518.27	-.97	.245
Luper	do	.52	-416.39	-418.10	+1.71	1.520
House Mountain	Cockspur	.25	+178.45	+177.96	+ .49	.090
Roy	do	.67	+344.18	+343.40	+ .78	.408
Owen	do	.55	+444.38	+445.79	-1.41	1.094
Brushy	Luper	.74	-153.84	-151.82	-2.02	3.020
Owen	do	.46	+454.28	+455.40	+2.88	3.815
Roy	do	.31	+354.71	+353.01	+1.70	.896
Hinch Mountain	do	1.51	- 99.82	-100.17	+ .35	.185
Brushy	Hinch Mountain	.27	- 50.23	- 51.65	+1.42	.544
Owen	do	.44	+555.17	+555.57	-.40	.070
Roy	do	.32	+452.38	+453.18	-.80	.205
Bean	do	.18	+ 11.71	+ 10.43	+1.28	.314
Harvey	do	.37	+203.59	+203.35	+ .24	.021
Roy	Owen	0.38	-102.38	-102.39	+ .01	.009
Bean	do	.46	-547.10	-545.14	-1.96	1.767
Do	Roy	.68	-442.53	-442.75	+ .22	.033
Harvey	do	.16	-247.66	-249.83	+2.17	.753
Bean	Harvey	.20	-190.05	-192.92	+2.87	1.647
Cohutta	do	.13	-536.40	-537.03	+ .63	.052
High Point	do	.28	- 2.26	- 1.58	-.78	.172
Do	Bean	.14	+190.32	+191.34	-1.02	.146
Cohutta	do	.80	-343.88	-344.11	+ .23	.047
Do	High Point	.18	-534.40	-535.45	+1.05	.202
Johns	do	.70	+153.90	+153.28	+ .62	.269
Gulf Point	do	1.35	+ 57.09	+ 57.81	-.72	.700
Do	Cohutta	.13	+587.13	+593.26	-6.13	4.885
Johns	do	.32	+089.75	+688.73	+1.02	.333
Pine Log	do	.25	+554.69	+652.55	+2.14	1.149
Grassy	do	.40	+263.84	+262.82	+1.02	.416
Pine Log	Johns	.34	-134.22	-136.18	+1.96	1.306
Lavender	do	.70	+ 62.25	+ 62.33	-.08	.004
Indian	do	.19	- 25.82	- 25.30	+1.38	.362
Grassy	Pine Log	.89	-289.61	-289.73	+ .12	.013
Sawnee	do	.60	+113.73	+113.22	+ .51	.130
Sweat	do	.93	+197.40	+196.40	+1.00	.930
Kenesaw	do	.67	+161.52	+161.25	+ .27	.047
Carnes	do	.39	+317.27	+316.98	+ .29	.033
Indian	do	.16	+107.25	+110.88	-3.63	2.108
Lavender	do	.28	+198.77	+198.52	+ .25	.018
Sawnee	Grassy	.99	+403.17	+402.95	+ .22	.049
Sweat	do	.44	+486.70	+486.13	+ .57	.143
Kenesaw	do	.09	+451.63	+450.98	+ .65	.038
Gulf Point	Pine Log	.14	+ 41.69	+ 40.71	+ .98	.134
Do	Johns	.87	- 95.03	- 95.47	+ .44	.022
Academy	Sawnee	.84	+252.43	+253.22	-.79	.524
Stone Mountain	do	.44	+ 86.30	+ 85.34	+ .96	.406
Atlanta northeast base	do	.84	+274.16	+273.15	+1.01	.858
Sweat	do	.91	+ 83.85	+ 83.18	+ .67	.408
Stone Mountain	Academy	2.03	-167.69	-167.88	+ .19	.073
Atlanta northeast base	do	1.91	+ 19.38	+ 19.93	-.55	.578
Sweat	do	.17	-169.87	-170.04	+ .17	.005
Kenesaw	Stone Mountain	.51	- 38.49	- 37.31	-1.18	.710
Atlanta southwest base	do	3.16	+195.28	+195.49	-.21	.139
Atlanta middle base	do	3.71	+188.78	+188.59	+ .19	.134
Sweat	do	.61	- 3.76	- 2.16	-1.60	1.562
Atlanta northeast base	do	3.76	+188.21	+187.81	+ .40	.602
Kenesaw	Atlanta northeast base	.97	-224.62	-225.12	+ .50	.242
Sweat	do	1.57	-190.14	-189.97	-.17	.045
Kenesaw	Atlanta southwest base	1.42	-232.21	-232.80	+ .59	.494
Sweat	do	1.08	-197.52	-197.65	+ .13	.041
Kenesaw	Sweat	4.32	- 35.24	- 35.15	-.09	.035
Carnes	do	.37	+123.65	+120.58	+3.07	3.487
Do	Kenesaw	.62	+155.14	+155.73	-.59	.218
Lavender	do	.17	+ 38.65	+ 37.27	+1.38	.324
Sawnee	do	.43	- 46.27	- 48.03	+1.76	1.332
Indian	Carnes	.68	-205.88	-206.10	+ .22	.033
Lavender	do	.51	-117.04	-118.46	+1.42	1.028
Indian	Lavender	.83	- 80.91	- 87.64	+ .73	.442
Brandon	do	.53	+ 3.54	+ 4.08	-.54	.154
Gulf Point	do	.71	-156.90	-157.81	+ .91	.588
Indian	Gulf Point	.23	+ 68.05	+ 70.17	-2.12	1.034
Brandon	do	.71	+161.25	+161.89	-.64	.280
Gunter	do	.24	+258.72	+259.63	-.91	.158
Indian	Brandon	.41	- 91.85	- 91.72	-.13	.007
Aurora	do	.44	+ 79.60	+ 81.50	-1.90	1.588
Gunter	do	.53	+ 97.92	+ 97.64	+ .28	.042
Aurora	Indian	.20	+172.85	+173.22	-.37	.027
Do	Gunter	.46	- 16.61	- 16.14	-.47	.102
Summit	do	.41	+ 73.48	+ 72.55	+ .93	.355
Rowe	do	.95	-13.92	- 14.70	+ .78	.578
Aurora	do	.35	- 3.39	- 1.44	+1.05	.382
Summit	do	.72	+ 87.32	+ 87.25	+ .07	.004
Wornock	do	.20	- 8.94	- 8.84	-.10	.023
Aurora	Summit	1.23	- 87.72	- 88.69	+ .97	1.157
Wornock	Aurora	.40	- 6.14	- 7.20	+1.06	.449
Do	do	.43	- 75.11	- 74.31	-.80	.275
Summit	Wilson	.67	+ 22.70	+ 21.58	+1.12	.840
Rowe	do	1.10	- 66.05	- 65.67	-.38	.159

The probable error of an observation of weight unity derived from the preceding adjustment is ± 0.61 meter. In other words, the reciprocal observations over a line 31.7 kilometers (19 $\frac{3}{4}$ miles) long, this being the length of line corresponding to unit weight, determined the difference of elevation of two points with such a degree of accuracy that it is an even chance whether the error is greater or less than 0.61 meter. The probable errors for lines of other than unit length were assumed to be proportional to their lengths.

The probable errors of the elevations of the two stations fixed by precise leveling are about ± 0.06 meter. The probable error of the elevation of Stone Mountain, fixed by spirit leveling, is about ± 0.35 meter. The probable error of Harvey was computed as ± 0.66 meter. Harvey may be considered as the least accurately determined and the probable error, ± 0.66 meter, may be assumed to be as large as for any station in the entire scheme. The probable error of the elevation of Harvey, when combined with the probable errors of the elevations fixed by the precise leveling, is ± 0.75 meter.

In the second adjustment the elevations of the stations Wornock, Aurora, and Indian were held fixed as determined by the first adjustment as 435.61, 428.41, and 601.63 meters, respectively. The elevations of the 18 remaining stations connected by the observations are unknowns to be determined by a least squares adjustment from the 38 observed differences of elevation indicated below. In this tabulation the observed differences of elevation are treated as in the first adjustment.

Station 1	Station 2	Weight p	Observed difference of elevations h_2-h_1	Adjusted difference of elevations h_2-h_1	Observed minus adjusted v	pv^2
Wornock.....	Cahaba.....	0.98	+ 25.50	+ 26.01	-0.51	0.255
Aurora.....	do.....	.34	+ 34.46	+ 33.21	+1.25	.581
Indian.....	Cheeshaw.....	.20	+134.05	+133.82	+ .23	.011
Cahaba.....	do.....	.06	+278.81	+273.79	+5.02	1.512
do.....	Alpine.....	.44	+ 11.16	+ 12.79	-1.63	1.169
Cheeshaw.....	do.....	.69	-261.57	-261.00	- .57	.224
Alpine.....	Morn.....	3.20	+111.45	+112.00	- .55	.968
Cheeshaw.....	do.....	.98	-148.22	-149.00	+ .78	.584
Alpine.....	Kahatchee.....	1.61	- 76.24	- 76.42	+ .18	.052
Horn.....	do.....	1.30	-189.04	-188.42	- .62	.504
Cahaba.....	Laurel.....	.68	+ 20.69	+ 20.18	+ .51	.172
Alpine.....	do.....	.83	+ 7.88	+ 7.39	+ .47	.183
Kahatchee.....	do.....	1.28	+ 82.90	+ 83.81	- .91	1.060
Laurel.....	Weogufka.....	.13	-130.41	-128.51	-1.90	.489
Kahatchee.....	do.....	1.31	- 44.44	- 44.70	+ .26	.089
Horn.....	do.....	.52	-233.53	-233.12	- .41	.087
Weogufka.....	Jamison.....	1.36	- 97.34	- 97.76	+ .42	.229
Laurel.....	do.....	.12	-227.72	-228.26	-1.46	.256
Kahatchee.....	do.....	.19	-141.02	-142.45	+1.43	.388
Jamison.....	Perry.....	.80	- 44.70	- 45.59	+ .89	.634
Perry.....	Parker.....	1.71	- 38.58	- 37.00	+ .42	.302
Parker.....	Wilder.....	.30	+ 48.71	+ 45.68	+3.03	2.754
Jamison.....	do.....	.26	- 37.14	- 36.91	- .23	.014
Wilder.....	Wetumpka.....	.36	- 40.83	- 42.69	+1.86	1.246
Weogufka.....	do.....	.38	-179.13	-177.35	-1.78	1.204
Parker.....	Lowndesboro.....	.22	- 48.81	- 47.89	+ .92	.186
Wilder.....	do.....	.19	- 92.62	- 93.57	+ .95	.172
Parker.....	do.....	.17	+ .99	+ .94	+ .05	.000
Lowndesboro.....	Lovers Leap.....	.64	+ 48.95	+ 48.83	+ .12	.009
Lovers Leap.....	Mount Carmel.....	.15	+ 24.38	+ 27.08	-2.70	1.094
Wetumpka.....	do.....	.10	+ 25.88	+ 25.03	+ .85	.072
Lovers Leap.....	Bargenier.....	1.27	+ 7.70	+ 7.89	- .19	.013
Lowndesboro.....	do.....	.34	+ 56.48	+ 56.72	- .24	.020
Mount Carmel.....	do.....	.53	- 19.98	- 19.19	+ .77	.314
Lovers Leap.....	County Line.....	.63	+ 4.74	+ 3.78	+ .96	.590
Bargenier.....	do.....	1.02	- 4.73	- 4.11	- .62	.392
Lovers Leap.....	Midway.....	.11	+ .31	+ .13	+ .18	.004
County Line.....	do.....	.26	- 3.72	- 3.65	- .07	.001

The probable error of an observation of weight unity derived from the preceding adjustment is ± 0.64 meter.

The probable error of Gunter was found to be about ± 0.06 meter. The probable error of Aurora, which is directly connected with Gunter, and the probable errors of Wornock and Indian, which are directly connected with Aurora, probably exceed this by very little. The probable error approaches this value for stations adjacent to these and is greatest for the most remote station. Station Midway was assumed to be the one least accurately determined, and its probable error was therefore computed as a limiting value and found to be ± 1.78 meters

from the vertical angles alone, or, when combined with the probable error of the elevations fixed by the precise leveling, it was ± 1.80 meters.

In the third adjustment the elevation of Spring Hill was held fixed at 66.09 meters, as determined by the vertical angles from the United States Coast and Geodetic Survey bench mark A,¹ which is on the stone sill at the northeast corner of the customhouse building at Mobile, Ala. The elevation of bench mark A is 3.74 meters, as determined by precise leveling. The elevations of the 9 remaining stations connected by the observations are unknowns, to be determined by least squares from the 17 observed differences of elevation indicated below. In this tabulation the observed differences of elevation are treated as in the first and second adjustment.

Station 1	Station 2	Weight p	Observed difference of elevations h_2-h_1	Adjusted difference of elevations h_2-h_1	Observed minus adjusted v	pv^2
Daphne.....	Spring Hill.....	1.55	+18.23	+17.88	+0.35	0.199
Minette.....	do.....	.84	- 9.23	- 9.33	+ .11	.010
Cold Creek.....	do.....	.38	-19.85	-18.26	-1.59	.961
Do.....	Daphne.....	.18	-34.05	-36.14	+2.09	.786
Minette.....	do.....	1.10	-27.05	-27.21	+ .16	.028
Do.....	Cold Creek.....	.52	+ 8.70	+ 8.93	- .23	.028
Red Hill.....	do.....	.14	-13.32	-12.58	- .74	.077
Dean.....	Minette.....	3.57	-13.19	-13.22	+ .03	.003
Coon.....	do.....	.14	- 5.49	- 5.75	+ .26	.010
Red Hill.....	Dean.....	.53	- 8.20	- 8.29	+ .09	.004
Do.....	Coon.....	.19	-15.69	-15.78	+ .07	.001
White.....	do.....	.25	-40.54	-40.65	+ .11	.003
Do.....	Red Hill.....	1.03	-25.02	-24.89	- .13	.017
Pollard.....	do.....	.87	-26.11	-26.22	+ .11	.010
Do.....	White.....	.94	- 1.12	- 1.33	+ .21	.042
Creagh.....	do.....	.86	-12.31	-11.98	- .33	.094
Do.....	Pollard.....	.49	-10.06	-10.65	+ .59	.171

The probable error of an observation of weight unity derived from the preceding adjustment is ± 0.37 meter.

The probable error of station Spring Hill, fixed by connection with the United States Coast and Geodetic Survey bench mark A at the customhouse, Mobile, Ala., may be assumed to be a little greater than ± 0.06 meter. The probable error approaches this value for stations adjacent to this station, and is greatest for the most remote station. Station Pollard was assumed to be the one least accurately determined, and its probable error was found to be ± 0.60 meter from the vertical angles alone, or, when combined with the probable error of the elevation fixed by precise leveling, it was ± 0.61 meter.

ACCURACY OF VERTICAL ANGLE RESULTS IN THE UNITED STATES.

The best test of accuracy is believed to be the probable error of an observation of unit weight. Such an observation is here considered to be the reciprocal nonsimultaneous observation over the length of line corresponding to unit weight, considered as 31.7 kilometers (19½ miles).

The vertical angle results of the three sections of triangulation considered in this publication have such accuracies that they would appear in the first half of a table like the one on page 63, Special Publication No. 13, in which 25 sections of vertical angle results of triangulation in the United States, having separate least square adjustments, have been arranged in order of accuracy, the most accurate being placed first.

ELEVATIONS.

The datum for all the elevations is mean sea level.

The stations are in three classes: First, those fixed directly by the spirit leveling, whose elevations are subject to a probable error varying from ± 0.06 to ± 0.35 meter; second, the stations in the main scheme, fixed by reciprocal measures of vertical angles and subject to

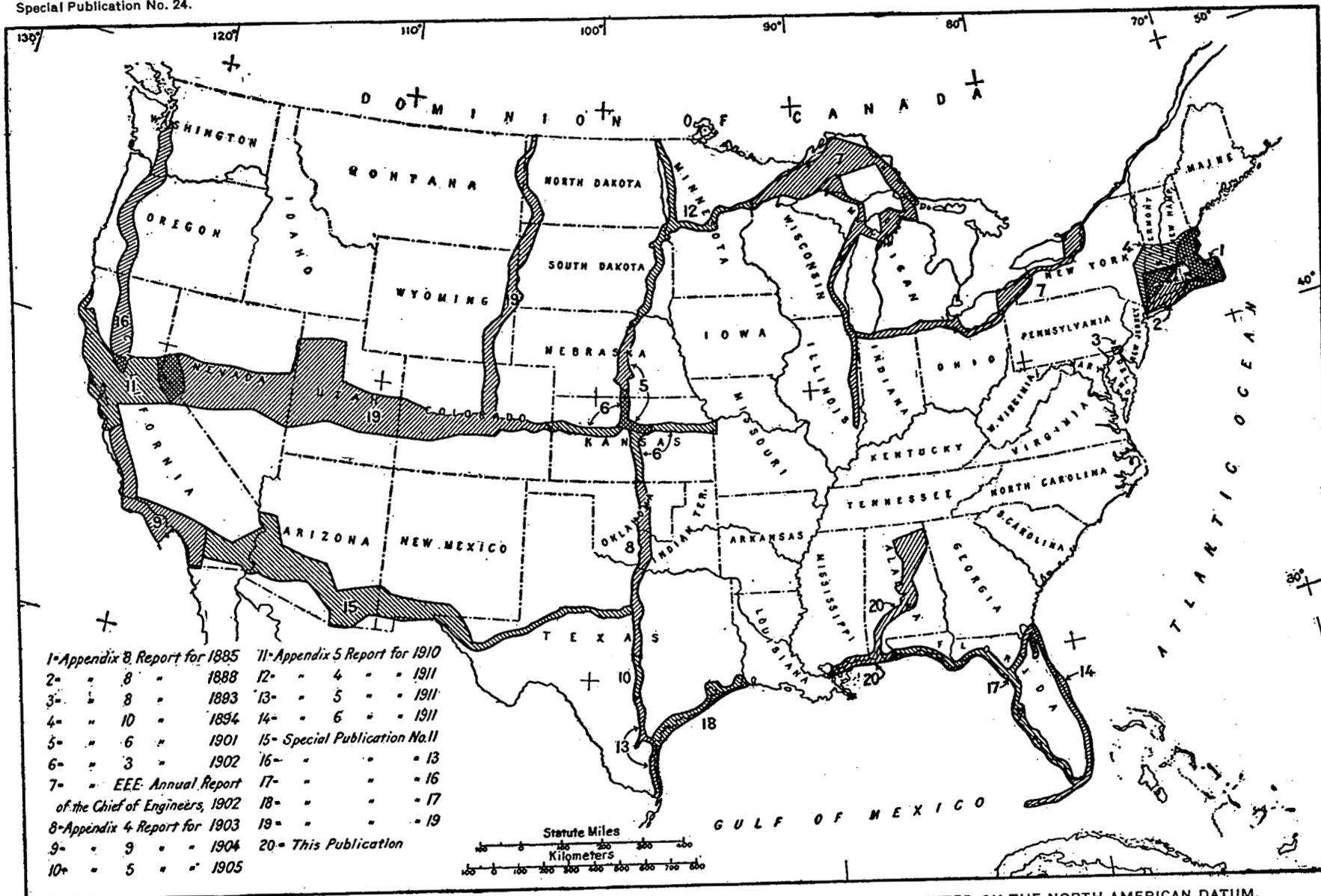
¹ See Special Publication No. 18, p. 91.

probable errors varying from ± 0.1 to ± 1.8 meters; and, third, the intersection stations, of which the elevations are fixed by measurements of vertical angles which are not reciprocal, the intersection stations not being occupied, and having their elevations subject to probable errors which may be as great as ± 6 meters in some cases.

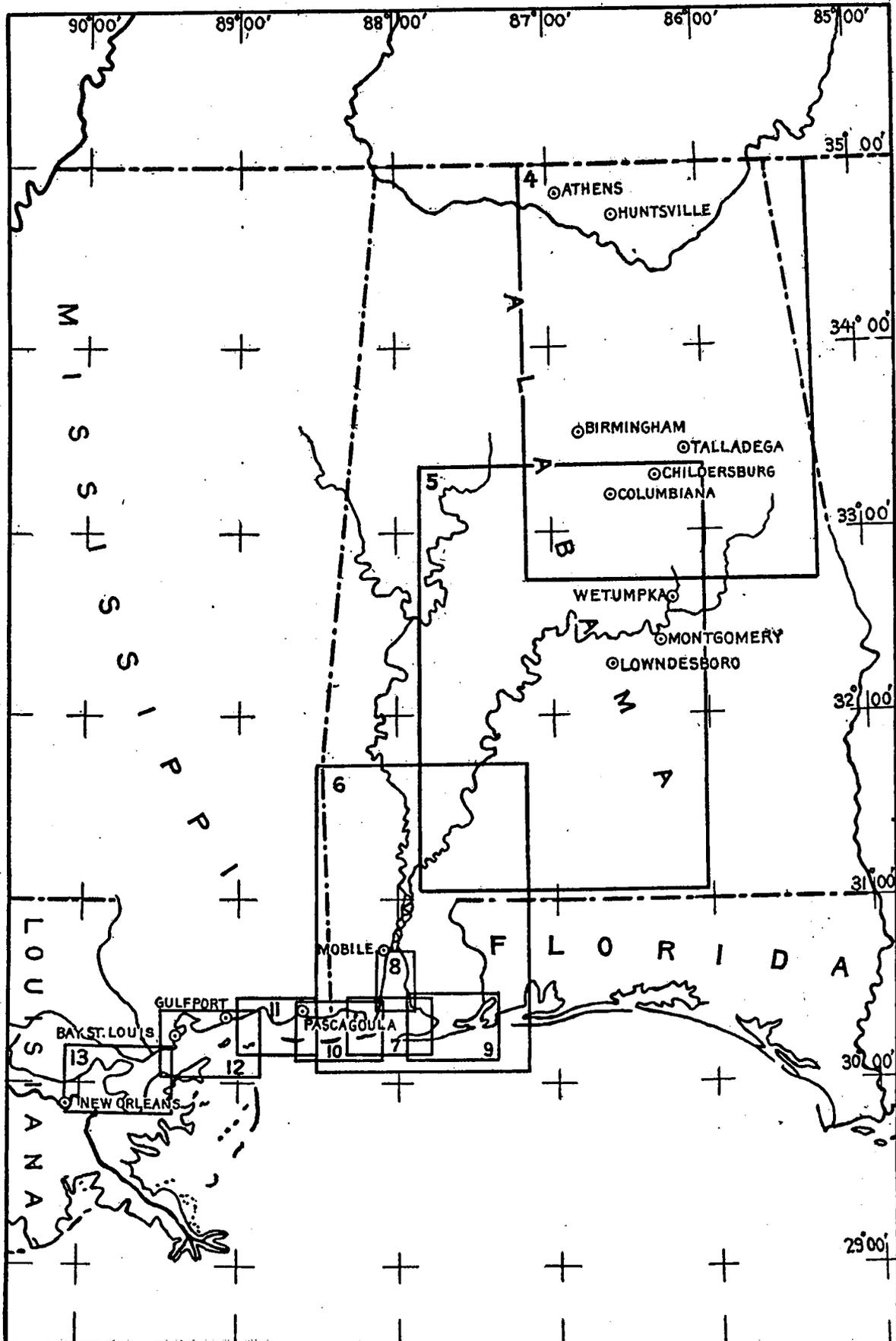
The accuracy with which the elevation of a station in the main scheme is determined depends mainly upon the distance of that station from the nearest station whose elevation is fixed by spirit leveling. The spirit-leveling stations are given in the following table, under the heading "Class 1." Station Midway is probably least accurately determined of all the stations in the main scheme.

Table of elevations.

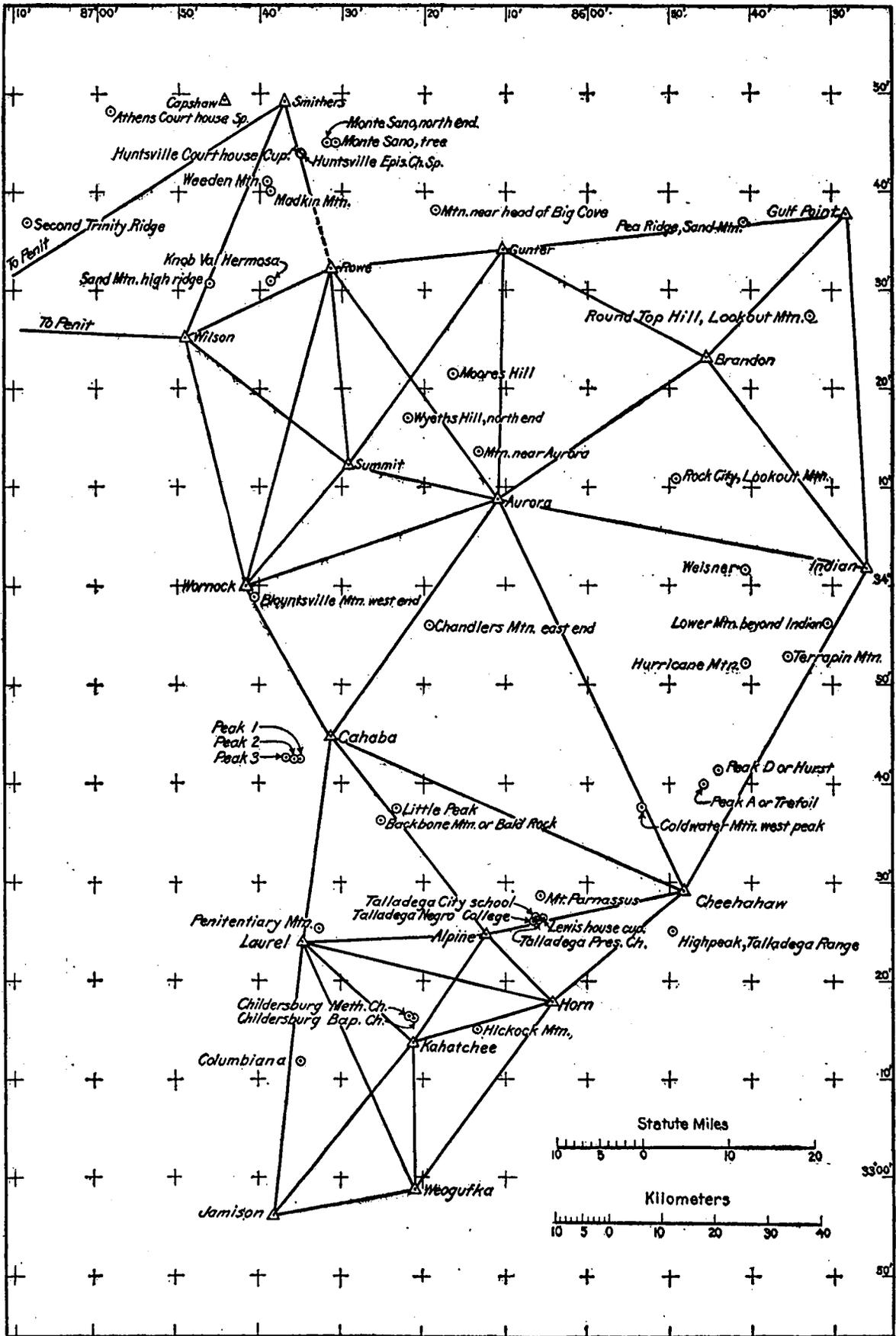
Station	Point to which elevation refers	Elevation		Station	Point to which elevation refers	Elevation	
		Meters	Feet			Meters	Feet
<i>Class 1.</i>				<i>Class 2—Continued.</i>			
Melton, Tenn.	Station mark	413.11	1355.35	County Line, Ala.	Station mark	177.7	583.0
Stone Mountain, Ga.	do.	513.95	1696.18	Midway, Ala.	do.	174.0	570.9
Gunter, Ala.	do.	412.27	1352.59	Pollard, Ala.	do.	123.2	404.2
Mobile bench mark A, Ala.	do.	3.74	12.27	Creagh, Ala.	do.	133.8	439.0
<i>Class 2.</i>				White, Ala.	do.	121.8	399.6
House Mountain, Tenn.	do.	643.6	2111.5	Coon, Ala.	do.	81.2	266.4
Cockspur, Tenn.	do.	821.6	2695.5	Red Hill, Ala.	do.	96.9	317.9
Brushy, Tenn.	do.	983.0	3225.1	Dean, Ala.	do.	88.6	290.7
Luper, Tenn.	do.	831.2	2727.0	Cold Creek, Ala.	do.	84.4	276.9
Hinch Mountain, Tenn.	do.	931.4	3055.8	Minette, Ala.	do.	75.4	247.4
Owen, Tenn.	do.	375.8	1232.9	Daphne, Ala.	do.	48.2	158.1
Roy, Tenn.	do.	478.2	1568.9	Spring Hill, Ala.	do.	66.1	216.9
Harvey, Tenn.	do.	728.0	2388.4	<i>Class 3.</i>			
Bean, Tenn.	do.	921.0	3021.6	Pea Ridge, Sand Mountain	Top of trees	572.5	1878.3
High Point, Ga.	do.	729.6	2393.7	Ethridge	Station mark	148.3	486.5
Cohutta, Ga.	do.	1265.1	4150.6	Fatama	do.	167.2	548.6
Grassy, Ga.	do.	1072.2	3288.1	St. Elmo	do.	42.0	137.8
Pine Log, Ga.	do.	712.5	2337.6	Smithers	do.	454.1	1489.8
Sawnee, Ga.	do.	599.3	1966.2	Capshaw	do.	383.8	1256.2
Academy, Ga.	do.	346.1	1135.5	Monte Sano, tree, north end	Top of tree	525.8	1725.1
Atlanta northeast base, Ga.	do.	326.1	1069.9	Monte Sano, north end of ridge	Top of trees	512.7	1682.1
Atlanta middle base, Ga.	do.	325.4	1067.6	Madkin Mountain	do.	390.1	1279.9
Atlanta southwest base, Ga.	do.	318.5	1044.9	Weeden Mountain	do.	383.6	1258.5
Sweet, Ga.	do.	516.1	1693.2	Athens courthouse spire	Base of cone of spire	243.1	797.6
Kanesaw, Ga.	do.	551.3	1808.7	Penit	Station mark	327.6	1074.8
Carnes, Ga.	do.	395.5	1297.6	Second Trinity Ridge	Top of trees	278.4	913.4
Johns, Ga.	do.	578.3	1890.7	Knob Val Hermosa	do.	401.5	1317.3
Lavender, Ga.	do.	514.0	1686.3	Wyeths Hill, north end	do.	352.8	1157.5
Indian, Ala.	do.	601.6	1973.7	Moore's Hill	Station mark	347.3	1139.4
Gulf Point, Ala.	do.	671.8	2204.1	Mountain near Aurora	Top of trees	406.7	1334.3
Brandon, Ala.	do.	569.9	1872.9	Round Top Hill, east side of Lookout Mountain	do.	515.1	1690.0
Aurora, Ala.	do.	428.4	1405.5	Rock City, Lookout Mountain	do.	517.7	1698.5
Rowe, Ala.	do.	427.0	1400.9	Welsner	Station mark	574.0	1883.2
Summit, Ala.	do.	339.7	1114.5	Lower Mountain beyond Indian	Top of trees	581.1	1906.5
Wornock, Ala.	do.	435.6	1429.1	Terrapin Mountain	do.	658.1	2159.1
Wilson, Ala.	do.	361.3	1185.4	Hurricane Mountain	do.	582.3	1910.4
Cahaba, Ala.	do.	451.6	1514.4	Chandlers Mountain, east end	do.	484.1	1588.3
Cheeshaw, Ala.	do.	735.4	2412.7	Blountsville Mountain, west end	do.	437.1	1434.1
Alpine, Ala.	do.	474.4	1556.4	Backbone Mountain or Bald Rock	Ground	485.7	1593.5
Laurel, Ala.	do.	481.8	1580.7	Peak A or Trefoll	Top of trees	622.4	2042.0
Horn, Ala.	do.	586.4	1923.9	Peak D or Hurst	do.	650.7	2134.8
Kahatchee, Ala.	do.	398.0	1305.8	Coldwater Mountain, west peak	do.	534.6	1753.9
Weogufka, Ala.	do.	353.3	1159.1	Columbiana	Station mark	296.4	972.4
Jamison, Ala.	do.	255.5	838.3	Montgomery Capitol	Top of dome	90.3	296.3
Perry, Ala.	do.	210.0	689.0	Montgomery water tank	Top	121.2	397.6
Wilder, Ala.	do.	218.6	717.2				
Wetumpka, Ala.	do.	175.9	577.1				
Parker, Ala.	do.	173.0	567.6				
Lowndesboro, Ala.	do.	125.1	410.4				
Lovers Leap, Ala.	do.	173.9	570.5				
Mount Carmel, Ala.	do.	201.0	659.4				
Bargenier, Ala.	do.	181.8	596.5				



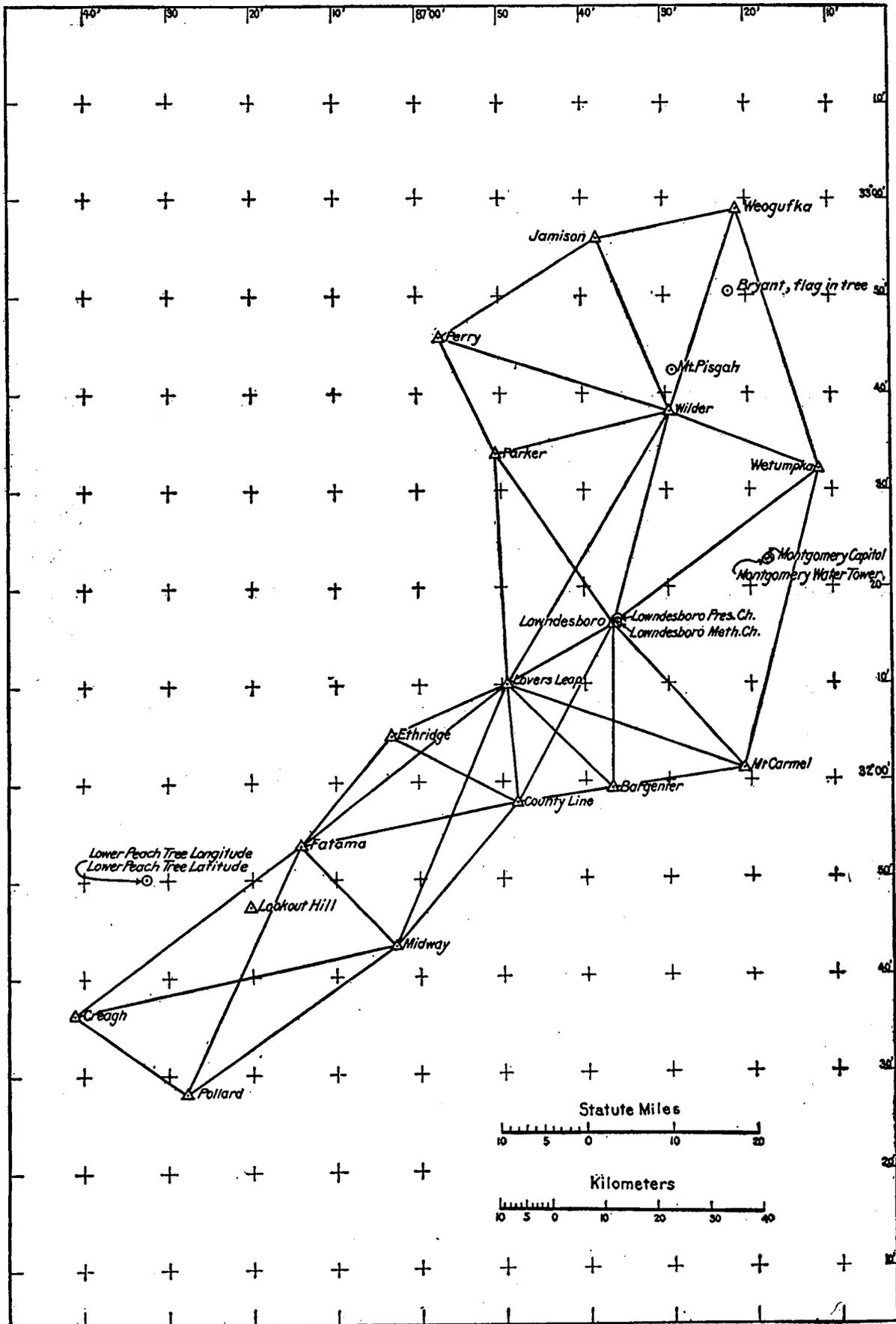
INDEX MAP SHOWING AREAS COVERED BY PUBLISHED TRIANGULATION WHICH HAS BEEN RIGIDLY COMPUTED ON THE NORTH AMERICAN DATUM.



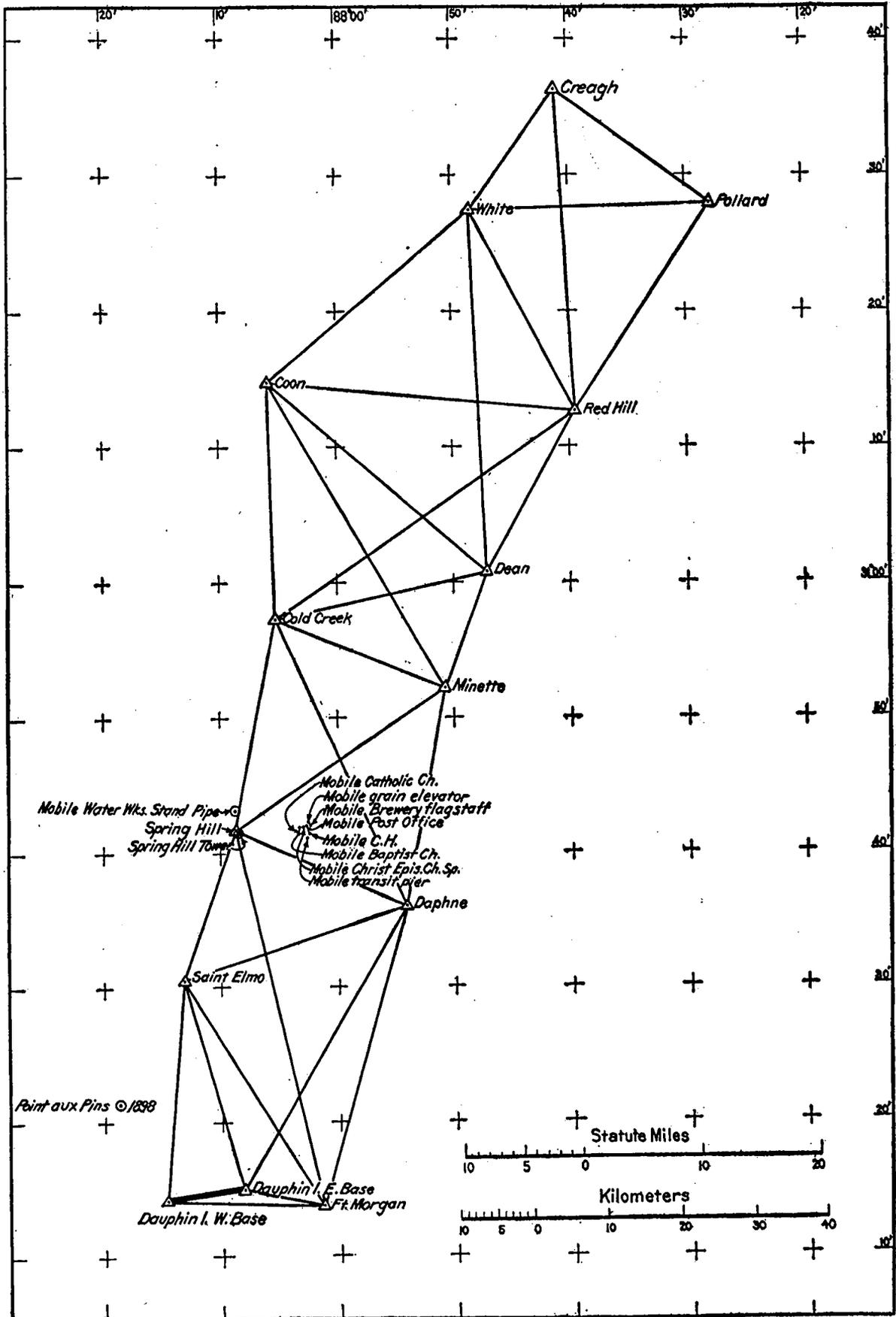
INDEX MAP SHOWING THE LIMITS OF EACH OF THE FOLLOWING SKETCHES—NOS. 4 TO 13.



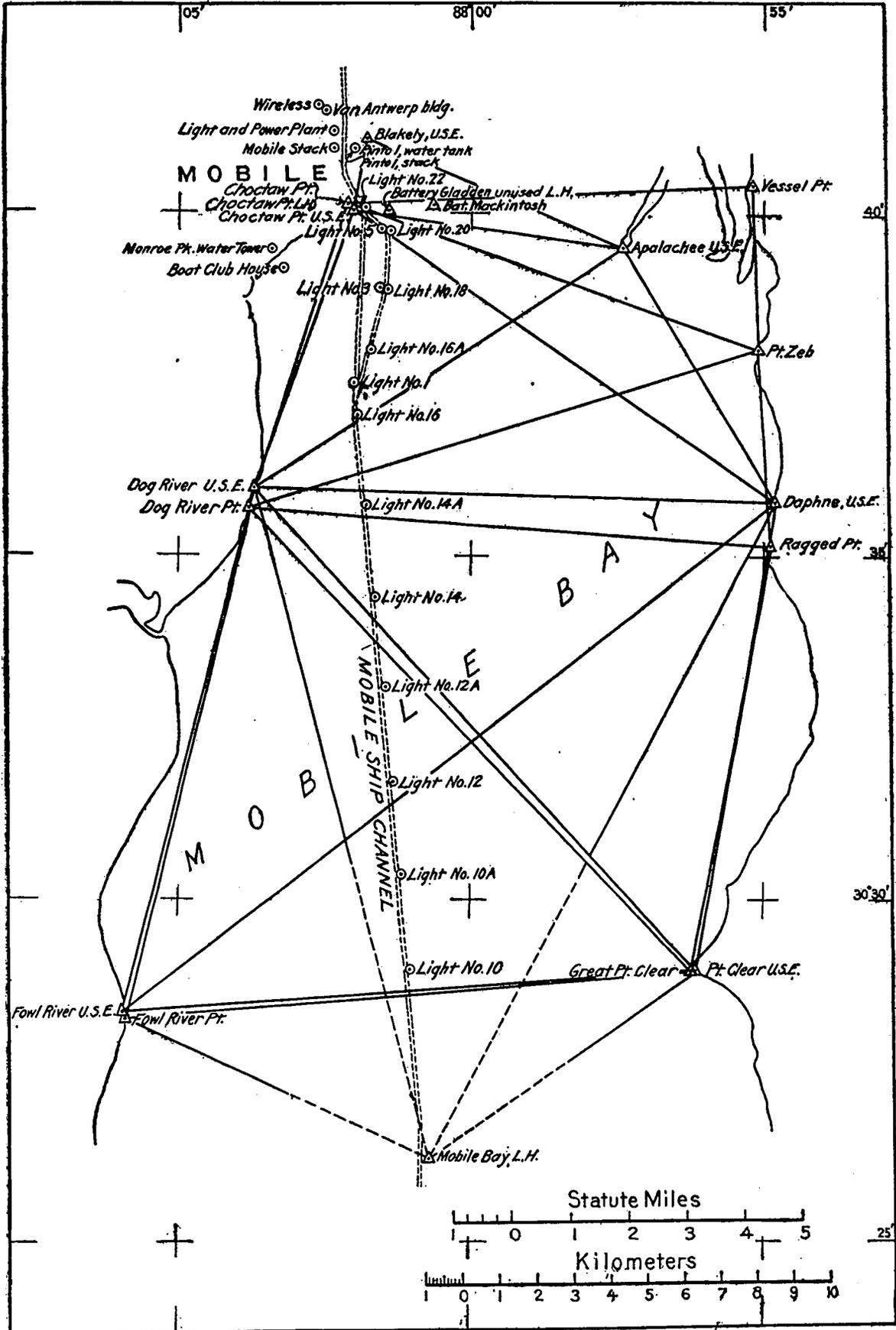
TRIANGULATION, EASTERN OBLIQUE ARC, STATIONS GULF POINT AND INDIAN TO JAMISON AND WEOGUFKA.



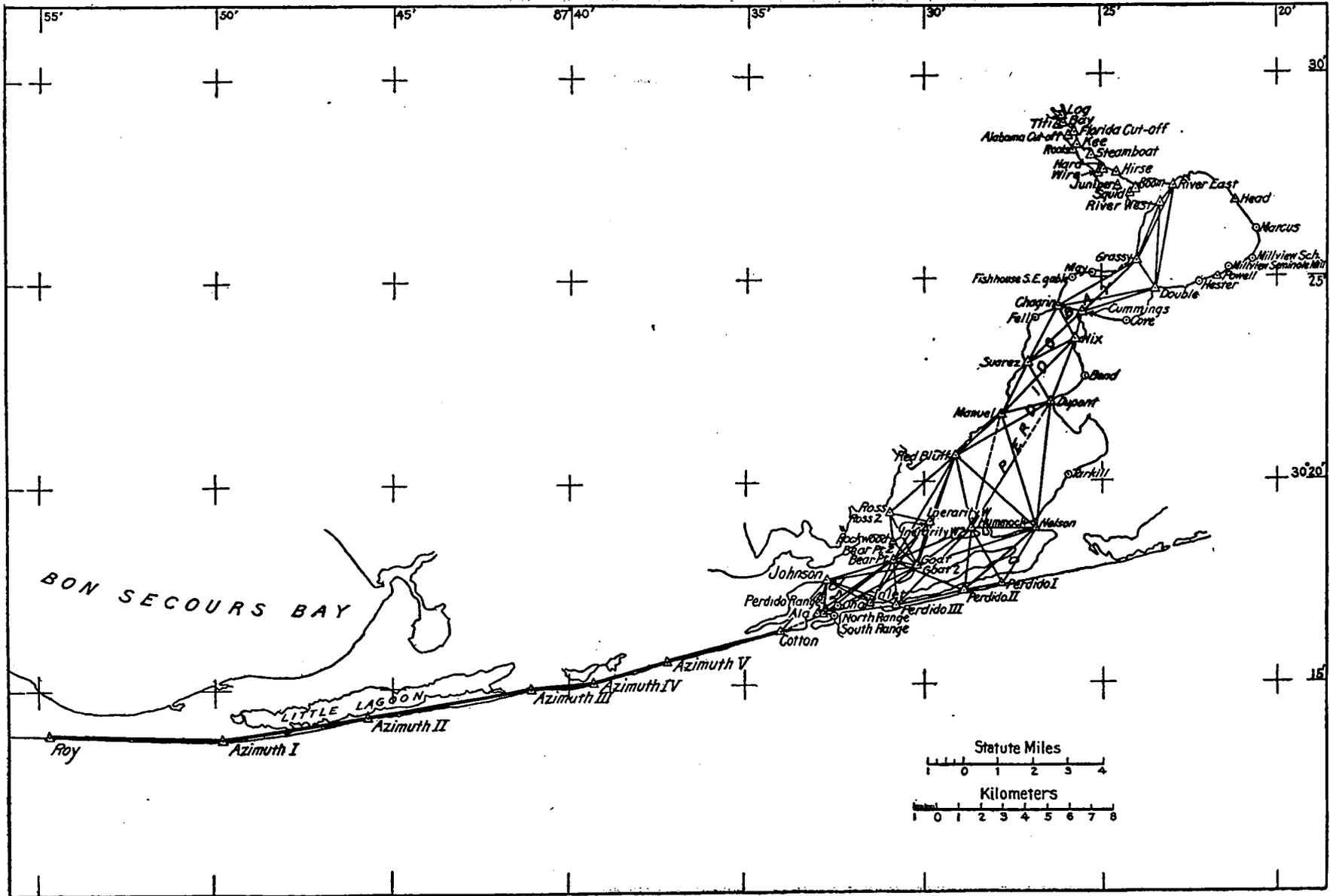
TRIANGULATION, EASTERN OBLIQUE ARC, STATIONS JAMISON AND WEOGUFKA TO CREAGH AND POLLARD.



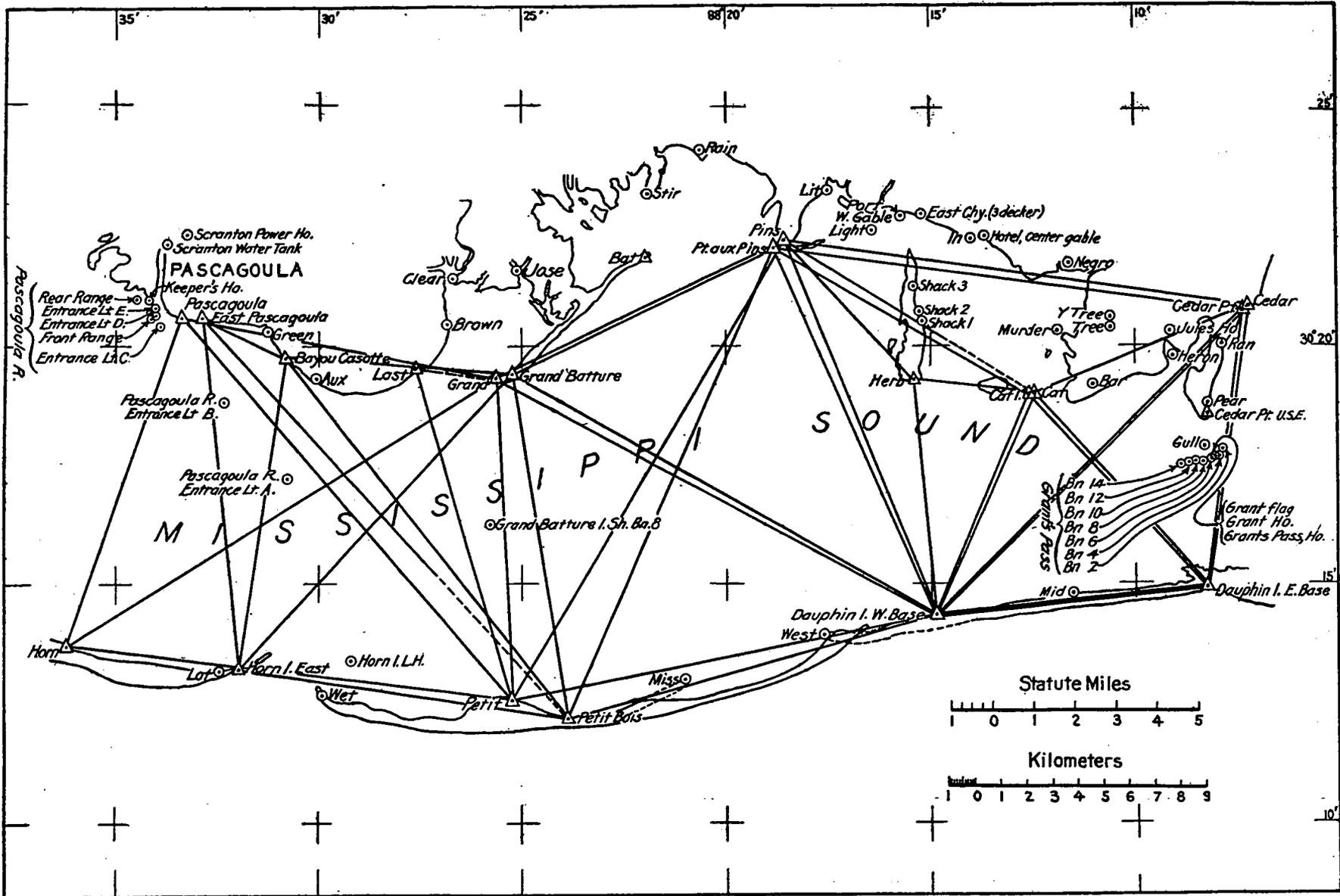
TRIANGULATION, EASTERN OBLIQUE ARC, STATIONS CREAUGH AND POLLARD TO DAUPHIN ISLAND BASE.



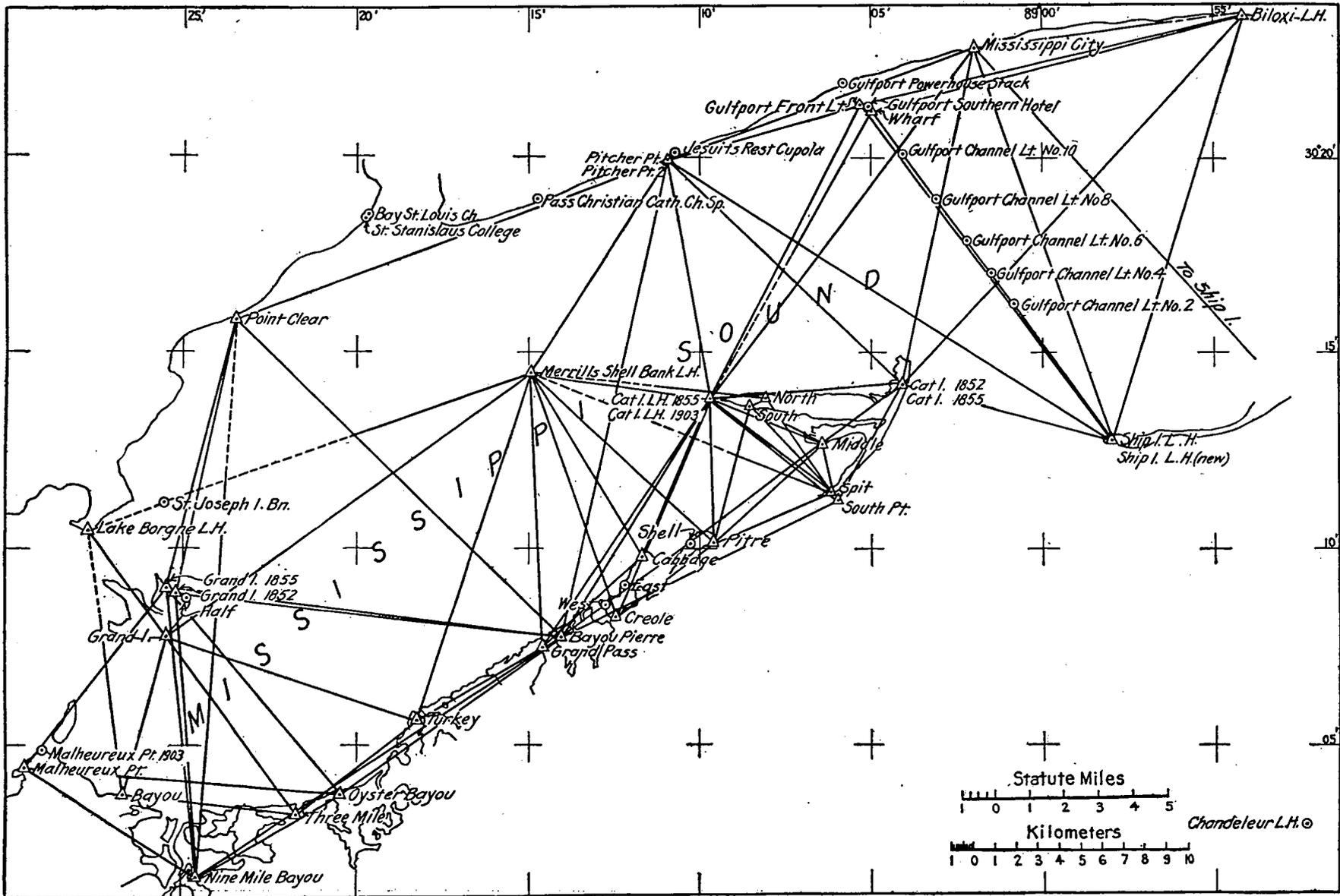
TRIANGULATION, UPPER MOBILE BAY.



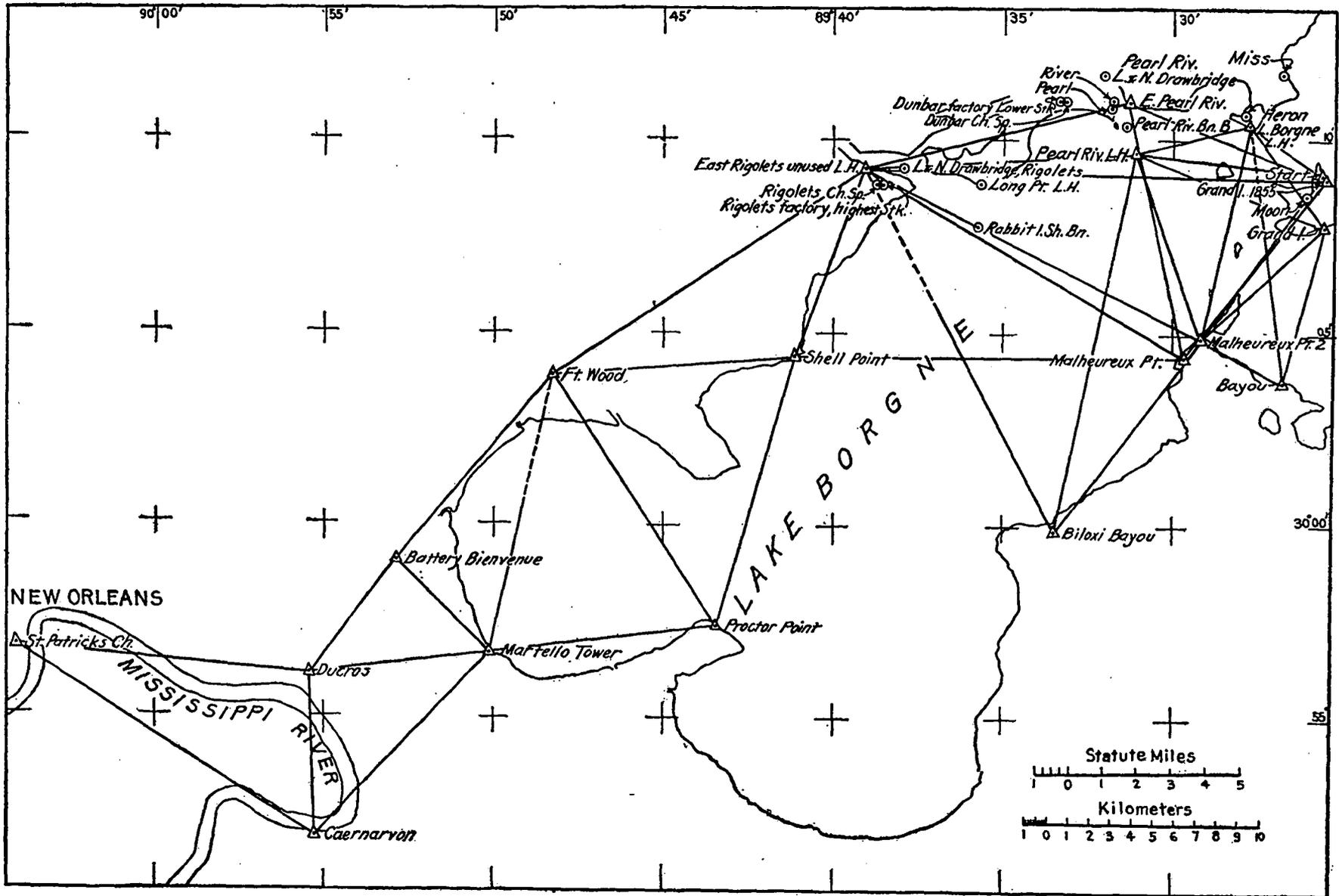
TRIANGULATION, PERDIDO BAY AND WESTWARD TO MOBILE BAY.



TRIANGULATION, MISSISSIPPI SOUND, MOBILE BAY TO PASCAGOULA.



TRIANGULATION, MISSISSIPPI SOUND, BILOXI TO LAKE BORGNE.



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Fireplace chimney.....	35			11	Herb.....	32	59		10
Fisher.....	40				Heron, 1856.....	40			
Fish house southeast gable.....	29			9	Heron, 1909.....	37	61		13
Fish River.....	38				Heron, 1910.....	32	59		7, 10
Florida Cut-off.....	28	55		9	Hester.....	29	56		9
Fort.....	30	57		11	Hickock Mountain.....	20	49		4
Fort Gaines (U. S. E.).....	22	50		7	High Peak, Talladega Range.....	20			4
Fort Morgan.....	17	46		6, 7	Hirse.....	28	54		9
Fort Morgan astronomic azimuth.....	21			7	Horn.....	16	43	66	4
Fort Wood.....	18	48		13	Horn, 1910.....	30	56		10, 11
					Horn Island 1.....	39			

Station	Position	Description	Elevation	Sketch	Station	Position	Description	Elevation	Sketch
	Page	Page	Page	Number		Page	Page	Page	Number
Horn Island 2.....	39				Lowndesboro Presbyterian Church spire.....	21			5
Horn Island east.....	17	47		10, 11	Madkin Mountain.....	19		66	4
Horn Island east, 1847.....	39				Malheureux Point.....	13	48		12, 13
Horn Island Lighthouse.....	34			10	Malheureux Point, 1903.....	37	61		12
Horn Island Pass Lighthouse.....	39				Malheureux Point 2.....	31	58		13
Horn Island west.....	18	47		11	Manuel.....	27	53		9
Hotel, center gable.....	33			10	Marcus.....	29	55		9
Hummock.....	27	53		9	Marsh.....	30	57		11
Huntsville courthouse cupola.....	19			4	Marshall's house, west gable.....	24			7
Huntsville Episcopal Church spire.....	19			4	Marsh Island, 1846.....	39			
Hurricane Mountain.....	19		66	4	Marsh Island, 1850.....	39			
Ice-factory stack.....	35			11	Marsh Point.....	39			
In.....	33	59		10	Martello Tower.....	18	48		13
Indian.....	16	41	66	4	May.....	29	56		9
Inerarity west.....	27	53		9	Merrill's Coquille.....	39			
Inerarity west 2.....	28	55		9	Merrill's Shell Bank Lighthouse.....	31			12
Inlet.....	28	55		9	Methodist Church spire, Childersburg	20	49		4
Island House, south gable.....	35			11	Methodist Church spire, Lowndes-				
Jacob.....	28	52		7	boro.....	21			5
Jamison.....	16	43	66	4, 5	Mid.....	32	59		7, 10
Jesuits' Rest cupola.....	37			12	Middle.....	31	58		12
Johns House.....	39				Middle Apalacha.....	38			
Johnson.....	27	52		9	Middle Ground light M G.....	24			7
Jolls Point.....	39				Middle Tenesaw.....	38			
Jose.....	33	60		10	Midway.....	17	45	60	5
Jules house, gable.....	31			10	Millview schoolhouse flagstaff.....	29			9
Jullet.....	22	50		7	Millview Seminole Mill smokestack.....	29			9
Juniper.....	28	54		9	Minetta Bay.....	38			
Kahatchee.....	16	43	66	4	Minette.....	17	46	66	6
Kee.....	28	54		9	Miss, 1909.....	37	61		13
Keeper's house, south chimney.....	34			10	Miss, 1910.....	33	60		10
Knob Val Hermosa.....	19		66	4	Mississippi City.....	18	47		12
Lake Borgne Lighthouse, 1903.....	31			12, 13	Mobile:				
Lake Borgne Lighthouse, 1909.....	31			12, 13	Baptist Church spire.....	21	50		6
Laurel.....	16	43	66	4	Barton Academy.....	39			
Lewis House cupola, Talladega.....	20	49		4	Brewery flagstaff.....	21	49		6
Light.....	33			10	Catholic Church, north cross.....	21			6
Light on road bridge, center of turn-					Christ Episcopal Church spire.....	21			6
table.....	35			11	Courthouse tower.....	21			6
Lit.....	33	59		10	Grain elevator tank.....	21	49		6
Little Bayou Casotte.....	39				Light and power plant stack.....	26	52		8
Little Dauphin Island.....	39				Post office, thermometer box.....	21	50		6
Little Dauphin (U. S. E.).....	22	50		7	Stack, Canal and Water Streets.....	26	52		8
Little Peak, southernmost of two.....	20			4	Transit pier.....	21	49		6
Little Point Clear, 1846.....	38				Van Antwerp Building.....	26	52		8
Little Point Clear 2.....	38				Waterworks standpipe.....	21			6
Little Point Clear, 1892.....	24	51		7	Mobile Bay Lighthouse, 1897-98.....	23			8
Log.....	28	55		9	Mobile Bay Lighthouse, 1910.....	22			7, 8
Long Point Lighthouse.....	38			13	Mobile Beach.....	38			
Lookout Hill.....	21	49		5	Mobile Point.....	38			
Lost.....	33	60		10	Mobile Point Beacon.....	23			7
Lot.....	34	60		10	Mobile Point Lighthouse.....	23			7
Louisville & Nashville drawbridge,					Mobile Point Lighthouse, 1840-47.....	38			
Pearl River, center light.....	38			13	Mobile Point Lighthouse, 1868.....	38			
Louisville & Nashville drawbridge,					Mobile River.....	38			
Rigolets, center light.....	38			13	Mobile Ship Channel Light No. 1.....	25			8
Lovers Leap.....	18	44	66	5	Mobile Ship Channel Light No. 2				
Lower Mountain beyond Indian.....	19		66	4	(Dolphin).....	22	50		7
Lower Peach Tree latitude.....	21			5	Mobile Ship Channel Light No. 2A.....	24			7
Lower Peach Tree longitude.....	21	49		5	Mobile Ship Channel Light No. 3.....	25			8
Lower Point Clear.....	40				Mobile Ship Channel Light No. 4.....	24			7
Lowndesboro.....	16	44	66	5	Mobile Ship Channel Light No. 4A.....	24			7
Lowndesboro Methodist Church spire	21			5	Mobile Ship Channel Light No. 5.....	26			8
					Mobile Ship Channel Light No. 6.....	24			7

Station	Position	Description	Elevation	Sketch	Station	Position	Description	Elevation	Sketch
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Mobile Ship Channel Light No. 6A...	24			7	Pascagoula River Entrance Light C...	34			10
Mobile Ship Channel Light No. 8...	24			7	Pascagoula River Entrance Light D...	34			10
Mobile Ship Channel Light No. 8A...	24			7	Pascagoula River Entrance Light E...	34			10
Mobile Ship Channel Light No. 10...	25			8	Pascagoula River Front Range...	34			10
Mobile Ship Channel Light No. 10A...	25			8	Pascagoula River Rear Range...	34			10
Mobile Ship Channel Light No. 12...	25			8	Pass Baron...	39			
Mobile Ship Channel Light No. 12A...	25			8	Pass Christian...	39			
Mobile Ship Channel Light No. 14...	25			8	Pass Christian Catholic Church spire...	37			12
Mobile Ship Channel Light No. 14A...	25			8	Peak A (Trefoll)...	20	49	66	4
Mobile Ship Channel Light No. 16...	25			8	Peak D (Hurst)...	20	49	66	4
Mobile Ship Channel Light No. 16A...	25			8	Peak 1...	20			4
Mobile Ship Channel Light No. 18...	25			8	Peak 2...	20			4
Mobile Ship Channel Light No. 20...	25			8	Peak 3...	20			4
Mobile Ship Channel Light No. 22...	25			8	Pea...	32	59		7, 10
Mobile Ship Channel Light No. MBA...	24			7	Pea Ridge, Sand Mountain...	19		66	4
Mobile Ship Channel Light No. MGA...	24			7	Pearl...	37	61		13
Monk...	30	57		11	Pearl River Beacon B...	37			13
Monks Point...	39				Pearl River Island...	40			
Monroe Park watertower...	26	52		8	Pearl River Lighthouse...	31			13
Monte Sano, north end...	19		66	4	Pelican Island, 1846...	39			
Monte Sano, tree...	19		66	4	Pelican Island, 1868...	39			
Montgomery...	39				Penit...	19	48	60	4
Montgomery:					Penitentiary Mountain...	20	49		4
Capitol...	21		66	5	Perdido Range...	27	52		9
Water tower...	21		66	5	Perdido I...	27	53		9
Moon...	37	61		13	Perdido II...	27	53		9
Moores Hill...	19	48	66	4	Perdido III...	27	53		9
Mountain near Aurora...	19		66	4	Perry...	16	44	60	5
Mountain near head of Big Cove...	19			4	Petit...	30	56		10
Mount Carmel...	16	45	66	5	Petit Bois...	17	47		10
Mount Parnassus...	20	49		4	Petit Bois east...	39			
Mount Pisgah...	20			5	Petit Bois west...	39			
Mouth of Pearl River...	40				Pine...	25	52		7
Mullet Point...	22	50		7	Pins...	29	50		10
Mullet Point (U. S. E.)...	23	51		7	Pinto Island, stack...	23	52		8
Murder...	33	59		10	Pinto Island, water tank...	26	52		8
Murder Point...	39				Pitcher Point...	30	58		12
					Pitcher Point 1...	39			
Navy Cove...	38				Pitcher Point 2...	18	47		12
Ned...	34	60		11	Pitre...	31	58		12
Negro...	33	59		10	Planing-mill stack...	36			11
Negro College, Talladega...	20	49		4	Plum...	30	57		11
Nelson...	27	53		9	Plummer...	39			
New...	23	51		7	Point aux Chenes...	39			
New Bon Secours Harbor...	38				Point aux Pins, 1846...	17	47		10
New Orleans, St. Patrick's Church...	18	48		13	Point aux Pins, 1898...	21	50		6
Nine Mile Bayou...	18	47		12	Point Blanc, 1851...	39			
Nix...	27	54		9	Point Blanc, 1852...	39			
North...	31	59		12	Point Cadde...	39			
North chimney...	35			11	Point Clear...	18	47		12
North gable, galvanized-iron roof...	35			11	Point Clear (U. S. E.)...	23	51		7, 8
North Range...	28			9	Point Juliet...	22	50		7
					Point Pierre...	39			
Ocean Springs hotel, northwest end of ridge place on roof...	35			11	Point Zeb...	22	50		8
Ono...	29			9	Pollard...	17	45	60	5, 6
Opposite Chickasaw Bayou...	38				Port...	33			10
Opposite Mobile Island...	38				Postoffice thermometer box, Mobile...	21	50		6
Out...	24	51		7	Powell...	29	56		9
Ox...	30	57		11	Presbyterian Church, Lowndesboro...	21			5
Oyster Bayou...	18	47		12	Presbyterian Church, Talladega...	20	49		4
Oyster Cove...	38				Proctor Point...	18	48		13
					Quar...	23	51		7
Parker...	16	44	66	5					
Pascagoula...	30	56		10, 11	Rabbit Island Shoal Beacon...	38			13
Pascagoula River Entrance Light A...	34			10	Ragged Point...	22	50		8
Pascagoula River Entrance Light B...	34			10	Rain...	33	60		10

Station	Position	Description	Elevation	Sketch	Station	Position	Description	Elevation	Sketch
	Page	Page	Page	Number		Page	Page	Page	Number
Ran.....	31	59		7, 10	South.....	81	53		12
Red.....	24	51		7	South Point.....	18			12
Red Bluff.....	27	53		9	South Range.....	28			9
Red Hill.....	17	45	66	6	Spanish River.....	88			
Rhodes Ship Yard.....	39				Spit.....	81	58		12
Rigolets Church spire.....	38			13	Spring Hill.....	17	46	66	6
Rigolets factory, highest stack.....	38			13	Spring Hill tower.....	21			6
River.....	37	61		13	Squid.....	28	54		9
River east.....	28	54		9	Stack, in operation.....	86			11
River west.....	28	54		9	Stack near water tower.....	86			11
Rock City, Lookout Mountain.....	19		66	4	Stack, second largest.....	35			11
Rockwood.....	27	53		9	Start.....	37	61		13
Roots.....	28	54		9	Steamboat.....	28	54		0
Ross.....	27	53		9	Stir.....	33			10
Ross 2.....	28	55		9	Suarez.....	27	54		9
Round Island.....	39				Summit.....	16	42	66	4
Round Island Lighthouse, 1855.....	39				Sure.....	22	50		7
Round Island Lighthouse, 1910.....	34			11	Talladega:				
Round Island North Spit Light.....	34			11	City school final.....	20	49		4
Round Island South Spit Light.....	34			11	Lewis House cupola.....	20	49		4
Round Top Hill, east side Lookout Mountain.....	19		66	4	Negro College.....	20	49		4
Rowe.....	16	42	66	4	Presbyterian Church.....	20	49		4
Roy.....	26	52	66	7, 9	Tarkill.....	29	55		9
St. Elmo.....	17	46	66	6	Tenesaw River.....	38			
St. Josephs Island.....	40				Terrapin Mountain.....	19		66	4
St. Josephs Island Beacon.....	37			12	Three Mile.....	31	58		12
St. Josephs Island Lighthouse.....	40				Titi.....	28	55		9
St. Louis Bay.....	40				Transit pier, Mobile.....	21	49		6
St. Louis Point.....	39				Tree.....	32			10
St. Patrick's Church, New Orleans.....	18	48		13	Turkey.....	31	58		12
St. Stanislaus College, Bay St. Louis.....	37			12	Upper Tenesaw.....	38			
Sand Island front range Lighthouse.....	22			7	Van Antwerp Building, Mobile.....	26	52		8
Sand Island Lighthouse, 1846-7.....	39				Vessel Point.....	22	50		8
Sand Island Lighthouse, 1868.....	39				Waterworks standpipe, Mobile.....	21			6
Sand Island rear range 1.....	23			7	Wooden Mountain.....	19		66	4
Sand Island rear range 2.....	23			7	Walsner.....	19	48	66	4
Sand Mountain, high ridge.....	19			4	Weogufka.....	16	43	66	4, 5
Saw Mill.....	39				West, 1909.....	37	61		12
Sawmill stack.....	35			11	West, 1910.....	33	59		10
Scranton powerhouse stack.....	34			10	West Ballast Ground beacon BG.....	36			11
Scranton water tank.....	34			10	Western cupola.....	35			11
Second Trinity Ridge.....	19		66	4	West gable.....	83			10
Shack 1.....	33			10	West Grand Bay.....	39			
Shack 2.....	33			10	West Gulf Shore, 1849.....	38			
Shack 3.....	33			10	West Gulf Shore, 1869.....	38			
Shell.....	37	61		12	Wet, 1910.....	34	60		10
Shell Bank Bayou.....	38				Wetumpka.....	16	44	66	5
Shell Point.....	18	48		13	Wharf, 1902.....	30	58		12
Shieldsboro.....	40				Wharf, 1910.....	24	51		7
Ship.....	30	57		11	White.....	17	45	66	6
Ship Island.....	18	47		11	Wilder.....	16	44	66	5
Ship Island east.....	39				Wilson.....	16	42	66	4
Ship Island Lighthouse, 1855.....	30			11, 12	Wire.....	28	54		9
Ship Island Lighthouse, 1902.....	30			11, 12	Wireless.....	26	52		8
Ship Island Main.....	39				Wornock.....	16	42	66	4
Ship Island water tank.....	36			11	Wreck.....	23			7
Ship Yard.....	39				Wyeths Hill, north end.....	19		66	4
Shoe.....	35	61		11	Y Tree.....	32			10
Sig.....	23	51		7					
Small leaning stack.....	36			11					
Smithers.....	19	48	66	4					