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# TRIANGULATION IN ALABAMA AND MISSISSIPPI

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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° 11′ 09.4″, and in longitude 67° 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° 57′ 24.4″ and in longitude 90° 04′ 24.4″ west of Greenwich. The geodetic line covers 23° 30′ 57″, and its total length is 2612.3 kilometers, or 1623.2 statute miles, with an azimuth of 57° 30.7′ at Calais and of 223° 22.5′ at New Orleans, as counted from south around by west. Its extremes differ 15° 13′ 45.0″ in latitude and 22° 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 | Correction |
|---|---|---|
| | | " |
| Gulf Point-Brandon to Cahaba-Cheehahaw | Indian and Aurora | 1.84 |
| Cahaba-Cheehahaw to Jamison-Weogufka | Horn and Laurel | .84 |
| Jamison-Weogufka to Creagh-Pollard | Lowndesboro and Wilder | .93 |
| 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 Point | .49 |
| Dauphin Island base net to Deer Island 1-Ship Island 1855 | East Pascagoula and Petit Bois | 1.31 |
| Deer Island 1-Ship Island 1855 to St. Patrick's Church | East Rigolets unused lighthouse and Grand Island 1855 | 2.65 |

The probable error of an observed direction is

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

in which $\Sigma v^2$ 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 $\pm 0''.47$. 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 $\pm 0''.42$.

## 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

$$\alpha = \sqrt{\frac{\Sigma \Delta^2}{3n}}$$

in which $\Sigma \Delta^2$ 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 | 1.19 | 0.82 |
| Gulf Point-Brandon to Cahaba-Cheehahaw | 2.24 | 2.88 | 1.03 | .78 |
| Cahaba-Cheehahaw to Jamison-Weogufka | 1.44 | 2.69 | 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 (37¼ 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 $\frac{1}{9500}$ 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 |
| $\alpha$ 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 $\Delta\varphi = +1''.9$ 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 Lavender[2] 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—Feet to meters (from 1 to 1,000 units).*

[Reduction factor: 1 foot = 0.3048006096 meter.]

| Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | | **100** | 30.48006 | **200** | 60.96012 | **300** | 91.44018 | **400** | 121.92024 | **500** | 152.40030 | **600** | 182.88037 | **700** | 213.36043 | **800** | 243.84049 | **900** | 274.32055 |
| 1 | .30480 | 1 | 30.78486 | 1 | 61.26492 | 1 | 91.74498 | 1 | 122.22504 | 1 | 152.70511 | 1 | 183.18517 | 1 | 213.66523 | 1 | 244.14529 | 1 | 274.62535 |
| 2 | .60960 | 2 | 31.08966 | 2 | 61.56972 | 2 | 92.04978 | 2 | 122.52985 | 2 | 153.00991 | 2 | 183.48997 | 2 | 213.97003 | 2 | 244.45009 | 2 | 274.93015 |
| 3 | .91440 | 3 | 31.39446 | 3 | 61.87452 | 3 | 92.35458 | 3 | 122.83465 | 3 | 153.31471 | 3 | 183.79477 | 3 | 214.27483 | 3 | 244.75489 | 3 | 275.23495 |
| 4 | 1.21920 | 4 | 31.69926 | 4 | 62.17932 | 4 | 92.65939 | 4 | 123.13945 | 4 | 153.61951 | 4 | 184.09957 | 4 | 214.57963 | 4 | 245.05969 | 4 | 275.53975 |
| 5 | 1.52400 | 5 | 32.00406 | 5 | 62.48412 | 5 | 92.96419 | 5 | 123.44425 | 5 | 153.92431 | 5 | 184.40437 | 5 | 214.88443 | 5 | 245.36449 | 5 | 275.84455 |
| 6 | 1.82880 | 6 | 32.30886 | 6 | 62.78893 | 6 | 93.26899 | 6 | 123.74905 | 6 | 154.22911 | 6 | 184.70917 | 6 | 215.18923 | 6 | 245.66929 | 6 | 276.14935 |
| 7 | 2.13360 | 7 | 32.61367 | 7 | 63.09373 | 7 | 93.57379 | 7 | 124.05385 | 7 | 154.53391 | 7 | 185.01397 | 7 | 215.49403 | 7 | 245.97409 | 7 | 276.45415 |
| 8 | 2.43840 | 8 | 32.91847 | 8 | 63.39853 | 8 | 93.87859 | 8 | 124.35865 | 8 | 154.83871 | 8 | 185.31877 | 8 | 215.79883 | 8 | 246.27889 | 8 | 276.75895 |
| 9 | 2.74321 | 9 | 33.22327 | 9 | 63.70333 | 9 | 94.18339 | 9 | 124.66345 | 9 | 155.14351 | 9 | 185.62357 | 9 | 216.10363 | 9 | 246.58369 | 9 | 277.06375 |
| **10** | 3.04801 | **110** | 33.52807 | **210** | 64.00813 | **310** | 94.48819 | **410** | 124.96825 | **510** | 155.44831 | **610** | 185.92837 | **710** | 216.40843 | **810** | 246.88849 | **910** | 277.36855 |
| 1 | 3.35281 | 1 | 33.83287 | 1 | 64.31293 | 1 | 94.79299 | 1 | 125.27305 | 1 | 155.75311 | 1 | 186.23317 | 1 | 216.71323 | 1 | 247.19329 | 1 | 277.67336 |
| 2 | 3.65761 | 2 | 34.13767 | 2 | 64.61773 | 2 | 95.09779 | 2 | 125.57785 | 2 | 156.05791 | 2 | 186.53797 | 2 | 217.01803 | 2 | 247.49810 | 2 | 277.97816 |
| 3 | 3.96241 | 3 | 34.44247 | 3 | 64.92253 | 3 | 95.40259 | 3 | 125.88265 | 3 | 156.36271 | 3 | 186.84277 | 3 | 217.32283 | 3 | 247.80290 | 3 | 278.28296 |
| 4 | 4.26721 | 4 | 34.74727 | 4 | 65.22733 | 4 | 95.70739 | 4 | 126.18745 | 4 | 156.66751 | 4 | 187.14757 | 4 | 217.62764 | 4 | 248.10770 | 4 | 278.58776 |
| 5 | 4.57201 | 5 | 35.05207 | 5 | 65.53213 | 5 | 96.01219 | 5 | 126.49225 | 5 | 156.97231 | 5 | 187.45237 | 5 | 217.93244 | 5 | 248.41250 | 5 | 278.89256 |
| 6 | 4.87681 | 6 | 35.35687 | 6 | 65.83693 | 6 | 96.31699 | 6 | 126.79705 | 6 | 157.27711 | 6 | 187.75718 | 6 | 218.23724 | 6 | 248.71730 | 6 | 279.19736 |
| 7 | 5.18161 | 7 | 35.66167 | 7 | 66.14173 | 7 | 96.62179 | 7 | 127.10185 | 7 | 157.58192 | 7 | 188.06198 | 7 | 218.54204 | 7 | 249.02210 | 7 | 279.50216 |
| 8 | 5.48641 | 8 | 35.96647 | 8 | 66.44653 | 8 | 96.92659 | 8 | 127.40665 | 8 | 157.88672 | 8 | 188.36678 | 8 | 218.84684 | 8 | 249.32690 | 8 | 279.80696 |
| 9 | 5.79121 | 9 | 36.27127 | 9 | 66.75133 | 9 | 97.23139 | 9 | 127.71146 | 9 | 158.19152 | 9 | 188.67158 | 9 | 219.15164 | 9 | 249.63170 | 9 | 280.11176 |
| **20** | 6.09601 | **120** | 36.57607 | **220** | 67.05613 | **320** | 97.53620 | **420** | 128.01626 | **520** | 158.49632 | **620** | 188.97638 | **720** | 219.45644 | **820** | 249.93650 | **920** | 280.41656 |
| 1 | 6.40081 | 1 | 36.88087 | 1 | 67.36093 | 1 | 97.84100 | 1 | 128.32106 | 1 | 158.80112 | 1 | 189.28118 | 1 | 219.76124 | 1 | 250.24130 | 1 | 280.72136 |
| 2 | 6.70561 | 2 | 37.18567 | 2 | 67.66574 | 2 | 98.14580 | 2 | 128.62586 | 2 | 159.10592 | 2 | 189.58598 | 2 | 220.06604 | 2 | 250.54610 | 2 | 281.02616 |
| 3 | 7.01041 | 3 | 37.49047 | 3 | 67.97054 | 3 | 98.45060 | 3 | 128.93066 | 3 | 159.41072 | 3 | 189.89078 | 3 | 220.37084 | 3 | 250.85090 | 3 | 281.33096 |
| 4 | 7.31521 | 4 | 37.79528 | 4 | 68.27534 | 4 | 98.75540 | 4 | 129.23546 | 4 | 159.71552 | 4 | 190.19558 | 4 | 220.67564 | 4 | 251.15570 | 4 | 281.63576 |
| 5 | 7.62002 | 5 | 38.10008 | 5 | 68.58014 | 5 | 99.06020 | 5 | 129.54026 | 5 | 160.02032 | 5 | 190.50038 | 5 | 220.98044 | 5 | 251.46050 | 5 | 281.94056 |
| 6 | 7.92482 | 6 | 38.40488 | 6 | 68.88494 | 6 | 99.36500 | 6 | 129.84506 | 6 | 160.32512 | 6 | 190.80518 | 6 | 221.28524 | 6 | 251.76530 | 6 | 282.24536 |
| 7 | 8.22962 | 7 | 38.70968 | 7 | 69.18974 | 7 | 99.66980 | 7 | 130.14986 | 7 | 160.62992 | 7 | 191.10998 | 7 | 221.59004 | 7 | 252.07010 | 7 | 282.55017 |
| 8 | 8.53442 | 8 | 39.01448 | 8 | 69.49454 | 8 | 99.97460 | 8 | 130.45466 | 8 | 160.93472 | 8 | 191.41478 | 8 | 221.89484 | 8 | 252.37490 | 8 | 282.85497 |
| 9 | 8.83922 | 9 | 39.31928 | 9 | 69.79934 | 9 | 100.27940 | 9 | 130.75946 | 9 | 161.23952 | 9 | 191.71958 | 9 | 222.19964 | 9 | 252.67971 | 9 | 283.15977 |
| **30** | 9.14402 | **130** | 39.62408 | **230** | 70.10414 | **330** | 100.58420 | **430** | 131.06426 | **530** | 161.54432 | **630** | 192.02438 | **730** | 222.50445 | **830** | 252.98451 | **930** | 283.46457 |
| 1 | 9.44882 | 1 | 39.92888 | 1 | 70.40894 | 1 | 100.88900 | 1 | 131.36906 | 1 | 161.84912 | 1 | 192.32918 | 1 | 222.80925 | 1 | 253.28931 | 1 | 283.76937 |
| 2 | 9.75362 | 2 | 40.23368 | 2 | 70.71374 | 2 | 101.19380 | 2 | 131.67386 | 2 | 162.15392 | 2 | 192.63399 | 2 | 223.11405 | 2 | 253.59411 | 2 | 284.07417 |
| 3 | 10.05842 | 3 | 40.53848 | 3 | 71.01854 | 3 | 101.49860 | 3 | 131.97866 | 3 | 162.45872 | 3 | 192.93879 | 3 | 223.41885 | 3 | 253.89891 | 3 | 284.37897 |
| 4 | 10.36322 | 4 | 40.84328 | 4 | 71.32334 | 4 | 101.80340 | 4 | 132.28346 | 4 | 162.76353 | 4 | 193.24359 | 4 | 223.72365 | 4 | 254.20371 | 4 | 284.68377 |
| 5 | 10.66802 | 5 | 41.14808 | 5 | 71.62814 | 5 | 102.10820 | 5 | 132.58827 | 5 | 163.06833 | 5 | 193.54839 | 5 | 224.02845 | 5 | 254.50851 | 5 | 284.98857 |
| 6 | 10.97282 | 6 | 41.45288 | 6 | 71.93294 | 6 | 102.41300 | 6 | 132.89307 | 6 | 163.37313 | 6 | 193.85319 | 6 | 224.33325 | 6 | 254.81331 | 6 | 285.29337 |
| 7 | 11.27762 | 7 | 41.75768 | 7 | 72.23774 | 7 | 102.71781 | 7 | 133.19787 | 7 | 163.67793 | 7 | 194.15799 | 7 | 224.63805 | 7 | 255.11811 | 7 | 285.59817 |
| 8 | 11.58242 | 8 | 42.06248 | 8 | 72.54255 | 8 | 103.02261 | 8 | 133.50267 | 8 | 163.98273 | 8 | 194.46279 | 8 | 224.94285 | 8 | 255.42291 | 8 | 285.90297 |
| 9 | 11.88722 | 9 | 42.36728 | 9 | 72.84735 | 9 | 103.32741 | 9 | 133.80747 | 9 | 164.28753 | 9 | 194.76759 | 9 | 225.24765 | 9 | 255.72771 | 9 | 286.20777 |
| **40** | 12.19202 | **140** | 42.67209 | **240** | 73.15215 | **340** | 103.63221 | **440** | 134.11227 | **540** | 164.59233 | **640** | 195.07239 | **740** | 225.55245 | **840** | 256.03251 | **940** | 286.51257 |
| 1 | 12.49682 | 1 | 42.97689 | 1 | 73.45695 | 1 | 103.93701 | 1 | 134.41707 | 1 | 164.89713 | 1 | 195.37719 | 1 | 225.85725 | 1 | 256.33731 | 1 | 286.81737 |
| 2 | 12.80163 | 2 | 43.28169 | 2 | 73.76175 | 2 | 104.24181 | 2 | 134.72187 | 2 | 165.20193 | 2 | 195.68199 | 2 | 226.16205 | 2 | 256.64211 | 2 | 287.12217 |
| 3 | 13.10643 | 3 | 43.58649 | 3 | 74.06655 | 3 | 104.54661 | 3 | 135.02667 | 3 | 165.50673 | 3 | 195.98679 | 3 | 226.46685 | 3 | 256.94691 | 3 | 287.42697 |
| 4 | 13.41123 | 4 | 43.89129 | 4 | 74.37135 | 4 | 104.85141 | 4 | 135.33147 | 4 | 165.81153 | 4 | 196.29159 | 4 | 226.77165 | 4 | 257.25171 | 4 | 287.73178 |
| 5 | 13.71603 | 5 | 44.19609 | 5 | 74.67615 | 5 | 105.15621 | 5 | 135.63627 | 5 | 166.11633 | 5 | 196.59639 | 5 | 227.07645 | 5 | 257.55652 | 5 | 288.03658 |
| 6 | 14.02083 | 6 | 44.50089 | 6 | 74.98095 | 6 | 105.46101 | 6 | 135.94107 | 6 | 166.42113 | 6 | 196.90119 | 6 | 227.38125 | 6 | 257.86132 | 6 | 288.34138 |
| 7 | 14.32563 | 7 | 44.80569 | 7 | 75.28575 | 7 | 105.76581 | 7 | 136.24587 | 7 | 166.72593 | 7 | 197.20599 | 7 | 227.68606 | 7 | 258.16612 | 7 | 288.64618 |
| 8 | 14.63043 | 8 | 45.11049 | 8 | 75.59055 | 8 | 106.07061 | 8 | 136.55067 | 8 | 167.03073 | 8 | 197.51080 | 8 | 227.99086 | 8 | 258.47092 | 8 | 288.95098 |
| 9 | 14.93523 | 9 | 45.41529 | 9 | 75.89535 | 9 | 106.37541 | 9 | 136.85547 | 9 | 167.33553 | 9 | 197.81560 | 9 | 228.29566 | 9 | 258.77572 | 9 | 289.25578 |
| **50** | 15.24003 | **150** | 45.72009 | **250** | 76.20015 | **350** | 106.68021 | **450** | 137.16027 | **550** | 167.64034 | **650** | 198.12040 | **750** | 228.60046 | **850** | 259.08052 | **950** | 289.56058 |
| 1 | 15.54483 | 1 | 46.02489 | 1 | 76.50495 | 1 | 106.98501 | 1 | 137.46507 | 1 | 167.94514 | 1 | 198.42520 | 1 | 228.90526 | 1 | 259.38532 | 1 | 289.86538 |
| 2 | 15.84963 | 2 | 46.32969 | 2 | 76.80975 | 2 | 107.28981 | 2 | 137.76988 | 2 | 168.24994 | 2 | 198.73000 | 2 | 229.21006 | 2 | 259.69012 | 2 | 290.17018 |
| 3 | 16.15443 | 3 | 46.63449 | 3 | 77.11455 | 3 | 107.59462 | 3 | 138.07468 | 3 | 168.55474 | 3 | 199.03480 | 3 | 229.51486 | 3 | 259.99492 | 3 | 290.47498 |
| 4 | 16.45923 | 4 | 46.93929 | 4 | 77.41935 | 4 | 107.89942 | 4 | 138.37948 | 4 | 168.85954 | 4 | 199.33960 | 4 | 229.81966 | 4 | 260.29972 | 4 | 290.77978 |
| 5 | 16.76403 | 5 | 47.24409 | 5 | 77.72416 | 5 | 108.20422 | 5 | 138.68428 | 5 | 169.16434 | 5 | 199.64440 | 5 | 230.12446 | 5 | 260.60452 | 5 | 291.08458 |
| 6 | 17.06883 | 6 | 47.54890 | 6 | 78.02896 | 6 | 108.50902 | 6 | 138.98908 | 6 | 169.46914 | 6 | 199.94920 | 6 | 230.42926 | 6 | 260.90932 | 6 | 291.38938 |
| 7 | 17.37363 | 7 | 47.85370 | 7 | 78.33376 | 7 | 108.81382 | 7 | 139.29388 | 7 | 169.77394 | 7 | 200.25400 | 7 | 230.73406 | 7 | 261.21412 | 7 | 291.69418 |
| 8 | 17.67844 | 8 | 48.15850 | 8 | 78.63856 | 8 | 109.11862 | 8 | 139.59868 | 8 | 170.07874 | 8 | 200.55880 | 8 | 231.03886 | 8 | 261.51892 | 8 | 291.99898 |
| 9 | 17.98324 | 9 | 48.46330 | 9 | 78.94336 | 9 | 109.42342 | 9 | 139.90348 | 9 | 170.38354 | 9 | 200.86360 | 9 | 231.34366 | 9 | 261.82372 | 9 | 292.30378 |
| **60** | 18.28804 | **160** | 48.76810 | **260** | 79.24816 | **360** | 109.72822 | **460** | 140.20828 | **560** | 170.68834 | **660** | 201.16840 | **760** | 231.64846 | **860** | 262.12852 | **960** | 292.60859 |
| 1 | 18.59284 | 1 | 49.07290 | 1 | 79.55296 | 1 | 110.03302 | 1 | 140.51308 | 1 | 170.99314 | 1 | 201.47320 | 1 | 231.95326 | 1 | 262.43332 | 1 | 292.91339 |
| 2 | 18.89764 | 2 | 49.37770 | 2 | 79.85776 | 2 | 110.33782 | 2 | 140.81788 | 2 | 171.29794 | 2 | 201.77800 | 2 | 232.25806 | 2 | 262.73813 | 2 | 293.21819 |
| 3 | 19.20244 | 3 | 49.68250 | 3 | 80.16256 | 3 | 110.64262 | 3 | 141.12268 | 3 | 171.60274 | 3 | 202.08280 | 3 | 232.56287 | 3 | 263.04293 | 3 | 293.52299 |
| 4 | 19.50724 | 4 | 49.98730 | 4 | 80.46736 | 4 | 110.94742 | 4 | 141.42748 | 4 | 171.90754 | 4 | 202.38760 | 4 | 232.86767 | 4 | 263.34773 | 4 | 293.82779 |
| 5 | 19.81204 | 5 | 50.29210 | 5 | 80.77216 | 5 | 111.25222 | 5 | 141.73228 | 5 | 172.21234 | 5 | 202.69241 | 5 | 233.17247 | 5 | 263.65253 | 5 | 294.13259 |
| 6 | 20.11684 | 6 | 50.59690 | 6 | 81.07696 | 6 | 111.55702 | 6 | 142.03708 | 6 | 172.51714 | 6 | 202.99721 | 6 | 233.47727 | 6 | 263.95733 | 6 | 294.43739 |
| 7 | 20.42164 | 7 | 50.90170 | 7 | 81.38176 | 7 | 111.86182 | 7 | 142.34188 | 7 | 172.82195 | 7 | 203.30201 | 7 | 233.78207 | 7 | 264.26213 | 7 | 294.74219 |
| 8 | 20.72644 | 8 | 51.20650 | 8 | 81.68656 | 8 | 112.16662 | 8 | 142.64669 | 8 | 173.12675 | 8 | 203.60681 | 8 | 234.08687 | 8 | 264.56693 | 8 | 295.04699 |
| 9 | 21.03124 | 9 | 51.51130 | 9 | 81.99136 | 9 | 112.47142 | 9 | 142.95149 | 9 | 173.43155 | 9 | 203.91161 | 9 | 234.39167 | 9 | 264.87173 | 9 | 295.35179 |
| **70** | 21.33604 | **170** | 51.81610 | **270** | 82.29616 | **370** | 112.77623 | **470** | 143.25629 | **570** | 173.73635 | **670** | 204.21641 | **770** | 234.69647 | **870** | 265.17653 | **970** | 295.65659 |
| 1 | 21.64084 | 1 | 52.12090 | 1 | 82.60097 | 1 | 113.08103 | 1 | 143.56109 | 1 | 174.04115 | 1 | 204.52121 | 1 | 235.00127 | 1 | 265.48133 | 1 | 295.96139 |
| 2 | 21.94564 | 2 | 52.42570 | 2 | 82.90577 | 2 | 113.38583 | 2 | 143.86589 | 2 | 174.34595 | 2 | 204.82601 | 2 | 235.30607 | 2 | 265.78613 | 2 | 296.26619 |
| 3 | 22.25044 | 3 | 52.73051 | 3 | 83.21057 | 3 | 113.69063 | 3 | 144.17069 | 3 | 174.65075 | 3 | 205.13081 | 3 | 235.61087 | 3 | 266.09093 | 3 | 296.57099 |
| 4 | 22.55525 | 4 | 53.03531 | 4 | 83.51537 | 4 | 113.99543 | 4 | 144.47549 | 4 | 174.95555 | 4 | 205.43561 | 4 | 235.91567 | 4 | 266.39573 | 4 | 296.87579 |
| 5 | 22.86005 | 5 | 53.34011 | 5 | 83.82017 | 5 | 114.30023 | 5 | 144.78029 | 5 | 175.26035 | 5 | 205.74041 | 5 | 236.22047 | 5 | 266.70053 | 5 | 297.18059 |
| 6 | 23.16485 | 6 | 53.64491 | 6 | 84.12497 | 6 | 114.60503 | 6 | 145.08509 | 6 | 175.56515 | 6 | 206.04521 | 6 | 236.52527 | 6 | 267.00533 | 6 | 297.48539 |
| 7 | 23.46965 | 7 | 53.94971 | 7 | 84.42977 | 7 | 114.90983 | 7 | 145.38989 | 7 | 175.86995 | 7 | 206.35001 | 7 | 236.83007 | 7 | 267.31013 | 7 | 297.79020 |
| 8 | 23.77445 | 8 | 54.25451 | 8 | 84.73457 | 8 | 115.21463 | 8 | 145.69469 | 8 | 176.17475 | 8 | 206.65481 | 8 | 237.13487 | 8 | 267.61494 | 8 | 298.09500 |
| 9 | 24.07925 | 9 | 54.55931 | 9 | 85.03937 | 9 | 115.51943 | 9 | 145.99949 | 9 | 176.47955 | 9 | 206.95961 | 9 | 237.43967 | 9 | 267.91974 | 9 | 298.39980 |
| **80** | 24.38405 | **180** | 54.86411 | **280** | 85.34417 | **380** | 115.82423 | **480** | 146.30429 | **580** | 176.78435 | **680** | 207.26441 | **780** | 237.74448 | **880** | 268.22454 | **980** | 298.70460 |
| 1 | 24.68885 | 1 | 55.16891 | 1 | 85.64897 | 1 | 116.12903 | 1 | 146.60909 | 1 | 177.08915 | 1 | 207.56922 | 1 | 238.04928 | 1 | 268.52934 | 1 | 299.00940 |
| 2 | 24.99365 | 2 | 55.47371 | 2 | 85.95377 | 2 | 116.43383 | 2 | 146.91389 | 2 | 177.39395 | 2 | 207.87402 | 2 | 238.35408 | 2 | 268.83414 | 2 | 299.31420 |
| 3 | 25.29845 | 3 | 55.77851 | 3 | 86.25857 | 3 | 116.73863 | 3 | 147.21869 | 3 | 177.69876 | 3 | 208.17882 | 3 | 238.65888 | 3 | 269.13894 | 3 | 299.61900 |
| 4 | 25.60325 | 4 | 56.08331 | 4 | 86.56337 | 4 | 117.04343 | 4 | 147.52350 | 4 | 178.00356 | 4 | 208.48362 | 4 | 238.96368 | 4 | 269.44374 | 4 | 299.92380 |
| 5 | 25.90805 | 5 | 56.38811 | 5 | 86.86817 | 5 | 117.34823 | 5 | 147.82830 | 5 | 178.30836 | 5 | 208.78842 | 5 | 239.26848 | 5 | 269.74854 | 5 | 300.22860 |
| 6 | 26.21285 | 6 | 56.69291 | 6 | 87.17297 | 6 | 117.65304 | 6 | 148.13310 | 6 | 178.61316 | 6 | 209.09322 | 6 | 239.57328 | 6 | 270.05334 | 6 | 300.53340 |
| 7 | 26.51765 | 7 | 56.99771 | 7 | 87.47777 | 7 | 117.95784 | 7 | 148.43790 | 7 | 178.91796 | 7 | 209.39802 | 7 | 239.87808 | 7 | 270.35814 | 7 | 300.83820 |
| 8 | 26.82245 | 8 | 57.30251 | 8 | 87.78258 | 8 | 118.26264 | 8 | 148.74270 | 8 | 179.22276 | 8 | 209.70282 | 8 | 240.18288 | 8 | 270.66294 | 8 | 301.14300 |
| 9 | 27.12725 | 9 | 57.60732 | 9 | 88.08738 | 9 | 118.56744 | 9 | 149.04750 | 9 | 179.52756 | 9 | 210.00762 | 9 | 240.48768 | 9 | 270.96774 | 9 | 301.44780 |
| **90** | 27.43205 | **190** | 57.91212 | **290** | 88.39218 | **390** | 118.87224 | **490** | 149.35230 | **590** | 179.83236 | **690** | 210.31242 | **790** | 240.79248 | **890** | 271.27254 | **990** | 301.75260 |
| 1 | 27.73686 | 1 | 58.21692 | 1 | 88.69698 | 1 | 119.17704 | 1 | 149.65710 | 1 | 180.13716 | 1 | 210.61722 | 1 | 241.09728 | 1 | 271.57734 | 1 | 302.05740 |
| 2 | 28.04166 | 2 | 58.52172 | 2 | 89.00178 | 2 | 119.48184 | 2 | 149.96190 | 2 | 180.44196 | 2 | 210.92202 | 2 | 241.40208 | 2 | 271.88214 | 2 | 302.36220 |
| 3 | 28.34646 | 3 | 58.82652 | 3 | 89.30658 | 3 | 119.78664 | 3 | 150.26670 | 3 | 180.74676 | 3 | 211.22682 | 3 | 241.70688 | 3 | 272.18694 | 3 | 302.66701 |
| 4 | 28.65126 | 4 | 59.13132 | 4 | 89.61138 | 4 | 120.09144 | 4 | 150.57150 | 4 | 181.05156 | 4 | 211.53162 | 4 | 242.01168 | 4 | 272.49174 | 4 | 302.97181 |
| 5 | 28.95606 | 5 | 59.43612 | 5 | 89.91618 | 5 | 120.39624 | 5 | 150.87630 | 5 | 181.35636 | 5 | 211.83642 | 5 | 242.31648 | 5 | 272.79655 | 5 | 303.27661 |
| 6 | 29.26086 | 6 | 59.74092 | 6 | 90.22098 | 6 | 120.70104 | 6 | 151.18110 | 6 | 181.66116 | 6 | 212.14122 | 6 | 242.62129 | 6 | 273.10135 | 6 | 303.58141 |
| 7 | 29.56566 | 7 | 60.04572 | 7 | 90.52578 | 7 | 121.00584 | 7 | 151.48590 | 7 | 181.96596 | 7 | 212.44602 | 7 | 242.92609 | 7 | 273.40615 | 7 | 303.88621 |
| 8 | 29.87046 | 8 | 60.35052 | 8 | 90.83058 | 8 | 121.31064 | 8 | 151.79070 | 8 | 182.27076 | 8 | 212.75083 | 8 | 243.23089 | 8 | 273.71095 | 8 | 304.19101 |
| 9 | 30.17526 | 9 | 60.65532 | 9 | 91.13538 | 9 | 121.61544 | 9 | 152.09550 | 9 | 182.57557 | 9 | 213.05563 | 9 | 243.53569 | 9 | 274.01575 | 9 | 304.49581 |

| | | | |
|---|---|---|---|
| 1 inch = .02540 meter. | 4 inches = .10160 meter. | 7 inches = .17780 meter. | 10 inches = .25400 meter. |
| 2 inches = .05080 meter. | 5 inches = .12700 meter. | 8 inches = .20320 meter. | 11 inches = .27940 meter. |
| 3 inches = .07620 meter. | 6 inches = .15240 meter. | 9 inches = .22860 meter. | 12 inches = .30480 meter. |

*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. | Meters. | Feet. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | | **100** | 328.08333 | **200** | 656.16667 | **300** | 984.25000 | **400** | 1,312.33333 | **500** | 1,640.41667 | **600** | 1,968.50000 | **700** | 2,296.58333 | **800** | 2,624.66667 | **900** | 2,952.75000 |
| 1 | 3.28083 | 1 | 331.36417 | 1 | 659.44750 | 1 | 987.53083 | 1 | 1,315.61417 | 1 | 1,643.69750 | 1 | 1,971.78083 | 1 | 2,299.86417 | 1 | 2,627.94750 | 1 | 2,956.03083 |
| 2 | 6.56167 | 2 | 334.64500 | 2 | 662.72833 | 2 | 990.81167 | 2 | 1,318.89500 | 2 | 1,646.97833 | 2 | 1,975.06167 | 2 | 2,303.14500 | 2 | 2,631.22833 | 2 | 2,959.31167 |
| 3 | 9.84250 | 3 | 337.92583 | 3 | 666.00917 | 3 | 994.09250 | 3 | 1,322.17583 | 3 | 1,650.25917 | 3 | 1,978.34250 | 3 | 2,306.42083 | 3 | 2,634.50917 | 3 | 2,962.59250 |
| 4 | 13.12333 | 4 | 341.20667 | 4 | 669.29000 | 4 | 997.37333 | 4 | 1,325.45667 | 4 | 1,653.54000 | 4 | 1,981.62333 | 4 | 2,309.70667 | 4 | 2,637.79000 | 4 | 2,965.87333 |
| 5 | 16.40417 | 5 | 344.48750 | 5 | 672.57083 | 5 | 1,000.65417 | 5 | 1,328.73750 | 5 | 1,656.82083 | 5 | 1,984.90417 | 5 | 2,312.98750 | 5 | 2,641.07083 | 5 | 2,969.15417 |
| 6 | 19.68500 | 6 | 347.76833 | 6 | 675.85167 | 6 | 1,003.93500 | 6 | 1,332.01833 | 6 | 1,660.10167 | 6 | 1,988.18500 | 6 | 2,316.26833 | 6 | 2,644.35167 | 6 | 2,972.43500 |
| 7 | 22.96583 | 7 | 351.04917 | 7 | 679.13250 | 7 | 1,007.21583 | 7 | 1,335.29917 | 7 | 1,663.38250 | 7 | 1,991.46583 | 7 | 2,319.54917 | 7 | 2,647.63250 | 7 | 2,975.71583 |
| 8 | 26.24667 | 8 | 354.33000 | 8 | 682.41333 | 8 | 1,010.49667 | 8 | 1,338.58000 | 8 | 1,666.66333 | 8 | 1,994.74667 | 8 | 2,322.83000 | 8 | 2,650.91333 | 8 | 2,978.99667 |
| 9 | 29.52750 | 9 | 357.61083 | 9 | 685.69417 | 9 | 1,013.77750 | 9 | 1,341.86083 | 9 | 1,669.94417 | 9 | 1,998.02750 | 9 | 2,326.11083 | 9 | 2,654.19417 | 9 | 2,982.27750 |
| **10** | 32.80833 | **110** | 360.89167 | **210** | 688.97500 | **310** | 1,017.05833 | **410** | 1,345.14167 | **510** | 1,673.22500 | **610** | 2,001.30833 | **710** | 2,329.39167 | **810** | 2,657.47500 | **910** | 2,985.55833 |
| 1 | 36.08917 | 1 | 364.17250 | 1 | 692.25583 | 1 | 1,020.33917 | 1 | 1,348.42250 | 1 | 1,676.50583 | 1 | 2,004.58917 | 1 | 2,332.67250 | 1 | 2,660.75583 | 1 | 2,988.83917 |
| 2 | 39.37000 | 2 | 367.45333 | 2 | 695.53667 | 2 | 1,023.62000 | 2 | 1,351.70333 | 2 | 1,679.78667 | 2 | 2,007.87000 | 2 | 2,335.95333 | 2 | 2,664.03667 | 2 | 2,992.12000 |
| 3 | 42.65083 | 3 | 370.73417 | 3 | 698.81750 | 3 | 1,026.90083 | 3 | 1,354.98417 | 3 | 1,683.06750 | 3 | 2,011.15083 | 3 | 2,339.23417 | 3 | 2,667.31750 | 3 | 2,995.40083 |
| 4 | 45.93167 | 4 | 374.01500 | 4 | 702.09833 | 4 | 1,030.18167 | 4 | 1,358.26500 | 4 | 1,686.34833 | 4 | 2,014.43167 | 4 | 2,342.51500 | 4 | 2,670.59833 | 4 | 2,998.68167 |
| 5 | 49.21250 | 5 | 377.29583 | 5 | 705.37917 | 5 | 1,033.46250 | 5 | 1,361.54583 | 5 | 1,689.62917 | 5 | 2,017.71250 | 5 | 2,345.79583 | 5 | 2,673.87917 | 5 | 3,001.96250 |
| 6 | 52.49333 | 6 | 380.57667 | 6 | 708.66000 | 6 | 1,036.74333 | 6 | 1,364.82667 | 6 | 1,692.91000 | 6 | 2,020.99333 | 6 | 2,349.07667 | 6 | 2,677.16000 | 6 | 3,005.24333 |
| 7 | 55.77417 | 7 | 383.85750 | 7 | 711.94083 | 7 | 1,040.02417 | 7 | 1,368.10750 | 7 | 1,696.19083 | 7 | 2,024.27417 | 7 | 2,352.35750 | 7 | 2,680.44083 | 7 | 3,008.52417 |
| 8 | 59.05500 | 8 | 387.13833 | 8 | 715.22167 | 8 | 1,043.30500 | 8 | 1,371.38833 | 8 | 1,699.47167 | 8 | 2,027.55500 | 8 | 2,355.63833 | 8 | 2,683.72167 | 8 | 3,011.80500 |
| 9 | 62.33583 | 9 | 390.41917 | 9 | 718.50250 | 9 | 1,046.58583 | 9 | 1,374.66917 | 9 | 1,702.75250 | 9 | 2,030.83583 | 9 | 2,358.91917 | 9 | 2,687.00250 | 9 | 3,015.08583 |
| **20** | 65.61667 | **120** | 393.70000 | **220** | 721.78333 | **320** | 1,049.86667 | **420** | 1,377.95000 | **520** | 1,706.03333 | **620** | 2,034.11667 | **720** | 2,362.20000 | **820** | 2,690.28333 | **920** | 3,018.36667 |
| 1 | 68.89750 | 1 | 396.98083 | 1 | 725.06417 | 1 | 1,053.14750 | 1 | 1,381.23083 | 1 | 1,709.31417 | 1 | 2,037.39750 | 1 | 2,365.48083 | 1 | 2,693.56417 | 1 | 3,021.64750 |
| 2 | 72.17833 | 2 | 400.26167 | 2 | 728.34500 | 2 | 1,056.42833 | 2 | 1,384.51167 | 2 | 1,712.59500 | 2 | 2,040.67833 | 2 | 2,368.76167 | 2 | 2,696.84500 | 2 | 3,024.92833 |
| 3 | 75.45917 | 3 | 403.54250 | 3 | 731.62583 | 3 | 1,059.70917 | 3 | 1,387.79250 | 3 | 1,715.87583 | 3 | 2,043.95917 | 3 | 2,372.04250 | 3 | 2,700.12583 | 3 | 3,028.20917 |
| 4 | 78.74000 | 4 | 406.82333 | 4 | 734.90667 | 4 | 1,062.99000 | 4 | 1,391.07333 | 4 | 1,719.15667 | 4 | 2,047.24000 | 4 | 2,375.32333 | 4 | 2,703.40667 | 4 | 3,031.49000 |
| 5 | 82.02083 | 5 | 410.10417 | 5 | 738.18750 | 5 | 1,066.27083 | 5 | 1,394.35417 | 5 | 1,722.43750 | 5 | 2,050.52083 | 5 | 2,378.60417 | 5 | 2,706.68750 | 5 | 3,034.77083 |
| 6 | 85.30167 | 6 | 413.38500 | 6 | 741.46833 | 6 | 1,069.55167 | 6 | 1,397.63500 | 6 | 1,725.71833 | 6 | 2,053.80167 | 6 | 2,381.88500 | 6 | 2,709.96833 | 6 | 3,038.05167 |
| 7 | 88.58250 | 7 | 416.66583 | 7 | 744.74917 | 7 | 1,072.83250 | 7 | 1,400.91583 | 7 | 1,728.99917 | 7 | 2,057.08250 | 7 | 2,385.16583 | 7 | 2,713.24917 | 7 | 3,041.33250 |
| 8 | 91.86333 | 8 | 419.94667 | 8 | 748.03000 | 8 | 1,076.11333 | 8 | 1,404.19667 | 8 | 1,732.28000 | 8 | 2,060.36333 | 8 | 2,388.44667 | 8 | 2,716.53000 | 8 | 3,044.61333 |
| 9 | 95.14417 | 9 | 423.22750 | 9 | 751.31083 | 9 | 1,079.39417 | 9 | 1,407.47750 | 9 | 1,735.56083 | 9 | 2,063.64417 | 9 | 2,391.72750 | 9 | 2,719.81083 | 9 | 3,047.89417 |
| **30** | 98.42500 | **130** | 426.50833 | **230** | 754.59167 | **330** | 1,082.67500 | **430** | 1,410.75833 | **530** | 1,738.84167 | **630** | 2,066.92500 | **730** | 2,395.00833 | **830** | 2,723.09167 | **930** | 3,051.17500 |
| 1 | 101.70583 | 1 | 429.78917 | 1 | 757.87250 | 1 | 1,085.95583 | 1 | 1,414.03917 | 1 | 1,742.12250 | 1 | 2,070.20583 | 1 | 2,398.28917 | 1 | 2,726.37250 | 1 | 3,054.45583 |
| 2 | 104.98667 | 2 | 433.07000 | 2 | 761.15333 | 2 | 1,089.23667 | 2 | 1,417.32000 | 2 | 1,745.40333 | 2 | 2,073.48667 | 2 | 2,401.57000 | 2 | 2,729.65333 | 2 | 3,057.73667 |
| 3 | 108.26750 | 3 | 436.35083 | 3 | 764.43417 | 3 | 1,092.51750 | 3 | 1,420.60083 | 3 | 1,748.68417 | 3 | 2,076.76750 | 3 | 2,404.85083 | 3 | 2,732.93417 | 3 | 3,061.01750 |
| 4 | 111.54833 | 4 | 439.63167 | 4 | 767.71500 | 4 | 1,095.79833 | 4 | 1,423.88167 | 4 | 1,751.96500 | 4 | 2,080.04833 | 4 | 2,408.13167 | 4 | 2,736.21500 | 4 | 3,064.29833 |
| 5 | 114.82917 | 5 | 442.91250 | 5 | 770.99583 | 5 | 1,099.07917 | 5 | 1,427.16250 | 5 | 1,755.24583 | 5 | 2,083.32917 | 5 | 2,411.41250 | 5 | 2,739.49583 | 5 | 3,067.57917 |
| 6 | 118.11000 | 6 | 446.19333 | 6 | 774.27667 | 6 | 1,102.36000 | 6 | 1,430.44333 | 6 | 1,758.52667 | 6 | 2,086.61000 | 6 | 2,414.69333 | 6 | 2,742.77667 | 6 | 3,070.86000 |
| 7 | 121.39083 | 7 | 449.47417 | 7 | 777.55750 | 7 | 1,105.64083 | 7 | 1,433.72417 | 7 | 1,761.80750 | 7 | 2,089.89083 | 7 | 2,417.97417 | 7 | 2,746.05750 | 7 | 3,074.14083 |
| 8 | 124.67167 | 8 | 452.75500 | 8 | 780.83833 | 8 | 1,108.92167 | 8 | 1,437.00500 | 8 | 1,765.08833 | 8 | 2,093.17167 | 8 | 2,421.25500 | 8 | 2,749.33833 | 8 | 3,077.42167 |
| 9 | 127.95250 | 9 | 456.03583 | 9 | 784.11917 | 9 | 1,112.20250 | 9 | 1,440.28583 | 9 | 1,768.36917 | 9 | 2,096.45250 | 9 | 2,424.53583 | 9 | 2,752.61917 | 9 | 3,080.70250 |
| **40** | 131.23333 | **140** | 459.31667 | **240** | 787.40000 | **340** | 1,115.48333 | **440** | 1,443.56667 | **540** | 1,771.65000 | **640** | 2,099.73333 | **740** | 2,427.81667 | **840** | 2,755.90000 | **940** | 3,083.98333 |
| 1 | 134.51417 | 1 | 462.59750 | 1 | 790.68083 | 1 | 1,118.76417 | 1 | 1,446.84750 | 1 | 1,774.93083 | 1 | 2,103.01417 | 1 | 2,431.09750 | 1 | 2,759.18083 | 1 | 3,087.26417 |
| 2 | 137.79500 | 2 | 465.87833 | 2 | 793.96167 | 2 | 1,122.04500 | 2 | 1,450.12833 | 2 | 1,778.21167 | 2 | 2,106.29500 | 2 | 2,434.37833 | 2 | 2,762.46167 | 2 | 3,090.54500 |
| 3 | 141.07583 | 3 | 469.15917 | 3 | 797.24250 | 3 | 1,125.32583 | 3 | 1,453.40917 | 3 | 1,781.49250 | 3 | 2,109.57583 | 3 | 2,437.65917 | 3 | 2,765.74250 | 3 | 3,093.82583 |
| 4 | 144.35667 | 4 | 472.44000 | 4 | 800.52333 | 4 | 1,128.60667 | 4 | 1,456.69000 | 4 | 1,784.77333 | 4 | 2,112.85667 | 4 | 2,440.94000 | 4 | 2,769.02333 | 4 | 3,097.10667 |
| 5 | 147.63750 | 5 | 475.72083 | 5 | 803.80417 | 5 | 1,131.88750 | 5 | 1,459.97083 | 5 | 1,788.05417 | 5 | 2,116.13750 | 5 | 2,444.22083 | 5 | 2,772.30417 | 5 | 3,100.38750 |
| 6 | 150.91833 | 6 | 479.00167 | 6 | 807.08500 | 6 | 1,135.16833 | 6 | 1,463.25167 | 6 | 1,791.33500 | 6 | 2,119.41833 | 6 | 2,447.50167 | 6 | 2,775.58500 | 6 | 3,103.66833 |
| 7 | 154.19917 | 7 | 482.28250 | 7 | 810.36583 | 7 | 1,138.44917 | 7 | 1,466.53250 | 7 | 1,794.61583 | 7 | 2,122.69917 | 7 | 2,450.78250 | 7 | 2,778.86583 | 7 | 3,106.94917 |
| 8 | 157.48000 | 8 | 485.56333 | 8 | 813.64667 | 8 | 1,141.73000 | 8 | 1,469.81333 | 8 | 1,797.89667 | 8 | 2,125.98000 | 8 | 2,454.06333 | 8 | 2,782.14667 | 8 | 3,110.23000 |
| 9 | 160.76083 | 9 | 488.84417 | 9 | 816.92750 | 9 | 1,145.01083 | 9 | 1,473.09417 | 9 | 1,801.17750 | 9 | 2,129.26083 | 9 | 2,457.34417 | 9 | 2,785.42750 | 9 | 3,113.51083 |
| **50** | 164.04167 | **150** | 492.12500 | **250** | 820.20833 | **350** | 1,148.29167 | **450** | 1,476.37500 | **550** | 1,804.45833 | **650** | 2,132.54167 | **750** | 2,460.62500 | **850** | 2,788.70833 | **950** | 3,116.79167 |
| 1 | 167.32250 | 1 | 495.40583 | 1 | 823.48917 | 1 | 1,151.57250 | 1 | 1,479.65583 | 1 | 1,807.73917 | 1 | 2,135.82250 | 1 | 2,463.90583 | 1 | 2,791.98917 | 1 | 3,120.07250 |
| 2 | 170.60333 | 2 | 498.68667 | 2 | 826.77000 | 2 | 1,154.85333 | 2 | 1,482.93667 | 2 | 1,811.02000 | 2 | 2,139.10333 | 2 | 2,467.18667 | 2 | 2,795.27000 | 2 | 3,123.35333 |
| 3 | 173.88417 | 3 | 501.96750 | 3 | 830.05083 | 3 | 1,158.13417 | 3 | 1,486.21750 | 3 | 1,814.30083 | 3 | 2,142.38417 | 3 | 2,470.46750 | 3 | 2,798.55083 | 3 | 3,126.63417 |
| 4 | 177.16500 | 4 | 505.24833 | 4 | 833.33167 | 4 | 1,161.41500 | 4 | 1,489.49833 | 4 | 1,817.58167 | 4 | 2,145.66500 | 4 | 2,473.74833 | 4 | 2,801.83167 | 4 | 3,129.91500 |
| 5 | 180.44583 | 5 | 508.52917 | 5 | 836.61250 | 5 | 1,164.69583 | 5 | 1,492.77917 | 5 | 1,820.86250 | 5 | 2,148.94583 | 5 | 2,477.02917 | 5 | 2,805.11250 | 5 | 3,133.19583 |
| 6 | 183.72667 | 6 | 511.81000 | 6 | 839.89333 | 6 | 1,167.97667 | 6 | 1,496.06000 | 6 | 1,824.14333 | 6 | 2,152.22667 | 6 | 2,480.31000 | 6 | 2,808.39333 | 6 | 3,136.47667 |
| 7 | 187.00750 | 7 | 515.09083 | 7 | 843.17417 | 7 | 1,171.25750 | 7 | 1,499.34083 | 7 | 1,827.42417 | 7 | 2,155.50750 | 7 | 2,483.59083 | 7 | 2,811.67417 | 7 | 3,139.75750 |
| 8 | 190.28833 | 8 | 518.37167 | 8 | 846.45500 | 8 | 1,174.53833 | 8 | 1,502.62167 | 8 | 1,830.70500 | 8 | 2,158.78833 | 8 | 2,486.87167 | 8 | 2,814.95500 | 8 | 3,143.03833 |
| 9 | 193.56917 | 9 | 521.65250 | 9 | 849.73583 | 9 | 1,177.81917 | 9 | 1,505.90250 | 9 | 1,833.98583 | 9 | 2,162.06917 | 9 | 2,490.15250 | 9 | 2,818.23583 | 9 | 3,146.31917 |
| **60** | 196.85000 | **160** | 524.93333 | **260** | 853.01667 | **360** | 1,181.10000 | **460** | 1,509.18333 | **560** | 1,837.26667 | **660** | 2,165.35000 | **760** | 2,493.43333 | **860** | 2,821.51667 | **960** | 3,149.60000 |
| 1 | 200.13083 | 1 | 528.21417 | 1 | 856.29750 | 1 | 1,184.38083 | 1 | 1,512.46417 | 1 | 1,840.54750 | 1 | 2,168.63083 | 1 | 2,496.71417 | 1 | 2,824.79750 | 1 | 3,152.88083 |
| 2 | 203.41167 | 2 | 531.49500 | 2 | 859.57833 | 2 | 1,187.66167 | 2 | 1,515.74500 | 2 | 1,843.82833 | 2 | 2,171.91167 | 2 | 2,499.99500 | 2 | 2,828.07833 | 2 | 3,156.16167 |
| 3 | 206.69250 | 3 | 534.77583 | 3 | 862.85917 | 3 | 1,190.94250 | 3 | 1,519.02583 | 3 | 1,847.10917 | 3 | 2,175.19250 | 3 | 2,503.27583 | 3 | 2,831.35917 | 3 | 3,159.44250 |
| 4 | 209.97333 | 4 | 538.05667 | 4 | 866.14000 | 4 | 1,194.22333 | 4 | 1,522.30667 | 4 | 1,850.39000 | 4 | 2,178.47333 | 4 | 2,506.55667 | 4 | 2,834.64000 | 4 | 3,162.72333 |
| 5 | 213.25417 | 5 | 541.33750 | 5 | 869.42083 | 5 | 1,197.50417 | 5 | 1,525.58750 | 5 | 1,853.67083 | 5 | 2,181.75417 | 5 | 2,509.83750 | 5 | 2,837.92083 | 5 | 3,166.00417 |
| 6 | 216.53500 | 6 | 544.61833 | 6 | 872.70167 | 6 | 1,200.78500 | 6 | 1,528.86833 | 6 | 1,856.95167 | 6 | 2,185.03500 | 6 | 2,513.11833 | 6 | 2,841.20167 | 6 | 3,169.28500 |
| 7 | 219.81583 | 7 | 547.89917 | 7 | 875.98250 | 7 | 1,204.06583 | 7 | 1,532.14917 | 7 | 1,860.23250 | 7 | 2,188.31583 | 7 | 2,516.39917 | 7 | 2,844.48250 | 7 | 3,172.56583 |
| 8 | 223.09667 | 8 | 551.18000 | 8 | 879.26333 | 8 | 1,207.34667 | 8 | 1,535.43000 | 8 | 1,863.51333 | 8 | 2,191.59667 | 8 | 2,519.68000 | 8 | 2,847.76333 | 8 | 3,175.84667 |
| 9 | 226.37750 | 9 | 554.46083 | 9 | 882.54417 | 9 | 1,210.62750 | 9 | 1,538.71083 | 9 | 1,866.79417 | 9 | 2,194.87750 | 9 | 2,522.96083 | 9 | 2,851.04417 | 9 | 3,179.12750 |
| **70** | 229.65833 | **170** | 557.74167 | **270** | 885.82500 | **370** | 1,213.90833 | **470** | 1,541.99167 | **570** | 1,870.07500 | **670** | 2,198.15833 | **770** | 2,526.24167 | **870** | 2,854.32500 | **970** | 3,182.40833 |
| 1 | 232.93917 | 1 | 561.02250 | 1 | 889.10583 | 1 | 1,217.18917 | 1 | 1,545.27250 | 1 | 1,873.35583 | 1 | 2,201.43917 | 1 | 2,529.52250 | 1 | 2,857.60583 | 1 | 3,185.68917 |
| 2 | 236.22000 | 2 | 564.30333 | 2 | 892.38667 | 2 | 1,220.47000 | 2 | 1,548.55333 | 2 | 1,876.63667 | 2 | 2,204.72000 | 2 | 2,532.80333 | 2 | 2,860.88667 | 2 | 3,188.97000 |
| 3 | 239.50083 | 3 | 567.58417 | 3 | 895.66750 | 3 | 1,223.75083 | 3 | 1,551.83417 | 3 | 1,879.91750 | 3 | 2,208.00083 | 3 | 2,536.08417 | 3 | 2,864.16750 | 3 | 3,192.25083 |
| 4 | 242.78167 | 4 | 570.86500 | 4 | 898.94833 | 4 | 1,227.03167 | 4 | 1,555.11500 | 4 | 1,883.19833 | 4 | 2,211.28167 | 4 | 2,539.36500 | 4 | 2,867.44833 | 4 | 3,195.53167 |
| 5 | 246.06250 | 5 | 574.14583 | 5 | 902.22917 | 5 | 1,230.31250 | 5 | 1,558.39583 | 5 | 1,886.47917 | 5 | 2,214.56250 | 5 | 2,542.64583 | 5 | 2,870.72917 | 5 | 3,198.81250 |
| 6 | 249.34333 | 6 | 577.42667 | 6 | 905.51000 | 6 | 1,233.59333 | 6 | 1,561.67667 | 6 | 1,889.76000 | 6 | 2,217.84333 | 6 | 2,545.92667 | 6 | 2,874.01000 | 6 | 3,202.09333 |
| 7 | 252.62417 | 7 | 580.70750 | 7 | 908.79083 | 7 | 1,236.87417 | 7 | 1,564.95750 | 7 | 1,893.04083 | 7 | 2,221.12417 | 7 | 2,549.20750 | 7 | 2,877.29083 | 7 | 3,205.37417 |
| 8 | 255.90500 | 8 | 583.98833 | 8 | 912.07167 | 8 | 1,240.15500 | 8 | 1,568.23833 | 8 | 1,896.32167 | 8 | 2,224.40500 | 8 | 2,552.48833 | 8 | 2,880.57167 | 8 | 3,208.65500 |
| 9 | 259.18583 | 9 | 587.26917 | 9 | 915.35250 | 9 | 1,243.43583 | 9 | 1,571.51917 | 9 | 1,899.60250 | 9 | 2,227.68583 | 9 | 2,555.76917 | 9 | 2,883.85250 | 9 | 3,211.93583 |
| **80** | 262.46667 | **180** | 590.55000 | **280** | 918.63333 | **380** | 1,246.71667 | **480** | 1,574.80000 | **580** | 1,902.88333 | **680** | 2,230.96667 | **780** | 2,559.05000 | **880** | 2,887.13333 | **980** | 3,215.21667 |
| 1 | 265.74750 | 1 | 593.83083 | 1 | 921.91417 | 1 | 1,249.99750 | 1 | 1,578.08083 | 1 | 1,906.16417 | 1 | 2,234.24750 | 1 | 2,562.33083 | 1 | 2,890.41417 | 1 | 3,218.49750 |
| 2 | 269.02833 | 2 | 597.11167 | 2 | 925.19500 | 2 | 1,253.27833 | 2 | 1,581.36167 | 2 | 1,909.44500 | 2 | 2,237.52833 | 2 | 2,565.61167 | 2 | 2,893.69500 | 2 | 3,221.77833 |
| 3 | 272.30917 | 3 | 600.39250 | 3 | 928.47583 | 3 | 1,256.55917 | 3 | 1,584.64250 | 3 | 1,912.72583 | 3 | 2,240.80917 | 3 | 2,568.89250 | 3 | 2,896.97583 | 3 | 3,225.05917 |
| 4 | 275.59000 | 4 | 603.67333 | 4 | 931.75667 | 4 | 1,259.84000 | 4 | 1,587.92333 | 4 | 1,916.00667 | 4 | 2,244.09000 | 4 | 2,572.17333 | 4 | 2,900.25667 | 4 | 3,228.34000 |
| 5 | 278.87083 | 5 | 606.95417 | 5 | 935.03750 | 5 | 1,263.12083 | 5 | 1,591.20417 | 5 | 1,919.28750 | 5 | 2,247.37083 | 5 | 2,575.45417 | 5 | 2,903.53750 | 5 | 3,231.62083 |
| 6 | 282.15167 | 6 | 610.23500 | 6 | 938.31833 | 6 | 1,266.40167 | 6 | 1,594.48500 | 6 | 1,922.56833 | 6 | 2,250.65167 | 6 | 2,578.73500 | 6 | 2,906.81833 | 6 | 3,234.90167 |
| 7 | 285.43250 | 7 | 613.51583 | 7 | 941.59917 | 7 | 1,269.68250 | 7 | 1,597.76583 | 7 | 1,925.84917 | 7 | 2,253.93250 | 7 | 2,582.01583 | 7 | 2,910.09917 | 7 | 3,238.18250 |
| 8 | 288.71333 | 8 | 616.79667 | 8 | 944.88000 | 8 | 1,272.96333 | 8 | 1,601.04667 | 8 | 1,929.13000 | 8 | 2,257.21333 | 8 | 2,585.29667 | 8 | 2,913.38000 | 8 | 3,241.46333 |
| 9 | 291.99417 | 9 | 620.07750 | 9 | 948.16083 | 9 | 1,276.24417 | 9 | 1,604.32750 | 9 | 1,932.41083 | 9 | 2,260.49417 | 9 | 2,588.57750 | 9 | 2,916.66083 | 9 | 3,244.74417 |
| **90** | 295.27500 | **190** | 623.35833 | **290** | 951.44167 | **390** | 1,279.52500 | **490** | 1,607.60833 | **590** | 1,935.69167 | **690** | 2,263.77500 | **790** | 2,591.85833 | **890** | 2,919.94167 | **990** | 3,248.02500 |
| 1 | 298.55583 | 1 | 626.63917 | 1 | 954.72250 | 1 | 1,282.80583 | 1 | 1,610.88917 | 1 | 1,938.97250 | 1 | 2,267.05583 | 1 | 2,595.13917 | 1 | 2,923.22250 | 1 | 3,251.30583 |
| 2 | 301.83667 | 2 | 629.92000 | 2 | 958.00333 | 2 | 1,286.08667 | 2 | 1,614.17000 | 2 | 1,942.25333 | 2 | 2,270.33667 | 2 | 2,598.42000 | 2 | 2,926.50333 | 2 | 3,254.58667 |
| 3 | 305.11750 | 3 | 633.20083 | 3 | 961.28417 | 3 | 1,289.36750 | 3 | 1,617.45083 | 3 | 1,945.53417 | 3 | 2,273.61750 | 3 | 2,601.70083 | 3 | 2,929.78417 | 3 | 3,257.86750 |
| 4 | 308.39833 | 4 | 636.48167 | 4 | 964.56500 | 4 | 1,292.64833 | 4 | 1,620.73167 | 4 | 1,948.81500 | 4 | 2,276.89833 | 4 | 2,604.98167 | 4 | 2,933.06500 | 4 | 3,261.14833 |
| 5 | 311.67917 | 5 | 639.76250 | 5 | 967.84583 | 5 | 1,295.92917 | 5 | 1,624.01250 | 5 | 1,952.09583 | 5 | 2,280.17917 | 5 | 2,608.26250 | 5 | 2,936.34583 | 5 | 3,264.42917 |
| 6 | 314.96000 | 6 | 643.04333 | 6 | 971.12667 | 6 | 1,299.21000 | 6 | 1,627.29333 | 6 | 1,955.37667 | 6 | 2,283.46000 | 6 | 2,611.54333 | 6 | 2,939.62667 | 6 | 3,267.71000 |
| 7 | 318.24083 | 7 | 646.32417 | 7 | 974.40750 | 7 | 1,302.49083 | 7 | 1,630.57417 | 7 | 1,958.65750 | 7 | 2,286.74083 | 7 | 2,614.82417 | 7 | 2,942.90750 | 7 | 3,270.99083 |
| 8 | 321.52167 | 8 | 649.60500 | 8 | 977.68833 | 8 | 1,305.77167 | 8 | 1,633.85500 | 8 | 1,961.93833 | 8 | 2,290.02167 | 8 | 2,618.10500 | 8 | 2,946.18833 | 8 | 3,274.27167 |
| 9 | 324.80250 | 9 | 652.88583 | 9 | 980.96917 | 9 | 1,309.05250 | 9 | 1,637.13583 | 9 | 1,965.21917 | 9 | 2,293.30250 | 9 | 2,621.38583 | 9 | 2,949.46917 | 9 | 3,277.55250 |

*Oblique Arc*

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points.* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Indian<br>1875 | 34 01 49.599<br>85 25 30.939 | 1528.3<br>793.7 | | | | | |
| Gulf Point<br>1875 | 34 37 31.818<br>85 28 02.368 | 980.4<br>60.3 | 356 37 54.24 | 176 39 19.64 | Indian | 66120.65 | 4.8203371 |
| Brandon<br>1875 | 34 23 06.990<br>85 45 12.570 | 215.4<br>321.4 | 224 31 15.82<br>322 21 45.16 | 44 40 59.42<br>142 32 49.48 | Gulf Point<br>Indian | 37427.34<br>49640.70 | 4.5731889<br>4.6958379 |
| Aurora<br>1877 | 34 08 47.479<br>86 11 00.660 | 1463.0<br>16.9 | 236 06 30.01<br>280 12 44.83 | 56 21 01.64<br>100 38 14.78 | Brandon<br>Indian | 47643.04<br>71154.56 | 4.6779995<br>4.8522027 |
| Gunter<br>1877 | 34 34 06.466<br>86 10 20.188 | 199.2<br>514.6 | 264 12 41.29<br>297 43 26.01<br>1 16 08.75 | 84 36 42.29<br>117 57 39.43<br>181 15 45.91 | Gulf Point<br>Brandon<br>Aurora | 64977.65<br>43509.05<br>46815.51 | 4.8127640<br>4.6385796<br>4.6703897 |
| Summit<br>1877 | 34 12 15.950<br>86 29 05.080 | 491.5<br>130.0 | 215 20 57.37<br>282 56 17.58 | 35 31 32.68<br>103 06 26.73 | Gunter<br>Aurora | 49562.05<br>28505.27 | 4.6951492<br>4.4549251 |
| Rowe<br>1877 | 34 32 21.933<br>86 31 26.498 | 675.8<br>675.7 | 264 12 09.84<br>324 11 29.67<br>354 26 06.25 | 84 24 08.07<br>144 23 01.23<br>174 27 26.09 | Gunter<br>Aurora<br>Summit | 32445.16<br>53676.31<br>37334.91 | 4.5111499<br>4.7297826<br>4.5721152 |
| Wilson<br>1877 | 34 25 07.104<br>86 49 02.770 | 218.9<br>70.7 | 243 29 08.00<br>307 42 51.45 | 63 39 05.96<br>127 54 06.58 | Rowe<br>Summit | 30100.47<br>38760.76 | 4.4785733<br>4.5883923 |
| Wornock<br>1878 | 33 59 48.237<br>86 41 51.845 | 1486.1<br>1330.6 | 166 46 10.41<br>194 50 01.09<br>220 24 30.52<br>250 33 52.87 | 346 42 08.16<br>14 55 53.22<br>40 31 40.41<br>70 51 09.97 | Wilson<br>Rowe<br>Summit<br>Aurora | 48081.88<br>62287.16<br>30282.69<br>50290.76 | 4.6819815<br>4.7943985<br>4.4811945<br>4.7014882 |
| Cahaba<br>1886 | 33 44 47.088<br>86 31 32.909 | 1450.7<br>847.0 | 150 14 15.40<br>215 23 38.12 | 330 08 30.45<br>35 35 06.24 | Wornock<br>Aurora | 31998.83<br>54505.05 | 4.5051341<br>4.7364367 |
| Cheehahaw<br>1886 | 33 29 07.674<br>85 48 30.943 | 236.4<br>798.8 | 113 41 59.31<br>154 46 12.31<br>210 19 48.20 | 293 18 09.86<br>334 33 41.14<br>30 32 35.06 | Cahaba<br>Aurora<br>Indian | 72577.90<br>81123.20<br>70107.39 | 4.8608044<br>4.9091451<br>4.8457638 |
| Alpine<br>1885 | 33 24 42.267<br>86 12 27.019 | 1302.2<br>698.1 | 141 33 49.94<br>257 27 28.50 | 321 23 16.16<br>77 40 40.05 | Cahaba<br>Cheehahaw | 47445.64<br>37981.02 | 4.6761963<br>4.5795666 |
| Laurel<br>1886 | 33 23 50.982<br>86 34 51.821 | 1570.7<br>1339.2 | 187 32 10.11<br>267 17 38.09 | 7 34 00.10<br>87 29 58.47 | Cahaba<br>Alpine | 39037.55<br>34786.45 | 4.5914826<br>4.5414101 |
| Horn<br>1885 | 33 17 52.239<br>86 04 28.407 | 1609.4<br>734.0 | 103 19 53.11<br>135 37 33.56<br>229 51 56.71 | 283 03 10.72<br>315 33 10.41<br>50 00 43.66 | Laurel<br>Alpine<br>Cheehahaw | 48426.88<br>17683.33<br>32331.47 | 4.6850865<br>4.2475640<br>4.5096255 |
| Kahatchee<br>1887 | 33 13 38.271<br>86 21 36.527 | 1179.1<br>945.8 | 132 35 52.87<br>214 45 03.15<br>253 32 14.06 | 312 28 36.07<br>34 50 05.00<br>73 41 37.06 | Laurel<br>Alpine<br>Horn | 27920.17<br>24909.27<br>27736.82 | 4.4459180<br>4.3963610<br>4.4430567 |
| Weogufka<br>1887 | 32 58 41.166<br>86 21 16.177 | 1268.0<br>420.0 | 155 37 52.84<br>178 54 27.71<br>216 17 57.86 | 335 30 26.34<br>358 54 16.60<br>36 27 08.76 | Laurel<br>Kahatchee<br>Horn | 51086.66<br>27641.55<br>44042.46 | 4.7083075<br>4.4415625<br>4.6438716 |
| Jamison<br>1885 | 32 55 56.476<br>86 38 20.983 | 1739.6<br>545.1 | 185 58 54.10<br>218 27 34.82<br>259 07 51.98 | 6 00 48.50<br>38 36 43.06<br>79 17 09.46 | Laurel<br>Kahatchee<br>Weogufka | 51869.88<br>41816.74<br>27096.38 | 4.7149152<br>4.6213502<br>4.4329113 |
| Wilder<br>1890 | 32 38 01.403<br>86 29 38.265 | 43.2<br>997.4 | 157 42 32.92<br>198 50 41.05 | 337 37 49.89<br>18 55 13.08 | Jamison<br>Weogufka | 35802.14<br>40362.91 | 4.5539090<br>4.6059824 |
| Wetumpka<br>1892 | 32 32 03.433<br>86 11 38.174 | 105.8<br>996.2 | 111 27 29.54<br>163 02 41.45 | 291 17 47.87<br>342 57 28.71 | Wilder<br>Weogufka | 30251.06<br>51466.00 | 4.4807405<br>4.7115204 |
| Perry<br>1890 | 32 45 33.149<br>86 57 21.077 | 1021.1<br>548.7 | 236 59 05.82<br>237 41 10.82 | 57 09 24.18<br>107 56 09.05 | Jamison<br>Wilder | 35322.81<br>45493.93 | 4.5480553<br>4.6579534 |
| Parker<br>1890 | 32 33 48.783<br>86 50 32.627 | 1502.7<br>851.1 | 153 54 01.75<br>256 31 27.06 | 333 50 21.32<br>76 42 42.85 | Perry<br>Wilder | 24167.41<br>33622.47 | 4.3832301<br>4.5266296 |
| Lowndesboro<br>1892 | 32 16 17.547<br>86 36 40.643 | 540.5<br>1063.7 | 146 11 12.11<br>195 19 40.54<br>233 18 40.33 | 326 03 46.10<br>15 23 27.19<br>53 32 05.45 | Parker<br>Wilder<br>Wetumpka | 39001.50<br>41650.41<br>48893.63 | 4.5010813<br>4.6196193<br>4.6892523 |
| Lovers Leap<br>1892 | 32 10 09.162<br>86 49 18.152 | 282.2<br>475.6 | 177 27 21.84<br>210 49 04.31<br>240 10 21.05 | 357 26 41.97<br>30 59 36.56<br>60 17 04.94 | Parker<br>Wilder<br>Lowndesboro | 43771.46<br>60033.56<br>22852.04 | 4.6411911<br>4.7783941<br>4.3589250 |
| Mount Carmel<br>1892 | 32 01 16.043<br>86 20 54.073 | 494.2<br>1419.0 | 110 18 12.79<br>138 17 36.55<br>194 17 57.70 | 290 03 07.35<br>318 09 12.89<br>14 22 54.54 | Lovers Leap<br>Lowndesboro<br>Wetumpka | 47605.17<br>37234.60<br>58733.80 | 4.6776541<br>4.5709467<br>4.7688881 |
| Bargenier<br>1892 | 31 59 16.418<br>86 36 50.844 | 505.7<br>1334.7 | 135 47 08.23<br>180 29 10.75<br>261 34 57.44 | 315 40 31.35<br>0 29 16.18<br>81 43 24.52 | Lovers Leap<br>Lowndesboro<br>Mount Carmel | 28077.53<br>31453.46<br>25381.58 | 4.4483589<br>4.4976684<br>4.4045187 |
| County Line<br>1892 | 31 57 52.186<br>86 48 12.211 | 1607.2<br>320.7 | 175 38 51.67<br>207 59 01.32<br>261 41 53.39 | 355 38 16.66<br>28 05 09.02<br>81 47 54.22 | Lovers Leap<br>Lowndesboro<br>Bargenier | 22765.56<br>38572.74<br>18076.73 | 4.3572783<br>4.5862805<br>4.2571200 |
| Ethridge<br>1892 | 32 04 45.888<br>87 03 29.071 | 1413.5<br>762.4 | 245 52 50.62<br>297 50 16.99 | 66 00 23.10<br>117 58 23.15 | Lovers Leap<br>County Line | 24426.92<br>27226.49 | 4.3878686<br>4.4349916 |

*Oblique Arc*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points*—Contd. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Fatama | 31 53 33.044 | 1017.7 | 219 09 30.43 | 39 15 11.54 | Ethridge | 26744.95 | 4.4272418 |
| 1895 | 87 14 13.032 | 342.5 | 231 51 29.31 | 52 04 42.16 | Lovers Leap | 49799.41 | 4.6972242 |
| | | | 258 52 09.90 | 79 05 55.36 | County Line | 41770.85 | 4.6208733 |
| Midway | 31 43 05.420 | 166.9 | 137 05 58.23 | 316 59 57.68 | Fatama | 26410.24 | 4.4217723 |
| 1895 | 87 02 48.912 | 1287.8 | 203 00 14.37 | 23 07 23.34 | Lovers Leap | 54356.87 | 4.7352545 |
| | | | 220 06 00.81 | 40 13 43.33 | County Line | 35740.08 | 4.5531555 |
| Pollard | 31 27 48.562 | 1495.6 | 204 17 07.57 | 24 24 16.68 | Fatama | 52211.60 | 4.7177670 |
| 1895 | 87 27 50.162 | 1324.3 | 234 23 05.75 | 54 36 12.18 | Midway | 48620.44 | 4.6868189 |
| Creagh | 31 36 13.074 | 402.7 | 232 48 00.74 | 53 02 07.98 | Fatama | 53122.24 | 4.7252764 |
| 1895 | 87 41 03.183 | 83.9 | 257 57 59.87 | 78 18 04.12 | Midway | 61761.81 | 4.7907200 |
| | | | 306 32 41.43 | 126 39 36.18 | Pollard | 26059.56 | 4.4159671 |
| White | 31 27 37.798 | 1164.1 | 216 23 54.47 | 36 27 46.67 | Creagh | 19724.40 | 4.2950039 |
| 1895 | 87 48 27.188 | 717.8 | 269 19 43.53 | 89 30 29.17 | Pollard | 32660.09 | 4.5140174 |
| Red Hill | 31 12 32.355 | 996.5 | 153 26 18.26 | 333 21 43.57 | White | 31186.36 | 4.4939647 |
| 1895 | 87 39 38.983 | 1031.9 | 177 05 45.67 | 357 05 01.78 | Creagh | 43811.78 | 4.6415909 |
| | | | 213 32 10.37 | 33 38 19.00 | Pollard | 33872.18 | 4.5298431 |
| Coon | 31 14 50.292 | 1548.9 | 229 07 36.91 | 49 16 36.03 | White | 36176.14 | 4.5584222 |
| 1895 | 88 05 43.313 | 1146.1 | 275 44 44.54 | 95 58 15.56 | Red Hill | 41619.17 | 4.6192934 |
| Dean | 31 00 42.233 | 1300.7 | 131 43 26.39 | 311 33 53.27 | Coon | 39303.38 | 4.5944299 |
| 1895 | 87 47 14.715 | 390.4 | 177 47 51.81 | 357 47 14.24 | White | 49791.76 | 4.6971575 |
| | | | 208 52 30.68 | 28 56 26.15 | Red Hill | 24982.13 | 4.3976295 |
| Cold Creek | 30 57 26.961 | 830.2 | 178 54 27.50 | 358 54 15.54 | Coon | 32136.82 | 4.5070029 |
| 1895 | 88 05 20.160 | 535.1 | 235 34 27.08 | 55 47 42.78 | Red Hill | 49459.74 | 4.6942518 |
| | | | 258 07 42.99 | 78 17 11.79 | Dean | 29422.05 | 4.4686730 |
| Minette | 30 52 09.393 | 289.2 | 112 50 32.37 | 292 43 01.81 | Cold Creek | 25258.17 | 4.4024020 |
| 1897 | 87 50 43.135 | 1145.9 | 150 24 15.61 | 330 16 31.21 | Coon | 48229.90 | 4.6833164 |
| | | | 199 17 29.43 | 19 19 16.59 | Dean | 16734.38 | 4.2236096 |
| Spring Hill | 30 41 46.437 | 1430.0 | 190 40 36.37 | 10 42 21.81 | Cold Creek | 29475.27 | 4.4694578 |
| 1897 | 88 08 45.908 | 1221.8 | 236 14 46.99 | 56 24 01.14 | Minette | 34596.29 | 4.5390295 |
| Daphne | 30 36 07.700 | 237.1 | 114 18 59.69 | 294 11 36.44 | Spring Hill | 25392.44 | 4.4047044 |
| 1897 | 87 54 16.425 | 437.6 | 155 54 53.04 | 335 49 13.38 | Cold Creek | 43167.47 | 4.6351566 |
| | | | 190 49 51.22 | 10 51 40.23 | Minette | 30153.73 | 4.4793410 |
| St. Elmo | 30 30 34.332 | 1057.2 | 198 15 32.61 | 18 17 43.24 | Spring Hill | 21796.49 | 4.3383865 |
| 1897 | 88 13 02.515 | 67.0 | 251 02 14.16 | 71 11 46.64 | Daphne | 31719.28 | 4.5013233 |
| Fort Morgan | 30 13 42.242 | 1300.8 | 149 07 15.71 | 329 01 22.17 | St. Elmo | 36331.04 | 4.5602779 |
| 1846 | 88 01 23.228 | 621.0 | 167 12 11.29 | 347 08 26.85 | Spring Hill | 53189.68 | 4.7258274 |
| | | | 195 20 36.66 | 15 24 12.73 | Daphne | 42968.44 | 4.6331495 |
| Dauphin Island east base | 30 14 56.379 | 1736.1 | 165 06 02.31 | 345 03 36.55 | St. Elmo | 29890.09 | 4.4755272 |
| 1846 | 88 08 14.288 | 381.9 | 209 40 29.33 | 29 47 33.63 | Daphne | 45083.81 | 4.6540206 |
| | | | 281 42 17.88 | 101 45 44.89 | Fort Morgan | 11225.44 | 4.0502034 |
| Dauphin Island west base | 30 14 21.492 | 661.8 | 185 31 01.82 | 5 31 56.69 | St. Elmo | 30096.51 | 4.4785161 |
| 1847 | 88 14 51.034 | 1364.6 | 264 11 22.08 | 84 14 41.91 | Dauphin Island east base | 10661.83 | 4.0278319 |
| | | | 273 08 45.71 | 93 15 32.46 | Fort Morgan | 21633.87 | 4.3351342 |
| Cedar Point | 30 20 44.421 | 1367.9 | 8 07 40.49 | 188 07 11.61 | Dauphin Island east base | 10825.76 | 4.0344585 |
| 1846 | 88 07 17.038 | 455.1 | 45 50 53.63 | 225 47 04.63 | Dauphin Island west base | 18918.31 | 4.2283570 |
| Cat Island | 30 18 56.205 | 1730.7 | 316 16 58.11 | 136 19 11.25 | Dauphin Island east base | 10214.42 | 4.0092138 |
| 1846 | 88 12 38.329 | 1024.0 | 22 45 26.44 | 202 44 19.53 | Dauphin Island west base | 9172.61 | 3.9624929 |
| Point aux Pins | 30 22 03.765 | 115.9 | 277 27 22.76 | 97 33 13.71 | Cedar Point | 18705.77 | 4.2719755 |
| 1846 | 88 18 51.471 | 1374.5 | 300 03 55.61 | 120 07 04.10 | Cat Island | 11519.11 | 4.0614191 |
| | | | 335 41 30.74 | 155 43 32.06 | Dauphin Island west base. | 15617.27 | 4.1936052 |
| Grand Batture | 30 19 25.773 | 793.0 | 244 29 56.94 | 64 33 10.10 | Point aux Pins | 11311.32 | 4.0535132 |
| 1846 | 88 25 13.801 | 368.7 | 299 19 58.42 | 119 25 12.45 | Dauphin Island west base | 19100.30 | 4.2810402 |
| Petit Bois | 30 12 09.316 | 286.9 | 170 08 08.44 | 350 07 24.35 | Grand Batture | 13641.50 | 4.1348623 |
| 1846 | 88 23 46.322 | 1239.0 | 203 16 15.20 | 23 18 43.90 | Point aux Pins | 19928.69 | 4.2994788 |
| | | | 254 05 28.80 | 74 09 58.23 | Dauphin Island west base | 14882.40 | 4.1726730 |
| Horn Island east | 30 13 13.826 | 425.7 | 223 08 45.72 | 43 12 08.38 | Grand Batture | 15704.85 | 4.1960339 |
| 1855 | 88 31 55.822 | 1492.9 | 278 35 35.99 | 98 39 42.30 | Petit Bois | 13241.65 | 4.1219420 |
| Bayou Casotte | 30 19 44.500 | 1370.3 | 273 40 45.04 | 93 43 33.46 | Grand Batture | 8929.55 | 3.9508295 |
| 1846 | 88 30 47.367 | 1265.3 | 321 12 24.07 | 141 15 56.28 | Petit Bois | 17975.65 | 4.2546847 |
| | | | 8 39 10.64 | 188 38 36.13 | Horn Island east 1855 | 12168.18 | 4.0852257 |
| East Pascagoula | 30 20 35.517 | 1093.7 | 296 30 51.75 | 116 31 51.27 | Bayou Casotte | 3518.00 | 3.5462953 |
| 1847 | 88 32 45.210 | 1207.6 | 317 13 19.14 | 137 17 50.81 | Petit Bois | 21223.28 | 4.3268125 |
| | | | 354 27 12.40 | 174 27 37.30 | Horn Island east 1855 | 13664.70 | 4.1356001 |

*Oblique Arc*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points*—Contd. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Horn Island west | 30 15 12.848 | 395.6 | 239 09 03.0 | 59 14 17.6 | East Pascagoula | 19401.16 | 4.2878277 |
| 1855 | 88 43 08.816 | 235.7 | 281 27 53.4 | 101 33 32.3 | Horn Island east 1855 | 18364.19 | 4.2639719 |
| Bellefontaine | 30 20 32.197 | 991.5 | 269 35 11.2 | 89 40 08.8 | East Pascagoula | 15734.96 | 4.1968380 |
| 1855 | 88 42 34.269 | 915.2 | 308 18 08.1 | 128 23 30.1 | Horn Island east 1855 | 21757.07 | 4.3376005 |
| | | | 5 21 55.9 | 185 21 38.5 | Horn Island west | 9876.86 | 3.9946188 |
| Deer Island 1 | 30 21 42.958 | 1322.8 | 281 11 23.6 | 101 14 51.4 | Bellefontaine | 11199.51 | 4.0491990 |
| 1855 | 88 49 25.601 | 683.6 | 320 00 29.3 | 140 03 39.4 | Horn Island west | 15673.34 | 4.1951614 |
| Ship Island 1855 | 30 14 28.425 | 875.3 | 204 59 17.0 | 25 01 14.8 | Deer Island 1 | 14764.19 | 4.1692095 |
| 1855 | 88 53 19.150 | 512.1 | 236 55 54.0 | 57 01 19.1 | Bellefontaine | 20554.00 | 4.3128964 |
| | | | 265 09 55.9 | 85 15 03.3 | Horn Island west | 16374.85 | 4.2141773 |
| Mississippi City | 30 22 48.145 | 1482.5 | 275 39 50.2 | 95 46 09.9 | Deer Island 1 | 20151.9 | 4.304316 |
| 1855 | 89 01 56.542 | 1509.6 | 318 01 41.1 | 138 06 02.2 | Ship Island 1855 | 20685.3 | 4.315662 |
| Cat Island 1855 | 30 14 15.776 | 485.8 | 192 11 06.9 | 12 12 11.3 | Mississippi City | 16141.4 | 4.207942 |
| 1855 | 89 04 04.148 | 110.7 | 268 39 39.9 | 88 45 04.7 | Ship Island 1855 | 17250.1 | 4.236793 |
| Pitcher Point 2 | 30 19 56.571 | 1742.0 | 249 44 59.0 | 69 49 30.5 | Mississippi City | 15291.5 | 4.184451 |
| 1855 | 89 10 53.867 | 1438.9 | 313 45 11.8 | 133 48 38.4 | Cat Island 1855 | 15166.5 | 4.180886 |
| Cat Island L. H. 1855 | 30 13 50.583 | 1557.6 | 170 07 51.2 | 350 07 14.2 | Pitcher Point 2 | 11439.2 | 4.058394 |
| 1855 | 89 09 40.469 | 1082.1 | 216 47 45.7 | 36 51 39.7 | Mississippi City | 20680.0 | 4.315551 |
| | | | 265 02 46.8 | 85 05 36.1 | Cat Island 1855 | 9026.3 | 3.955511 |
| Cat Island 1852 | 30 14 15.947 | 491.1 | 133 46 34.5 | 313 43 07.7 | Pitcher Point 2 | 15168.4 | 4.180939 |
| 1852 | 89 04 03.861 | 103.2 | 192 09 46.0 | 12 10 50.3 | Mississippi City | 16134.7 | 4.207760 |
| South Point | 30 11 15.287 | 470.7 | 128 55 14.6 | 308 53 23.1 | Cat Island L. H. | 7614.1 | 3.881619 |
| 1857 | 89 05 58.933 | 1576.7 | 208 54 26.3 | 28 55 24.1 | Cat Island 1855 | 6349.2 | 3.802717 |
| Bayou Pierre | 30 07 44.263 | 1363.0 | 192 15 29.4 | 12 17 01.8 | Pitcher Point 2 | 23076.7 | 4.363173 |
| 1852 | 89 13 57.285 | 1533.3 | 211 19 44.3 | 31 21 53.4 | Cat Island L. H. | 13207.6 | 4.120823 |
| | | | 232 44 05.2 | 52 49 03.6 | Cat Island 1852 | 19937.5 | 4.299670 |
| | | | 232 44 01.4 | 52 48 59.5 | Cat Island 1855 | 19928.1 | 4.299466 |
| | | | 243 03 12.4 | 63 07 12.7 | South Point | 14355.3 | 4.157013 |
| Point Clear | 30 15 49.025 | 1509.7 | 249 17 22.9 | 69 23 44.6 | Pitcher Point 2 | 21607.3 | 4.334601 |
| 1855 | 89 23 30.482 | 814.8 | 314 11 30.0 | 134 16 18.3 | Bayou Pierre | 21398.6 | 4.330386 |
| Grand Island 1855 | 30 09 00.431 | 13.3 | 193 49 32.1 | 13 50 30.4 | Point Clear | 12957.4 | 4.112517 |
| 1855 | 89 25 26.315 | 704.2 | 277 11 58.9 | 97 17 44.9 | Bayou Pierre | 18590.2 | 4.269285 |
| Grand Island 1852 | 30 08 51.652 | 1590.5 | 191 44 44.4 | 11 45 34.7 | Point Clear | 13127.0 | 4.118166 |
| 1852 | 89 25 10.450 | 279.6 | 276 31 22.4 | 96 37 00.4 | Bayou Pierre | 18136.4 | 4.258550 |
| Oyster Bayou | 30 03 44.552 | 1371.9 | 140 47 34.1 | 320 45 05.3 | Grand Island 1855 | 12556.2 | 4.098857 |
| 1855 | 89 20 29.733 | 796.3 | 234 53 18.5 | 54 56 35.3 | Bayou Pierre | 12841.6 | 4.108621 |
| Nine Mile Bayou | 30 01 37.250 | 1147.0 | 174 31 10.7 | 354 30 46.2 | Grand Island 1855 | 13709.0 | 4.137007 |
| 1855 | 89 24 37.392 | 1002.0 | 176 12 58.0 | 356 12 41.5 | Grand Island 1852 | 13405.3 | 4.127275 |
| | | | 183 54 04.4 | 3 54 38.1 | Point Clear | 26288.9 | 4.419772 |
| | | | 236 33 42.6 | 56 39 03.5 | Bayou Pierre | 20532.7 | 4.312446 |
| | | | 239 24 30.6 | 59 26 34.6 | Oyster Bayou | 7706.2 | 3.886843 |
| Malheureux Point | 30 04 26.162 | 805.6 | 218 30 24.3 | 38 32 30.3 | Grand Island 1855 | 10794.8 | 4.033214 |
| 1855 | 89 29 37.452 | 1003.1 | 274 57 11.4 | 95 01 46.1 | Oyster Bayou | 14725.9 | 4.168083 |
| | | | 302 53 00.8 | 122 55 31.1 | Nine Mile Bayou | 9574.1 | 3.981100 |
| East Pearl River | 30 10 58.098 | 1789.0 | 290 33 50.3 | 110 36 51.4 | Grand Island 1855 | 10303.0 | 4.012962 |
| 1855 | 89 31 26.770 | 716.1 | 346 21 47.0 | 166 22 41.9 | Malheureux Point | 12418.1 | 4.094055 |
| East Rigolets unused L. H. | 30 09 15.312 | 471.5 | 255 27 44.1 | 75 31 33.9 | East Pearl River | 12635.7 | 4.101598 |
| 1855 | 89 39 03.956 | 106.0 | 271 08 33.5 | 91 15 23.4 | Grand Island 1855 | 21885.9 | 4.340165 |
| | | | 300 22 33.1 | 120 27 17.3 | Malheureux Point | 17586.5 | 4.245179 |
| Shell Point | 30 04 21.392 | 658.7 | 200 01 04.4 | 20 02 06.2 | E. Rigolets unused L. H. | 9632.7 | 3.983750 |
| 1855 | 89 41 07.174 | 192.1 | | | | | |
| | | | 269 29 47.1 | 89 35 32.7 | Malheureux Point | 18473.1 | 4.266540 |
| Fort Wood | 30 03 54.358 | 1673.0 | 236 08 49.0 | 56 13 25.5 | E. Rigolets unused L. H. | 17758.4 | 4.249405 |
| 1855 | 89 48 15.056 | 403.2 | | | | | |
| | | | 265 48 56.6 | 85 52 31.0 | Shell Point | 11490.5 | 4.060338 |
| Proctor Point | 29 57 28.788 | 886.3 | 147 09 47.5 | 327 07 24.4 | Fort Wood | 14133.1 | 4.150236 |
| 1853 | 89 43 28.935 | 775.8 | 196 38 17.2 | 16 39 28.1 | Shell Point | 13260.5 | 4.122559 |
| Martello Tower | 29 56 41.645 | 1282.2 | 192 37 31.6 | 12 38 27.3 | Fort Wood | 13654.3 | 4.135271 |
| 1873 | 89 50 06.480 | 173.8 | 262 13 05.9 | 82 16 24.4 | Proctor Point | 10758.7 | 4.031758 |
| Battery Bienvenue | 29 59 04.743 | 146.0 | 219 38 17.5 | 39 40 35.5 | Fort Wood | 11583.2 | 4.063829 |
| 1873 | 89 52 50.933 | 1365.3 | 314 58 06.2 | 134 59 28.3 | Martello Tower | 6233.4 | 3.794728 |
| Ducros | 29 56 05.775 | 177.8 | 216 56 52.1 | 36 58 09.4 | Battery Bienvenue | 6896.3 | 3.838614 |
| 1873 | 89 55 25.569 | 685.8 | 262 37 25.1 | 82 40 04.4 | Martello Tower | 8628.4 | 3.935932 |
| Caernarvon | 29 51 51.202 | 1576.4 | 177 55 51.6 | 357 55 46.3 | Ducros | 7843.6 | 3.894517 |
| 1873 | 89 55 15.011 | 402.9 | 222 45 52.6 | 42 48 26.4 | Martello Tower | 12185.6 | 4.085847 |
| New Orleans St. Patrick's Church | 29 56 47.140 | 1451.4 | 275 07 40.8 | 95 12 03.1 | Ducros | 14149.4 | 4.150739 |
| 1873 | 90 04 11.033 | 295.9 | 302 19 25.0 | 122 23 52.2 | Caernarvon | 17024.2 | 4.231066 |

*Oblique Arc*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Supplementary points.* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Pea Ridge, Sand Mountain [1] | 34 36 54.88 | 1691.1 | 15 02 11 | 194 59 39 | Brandon | 26411.9 | 4.421800 |
| 1875 | 85 40 44.36 | 1130.2 | 266 35 03 | 86 42 16 | Gulf Point | 19445.0 | 4.288807 |
| Mountain near head of Big Cove [2] | 34 38 09.76 | 300.7 | 61 47 03 | 241 39 39 | Rowe | 22623.8 | 4.354566 |
| 1877 | 86 18 24.70 | 629.1 | 348 09 58 | 168 14 09 | Aurora | 55473.0 | 4.744082 |
| Smithers | 34 48 58.906 | 1815.1 | 344 36 05.58 | 164 39 14.34 | Rowe | 31860.89 | 4.5032579 |
| 1878 | 86 36 58.267 | 1480.8 | 22 45 32.78 | 202 38 41.19 | Wilson | 47824.75 | 4.6796527 |
| Capshaw | 34 49 04.091 | 126.0 | 270 47 07.72 | 90 51 18.41 | Smithers | 11159.89 | 4.0476598 |
| 1878 | 86 44 17.333 | 440.6 | 327 30 18.15 | 147 37 36.73 | Rowe | 36588.19 | 4.5633409 |
| | | | 9 20 54.82 | 189 18 12.66 | Wilson | 44872.46 | 4.6519799 |
| Monte Sano, tree [1] | 34 44 55.13 | 1698.8 | 110 35 09 | 290 27 29 | Capshaw | 21883.4 | 4.340114 |
| 1878 | 86 30 51.26 | 1303.8 | 128 51 48 | 308 48 19 | Smithers | 11979.2 | 4.078428 |
| Monte Sano, north end [1] | 34 44 51.71 | 1593.4 | 35 31 11 | 215 21 32 | Wilson | 44802.7 | 4.651304 |
| 1878 | 86 32 03.46 | 88.0 | 135 29 07 | 315 26 18 | Smithers | 10686.8 | 4.028848 |
| Huntsville courthouse cupola [2] | 34 43 48.72 | 1501.3 | 124 46 14 | 304 40 59 | Capshaw | 17059.1 | 4.231955 |
| 1878 | 86 35 05.95 | 151.4 | 163 22 23 | 343 21 19 | Smithers | 9975.7 | 3.998945 |
| Huntsville Episcopal Church spire [2] | 34 43 49.01 | 1510.2 | 124 27 56 | 304 22 38 | Capshaw | 17176.0 | 4.234922 |
| 1878 | 86 35 00.13 | 3.3 | 162 32 49 | 342 31 42 | Smithers | 10010.7 | 4.000466 |
| Madkin Mountain | 34 40 01.727 | 53.2 | 30 06 01.6 | 210 00 06.9 | Wilson | 31847.5 | 4.503076 |
| 1877-8 | 86 38 37.309 | 949.9 | 152 39 40.9 | 332 36 36.0 | Capshaw | 18818.3 | 4.274581 |
| | | | 322 11 53.6 | 142 15 58.2 | Rowe | 17922.9 | 4.253400 |
| Wooden Mountain [1] | 34 41 03.04 | 93.7 | 192 09 08 | 12 10 19 | Smithers | 15000.4 | 4.176104 |
| 1877-8 | 86 39 02.52 | 66.4 | 324 04 36 | 144 08 55 | Rowe | 19819.7 | 4.297096 |
| Athens courthouse spire [1] | 34 48 10.16 | 313.1 | 267 15 11 | 87 27 21 | Smithers | 32515.7 | 4.512494 |
| 1877-8 | 86 58 17.37 | 441.5 | 341 36 46 | 161 42 01 | Wilson | 44898.8 | 4.652235 |
| Penit [1] | 34 26 08.48 | 261.3 | 237 14 00.64 | 57 38 35.71 | Smithers | 78460.29 | 4.8946499 |
| 1878 | 87 20 14.22 | 363.0 | 272 07 09.64 | 92 24 47.68 | Wilson | 47822.74 | 4.6796344 |
| Second Trinity Ridge [1] | 34 36 43.89 | 1352.4 | 244 40 20 | 64 58 18 | Smithers | 53238.0 | 4.726222 |
| 1877-8 | 87 08 31.67 | 506.9 | 277 55 28 | 98 16 30 | Rowe | 57287.8 | 4.758062 |
| Sand Mountain, high ridge [2] | 34 30 42.36 | 1305.2 | 263 37 10 | 84 21 38 | Gulf Point | 120497.2 | 5.080977 |
| 1875 | 86 46 23.52 | 599.9 | 278 13 38 | 98 48 14 | Brandon | 94753.7 | 4.976596 |
| Knob Val., Hermosa [1] | 34 30 52.76 | 1625.7 | 56 21 27 | 236 15 32 | Wilson | 19200.0 | 4.283301 |
| 1877-8 | 86 38 36.83 | 939.4 | 255 54 36 | 75 58 40 | Rowe | 11313.7 | 4.053607 |
| Wyeths Hill, north end [1] | 34 17 04.64 | 143.0 | 51 08 08 | 231 04 05 | Summit | 14165.8 | 4.151241 |
| 1877 | 86 21 54.25 | 1387.5 | 209 19 09 | 29 25 42 | Gunter | 36130.4 | 4.557873 |
| Moores Hill | 34 21 32.108 | 989.4 | 49 49 14.22 | 229 41 48.32 | Summit | 26526.75 | 4.4236841 |
| 1875-77 | 86 15 53.436 | 1365.6 | 130 07 32.05 | 309 58 44.25 | Rowe | 31116.58 | 4.4929918 |
| | | | 342 20 18.01 | 162 23 02.80 | Aurora | 24722.18 | 4.3930868 |
| Mountain near Aurora [1] | 34 13 38.16 | 1175.8 | 141 11 52 | 321 01 35 | Rowe | 44485.5 | 4.648218 |
| 1877 | 86 13 13.31 | 340.7 | 186 39 02 | 6 40 40 | Gunter | 38105.0 | 4.580982 |
| Round Top Hill, east side of Lookout Mountain [1] | 34 27 19.34 | 595.9 | 68 09 59 | 248 02 51 | Brandon | 20852.9 | 4.319166 |
| 1875 | 85 32 34.86 | 889.8 | 200 11 27 | 20 14 01 | Gulf Point | 20111.2 | 4.303438 |
| Rock City, Lookout Mountain | 34 10 46.498 | 1432.7 | 83 52 20.0 | 263 40 03.5 | Aurora | 33792.2 | 4.528816 |
| 1875 | 85 49 09.160 | 234.6 | 194 50 06.8 | 14 52 20.0 | Brandon | 23605.1 | 4.373006 |
| | | | 213 05 24.0 | 33 17 19.8 | Gulf Point | 59106.9 | 4.771638 |
| Weisner | 34 01 35.278 | 1087.0 | 105 57 40.34 | 285 40 32.83 | Aurora | 48851.91 | 4.6888815 |
| 1875-77 | 85 40 27.295 | 700.3 | 169 37 25.07 | 349 34 45.59 | Brandon | 40464.70 | 4.6070763 |
| | | | 268 49 51.89 | 88 58 13.49 | Indian | 22999.73 | 4.3617228 |
| Lower Mountain, beyond Indian | 33 56 18.637 | 574.2 | 110 21 03.2 | 289 58 11.7 | Aurora | 66944.2 | 4.825713 |
| 1875 | 85 30 10.673 | 274.1 | 155 04 36.1 | 334 56 09.7 | Brandon | 54676.3 | 4.737799 |
| | | | 182 27 21.0 | 2 28 33.4 | Gulf Point | 76275.3 | 4.882384 |
| | | | 204 53 28.7 | 25 00 42.2 | Lavender | 46917.8 | 4.671338 |
| Terrapin Mountain | 33 52 57.667 | 1776.7 | 118 09 44.5 | 297 49 44.5 | Aurora | 62343.3 | 4.794790 |
| 1875 | 85 35 15.258 | 392.2 | 164 41 41.6 | 344 36 06.5 | Brandon | 57810.8 | 4.762009 |
| | | | 187 37 20.0 | 7 41 23.8 | Gulf Point | 83137.5 | 4.919797 |
| Hurricane Mountain | 33 52 15.352 | 473.0 | 192 47 58.1 | 12 54 58.3 | Gulf Point | 85852.7 | 4.933754 |
| 1875 | 85 40 29.000 | 745.4 | 215 21 45.2 | 35 34 44.9 | Lavender | 61436.2 | 4.788424 |
| | | | 232 26 00.3 | 52 34 22.0 | Indian | 29065.6 | 4.463379 |
| Chandlers Mountain, east end [1] | 33 56 00.36 | 11.1 | 153 32 52 | 333 27 25 | Summit | 33587.3 | 4.526175 |
| 1877 | 86 19 20.68 | 531.1 | 164 36 33 | 344 29 45 | Rowe | 69737.9 | 4.843469 |
| Blountsville Mountain, west end [1] | 33 58 45.82 | 1411.8 | 192 55 56 | 13 01 07 | Rowe | 63748.6 | 4.804471 |
| 1877 | 86 40 45.93 | 1179.0 | 215 41 31 | 35 47 59 | Summit | 30755.1 | 4.487917 |

[1] Checked by vertical angles only.

[2] No check on this position.

*Oblique Arc*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Peak 1[1] 1885-6 | 33 42 33.12<br>86 35 12.26 | 1020.4<br>315.7 | 313 38 54<br>359 07 28 | 133 55 52<br>179 07 39 | Horn<br>Laurel | 65928.2<br>34575.6 | 4.819071<br>4.538770 |
| Peak 2[1] 1885-6 | 33 42 30.65<br>86 36 00.21 | 944.3<br>5.4 | 312 51 45<br>357 04 02 | 133 09 10<br>177 04 39 | Horn<br>Laurel | 66775.0<br>34540.4 | 4.824614<br>4.538328 |
| Peak 3[1] 1885-6 | 33 42 34.31<br>86 36 47.45 | 1057.1<br>1221.8 | 312 13 32<br>355 03 53 | 132 31 22<br>175 04 57 | Horn<br>Laurel | 67747.8<br>34736.7 | 4.830895<br>4.540788 |
| Backbone Mountain, or Bald Rock 1886 | 33 36 14.37<br>86 25 17.43 | 442.7<br>449.4 | 32 57 43<br>148 32 54<br>282 50 03<br>316 56 24<br>352 12 14 | 212 52 26<br>328 29 26<br>103 10 22<br>137 03 29<br>172 14 17 | Laurel<br>Cahaba<br>Cheehahaw<br>Alpine<br>Kahatchee | 27282<br>18523<br>58423<br>29155<br>42167 | 4.435888<br>4.267704<br>4.766586<br>4.464718<br>4.624968 |
| Little Peak, southern of two 1886 | 33 37 27.91<br>86 23 59.50 | 859.9<br>1533.6 | 139 14 11<br>285 30 54<br>322 47 56<br>355 11 43 | 319 10 00<br>105 50 30<br>142 54 18<br>175 13 02 | Cahaba<br>Cheehahaw<br>Alpine<br>Kahatchee | 17874<br>57030<br>29594<br>44199 | 4.252217<br>4.756104<br>4.471197<br>4.645413 |
| Peak A, or Trefoil 1877-86 | 33 39 58.033<br>85 45 54.702 | 1787.9<br>1409.3 | 11 22 57.3<br>97 24 33.4<br>144 08 00.0 | 191 21 31.0<br>276 59 13.9<br>323 54 00.0 | Cheehahaw<br>Cahaba<br>Aurora | 20437.8<br>71071.6<br>65849.6 | 4.310435<br>4.851696<br>4.818553 |
| Peak D, or Hurst 1877-86 | 33 41 37.051<br>85 44 19.011 | 1141.5<br>489.6 | 15 44 06.7<br>35 30 48.4<br>94 48 22.5<br>140 48 23.9 | 195 41 47.4<br>215 19 41.1<br>274 22 09.3<br>320 33 30.1 | Cheehahaw<br>Horn<br>Cahaba<br>Aurora | 23983.9<br>53805.3<br>73198.5<br>64931.4 | 4.379920<br>4.731309<br>4.864502<br>4.812455 |
| Coldwater Mountain, west peak 1877-87 | 33 37 38.745<br>85 53 25.633 | 1193.7<br>660.7 | 44 40 36.7<br>102 48 08.4<br>154 52 02.0<br>334 12 23.2 | 224 25 05.4<br>282 26 59.8<br>334 42 13.8<br>154 15 06.2 | Kahatchee<br>Cahaba<br>Aurora<br>Cheehahaw | 62270.0<br>60372.8<br>63639.8<br>17484.4 | 4.794279<br>4.780841<br>4.803729<br>4.242650 |
| Mount Parnassus 1885-87 | 33 28 42.541<br>86 05 42.329 | 1310.6<br>1092.9 | 41 36 05.1<br>78 53 31.4<br>354 32 49.2 | 221 27 20.5<br>258 37 27.4<br>174 33 29.9 | Kahatchee<br>Laurel<br>Horn | 37212.7<br>46074.7<br>20125.3 | 4.570691<br>4.663463<br>4.303742 |
| High Peak, Talladega Range[1] 1877-86 | 33 25 01.00<br>85 49 51.93 | 30.8<br>1341.7 | 158 07 46<br>195 22 59 | 337 56 00<br>15 23 44 | Aurora<br>Cheehahaw | 87256.7<br>7882.0 | 4.940799<br>3.896639 |
| Talladega Negro College flagstaff 1887 | 33 26 01.260<br>86 06 47.953 | 38.8<br>1238.7 | 258 27 21.9<br>346 31 22.8<br>45 10 54.4<br>74 29 59.8 | 78 37 26.7<br>166 32 39.6<br>225 02 46.2<br>254 26 53.0 | Cheehahaw<br>Horn<br>Kahatchee<br>Alpine | 28905.9<br>15491.5<br>32435.4<br>9091.6 | 4.4609860<br>4.1900935<br>4.5110186<br>3.9586418 |
| Talladega Presbyterian Church spire 1887 | 33 26 09.192<br>86 06 02.287 | 283.2<br>59.1 | 258 28 12.7<br>350 59 06.3<br>46 18 57.6<br>74 57 01.7 | 78 37 52.3<br>170 59 57.9<br>226 10 24.2<br>254 53 29.7 | Cheehahaw<br>Horn<br>Kahatchee<br>Alpine | 27701.2<br>15501.1<br>33450.9<br>10294.0 | 4.4424988<br>4.1903635<br>4.5244074<br>4.0125828 |
| Talladega City, school, finial of cupola[1] 1885 | 33 26 27.74<br>86 06 25.17 | 854.6<br>650.1 | 70 51 34<br>349 13 46 | 250 48 15<br>169 14 50 | Alpine<br>Horn | 9896.7<br>16165.8 | 3.995488<br>4.208596 |
| Lewis House cupola 1885-87 | 33 26 24.595<br>86 05 27.040 | 757.7<br>698.4 | 46 47 47.8<br>73 49 50.2<br>259 04 57.0<br>354 30 37.4 | 226 38 55.1<br>253 45 58.8<br>79 14 17.3<br>174 31 09.7 | Kahatchee<br>Alpine<br>Cheehahaw<br>Horn | 34438.2<br>11298.6<br>26715.8<br>15857.1 | 4.537041<br>4.053024<br>4.426769<br>4.200224 |
| Penitentiary Mountain 1885-87 | 33 25 20.589<br>86 32 50.300 | 634.3<br>1299.5 | 48 41 15.4<br>183 10 21.3<br>272 02 44.5<br>321 05 59.2 | 228 40 08.5<br>3 11 04.2<br>92 13 58.2<br>141 12 09.4 | Laurel<br>Cahaba<br>Alpine<br>Kahatchee | 4181.0<br>35993.7<br>31627.9<br>27781.8 | 3.621275<br>4.556227<br>4.500071<br>4.443761 |
| Childersburg Methodist Church spire[1] 1885-86 | 33 16 26.98<br>86 21 43.27 | 831.2<br>1119.8 | 123 54 43<br>264 19 10 | 303 47 30<br>84 28 38 | Laurel<br>Horn | 24555.3<br>26906.4 | 4.390145<br>4.429855 |
| Childersburg Baptist Church spire 1887 | 33 16 33.356<br>86 21 14.837 | 1027.6<br>384.0 | 122 36 19.1<br>222 08 28.3<br>264 35 31.1<br>5 56 39.3 | 302 28 50.1<br>42 13 18.4<br>84 44 43.5<br>185 56 27.4 | Laurel<br>Alpine<br>Horn<br>Kahatchee | 25063.0<br>20326.2<br>26155.0<br>5423.0 | 4.3990325<br>4.3080565<br>4.4175544<br>3.7342396 |
| Hickock Mountain 1885-87 | 33 15 05.604<br>86 13 33.936 | 172.6<br>878.5 | 77 53 02.8<br>116 11 19.2<br>249 58 33.8 | 257 48 38.3<br>295 59 37.1<br>70 03 33.1 | Kahatchee<br>Laurel<br>Horn | 12780.4<br>36802.0<br>15022.2 | 4.106544<br>4.565871<br>4.176734 |
| Columbiana[2] 1887 | 33 11 45.02<br>86 34 57.45 | 1386.9<br>1488.0 | 180 22 22.3<br>260 23 26.6 | 0 22 25.4<br>80 30 45.3 | Laurel<br>Kahatchee | 22365.6<br>21033.5 | 4.349580<br>4.322912 |
| Bryant, flag in tree[1] 1887-90 | 32 50 18.32<br>86 22 13.46 | 564.3<br>350.1 | 27 03 47<br>185 29 07 | 206 59 47<br>5 29 38 | Wilder<br>Weogufka | 25483.9<br>15561.8 | 4.406266<br>4.192060 |
| Mount Pisgah 1887-92 | 32 42 14.622<br>86 29 12.855 | 450.4<br>334.8 | 202 09 18.6<br>304 19 15.2<br>4 51 13.2 | 22 13 37.1<br>124 28 43.7<br>184 50 59.5 | Weogufka<br>Wetumpka<br>Wilder | 32821.6<br>33324.2<br>7828.3 | 4.516160<br>4.522759<br>3.893665 |

[1] No check on this position.

[2] Checked by vertical angles only.

*Oblique Arc*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Montgomery Capitol 1887–92 | 32 22 39.555 | 1218.4 | 6 32 05.6 | 186 30 33.7 | Mount Carmel | 39792.0 | 4.5997962 |
| | 86 18 01.505 | 39.3 | 34 28 35.0 | 214 18 33.5 | Bargenier | 52375.0 | 4.7191236 |
| | | | 68 11 02.2 | 248 01 03.8 | Lowndesboro | 31548.4 | 4.4989771 |
| | | | 147 24 43.3 | 327 18 28.8 | Wilder | 33721.4 | 4.5279058 |
| | | | 175 39 31.6 | 355 37 46.5 | Weogufka | 66779.7 | 4.8246442 |
| | | | 209 55 52.0 | 29 59 17.7 | Wetumpka | 20048.1 | 4.3020727 |
| Montgomery water tower 1890–92 | 32 22 45.838 | 1412.0 | 68 02 55.3 | 247 52 51.2 | Lowndesboro | 31879.1 | 4.5035062 |
| | 86 17 50.844 | 1329.1 | 146 50 14.4 | 326 43 54.3 | Wilder | 33710.1 | 4.5277606 |
| | | | 209 30 43.4 | 29 34 03.4 | Wetumpka | 19741.8 | 4.2953874 |
| Lowndesboro Methodist Church spire 1890–92 | 32 16 41.751 | 1286.1 | 6 41 13.2 | 186 41 11.4 | Lowndesboro | 750.7 | 2.875455 |
| | 86 36 37.302 | 976.2 | 145 27 37.4 | 325 20 09.6 | Parker | 38433.8 | 4.584713 |
| | | | 195 29 11.0 | 15 32 56.0 | Wilder | 40908.4 | 4.6118127 |
| Lowndesboro Presbyterian Church spire 1890–92 | 32 16 54.348 | 1674.1 | 11 56 55.5 | 191 56 50.6 | Lowndesboro | 1158.6 | 3.063945 |
| | 86 36 31.478 | 823.7 | 144 56 34.8 | 324 49 03.8 | Parker | 38202.2 | 4.582088 |
| | | | 195 25 33.3 | 15 29 15.2 | Wilder | 40493.9 | 4.6073895 |
| Lookout Hill 1895 | 31 47 09.559 | 294.4 | 218 20 21.0 | 38 23 28.6 | Fatama | 15064.2 | 4.1779452 |
| | 87 20 08.618 | 226.7 | 285 17 20.8 | 105 26 27.9 | Midway | 28378.4 | 4.4529877 |
| Lower Peach Tree longitude 1857 [1] 1895 | 31 50 20.45 | 629.8 | 258 25 31.7 | 78 35 17.6 | Fatama | 29771.1 | 4.4737945 |
| | 87 32 42.87 | 1127.2 | 286 27 10.5 | 106 33 48.1 | Lookout Hill | 20691.2 | 4.3157856 |
| Lower Peach Tree latitude 1857 [1] | 31 50 20.45 | 629.8 | | | | | |
| | 87 32 42.81 | 1125.6 | | | | | |
| Mobile Court House tower 1895–97 | 30 41 23.155 | 713.0 | 94 04 10.4 | 274 00 55.8 | Spring Hill | 10170.3 | 4.007334 |
| | 88 02 24.718 | 657.8 | 171 05 02.8 | 351 03 32.9 | Cold Creek | 30044.6 | 4.477767 |
| | | | 223 06 00.0 | 43 11 59.0 | Minette | 27277.5 | 4.435805 |
| | | | 306 43 49.6 | 126 47 58.5 | Daphne | 16230.0 | 4.210318 |
| Mobile grain elevator, tank on top [1] 1897 | 30 42 09.08 | 279.6 | 310 16 59 | 130 21 10 | Daphne | 17199.3 | 4.235510 |
| | 88 02 28.96 | 770.5 | 86 03 03 | 265 59 51 | Spring Hill | 10055.7 | 4.002411 |
| Mobile brewery flagstaff 1895–97 | 30 41 57.317 | 1765.0 | 88 07 26.6 | 268 04 13.1 | Spring Hill | 10090.7 | 4.003922 |
| | 88 02 26.950 | 717.2 | 170 52 39.1 | 350 51 10.3 | Cold Creek | 28996.3 | 4.462343 |
| | | | 224 44 38.4 | 44 50 38.6 | Minette | 26560.9 | 4.424243 |
| | | | 309 27 54.4 | 129 32 04.5 | Daphne | 16926.0 | 4.228555 |
| Mobile transit pier 1856–57 | 30 41 30.888 | 951.2 | 92 47 29.6 | 272 44 19.4 | Spring Hill | 9925.5 | 3.996754 |
| | 88 02 33.395 | 888.8 | 223 47 42.2 | 43 53 45.6 | Minette | 27263.5 | 4.435581 |
| | | | 306 54 42.7 | 126 58 56.0 | Daphne | 16557.6 | 4.218997 |
| Mobile Baptist Church spire (St. Francis Street) 1897 | 30 41 28.267 | 870.5 | 93 22 35.2 | 273 19 31.9 | Spring Hill | 9572.8 | 3.981038 |
| | 88 02 46.832 | 1246.4 | 224 12 48.8 | 44 18 59.1 | Minette | 27570.0 | 4.440437 |
| | | | 305 57 25.5 | 126 01 45.7 | Daphne | 16797.4 | 4.225241 |
| Mobile Post Office Weather Bureau thermometer box [1] 1897 | 30 41 34.02 | 1047.6 | 307 25 44 | 127 29 55 | Daphne | 16520.8 | 4.218032 |
| | 88 02 28.91 | 769.4 | 92 12 31 | 272 09 18 | Spring Hill | 10040.5 | 4.001755 |
| Mobile Catholic Church, north cross [1] 1897 | 30 41 24.51 | 754.8 | 94 01 26 | 273 58 21 | Spring Hill | 9683.1 | 3.986016 |
| | 88 02 42.96 | 1143.4 | 223 53 35 | 43 59 43 | Minette | 27581.4 | 4.440617 |
| Mobile Christ Episcopal Church spire 1848 | 30 41 20.153 | 620.6 | 171 15 01.3 | 351 13 32.8 | Cold Creek | 30124.6 | 4.478922 |
| | 88 02 27.506 | 732.0 | 306 18 43.1 | 126 22 53.4 | Daphne | 16234.6 | 4.210442 |
| | | | 94 37 19.1 | 274 34 06.0 | Spring Hill | 10103.3 | 4.004464 |
| Mobile waterworks standpipe 1897 | 30 43 11.035 | 339.8 | 347 16 13.1 | 167 16 24.4 | Spring Hill | 2670.8 | 3.426638 |
| | 88 09 08.022 | 213.4 | 240 28 54.0 | 60 38 19.6 | Minette | 33730.2 | 4.528019 |
| | | | 298 42 45.1 | 118 50 19.8 | Daphne | 27081.1 | 4.432666 |
| Spring Hill tower 1895–97 | 30 41 41.359 | 1273.6 | 155 07 41.0 | 335 07 39.6 | Spring Hill | 172.35 | 2.23642 |
| | 88 08 43.184 | 1149.3 | 190 28 59.9 | 10 30 43.9 | Cold Creek | 29615.7 | 4.471522 |
| | | | 235 57 53.8 | 56 07 06.6 | Minette | 34623.3 | 4.539369 |
| | | | 293 56 15.8 | 114 03 37.6 | Daphne | 25262.5 | 4.402476 |
| Point aux Pins 1897 | 30 22 35.446 | 1091.5 | 210 51 32.5 | 30 54 20.0 | St. Elmo | 17182.5 | 4.235087 |
| | 88 18 33.046 | 882.4 | 338 40 43.3 | 158 42 35.3 | Dauphin Island west base | 16326.0 | 4.212881 |
| | | | 300 45 03.8 | 120 53 43.5 | Fort Morgan | 32043.4 | 4.505739 |
| | | | 310 29 22.1 | 130 34 34.4 | Dauphin Island east base | 21751.5 | 4.337490 |
| Fort Morgan astronomic azimuth 1847 | 30 13 42.236 | 1300.6 | 93 15 34.57 | 273 08 47.83 | Dauphin Island west base | 21633.17 | 4.3351203 |
| | 88 01 23.255 | 621.8 | 143 59 49.26 | 323 56 50.84 | Cedar Point | 16074.73 | 4.2061437 |

[1] No check on this position.

*Mobile Bay*

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points.* | ° ′ ″ | | ° ′ ″ | ′ ″ | | *Meters* | |
| Mullet Point 1848 | 30 24 39.49<br>87 54 28.34 | 1216.0<br>756.3 | 28 44 23<br>70 37 40 | 208 40 54<br>250 31 11 | Fort Morgan<br>Cedar Point | 23075.5<br>21763.5 | 4.363151<br>4.337730 |
| Point Juliet 1848 | 30 22 52.19<br>88 06 23.91 | 1607.1<br>638.3 | 260 08 13<br>334 36 01 | 80 14 15<br>154 38 33 | Mullet Point<br>Fort Morgan | 19386.1<br>18743.4 | 4.287490<br>4.272848 |
| Fowl River Point 1848 | 30 28 15.56<br>88 05 47.96 | 479.1<br>1297.4 | 290 06 03<br>5 30 31 | 110 11 47<br>185 30 13 | Mullet Point<br>Point Juliet | 19316.1<br>10003.7 | 4.285919<br>4.000162 |
| Great Point Clear 1848 | 30 28 58.52<br>87 56 12.64 | 1802.1<br>337.1 | 340 45 44<br>85 06 52 | 160 46 37<br>265 02 00 | Mullet Point<br>Fowl River Point | 8447.6<br>15402.7 | 3.926732<br>4.187596 |
| Dog River Point 1848 | 30 35 40.83<br>88 03 41.05 | 1257.3<br>1093.6 | 315 59 40<br>13 52 19 | 136 03 28<br>193 51 15 | Great Point Clear<br>Fowl River Point | 17214.4<br>14122.4 | 4.235892<br>4.149910 |
| Ragged Point 1848 | 30 35 05.57<br>87 54 54.91 | 171.5<br>1463.0 | 10 23 45<br>94 27 58 | 190 23 06<br>274 23 30 | Great Point Clear<br>Dog River Point | 11491.2<br>14059.6 | 4.060365<br>4.147972 |
| Point Zeb 1848 | 30 38 04.87<br>87 55 08.68 | 150.0<br>231.2 | 356 12 10<br>72 01 52 | 176 12 17<br>251 57 31 | Ragged Point<br>Dog River Point | 5533.6<br>14350.4 | 3.743007<br>4.156863 |
| Choctaw Point 1848 | 30 40 05.11<br>88 02 04.84 | 157.4<br>128.9 | 288 26 51<br>17 29 07 | 108 30 23<br>197 28 18 | Point Zeb<br>Dog River Point | 11682.6<br>8532.2 | 4.067539<br>3.931060 |
| Vessel Point 1848 | 30 40 26.07<br>87 55 15.62 | 802.8<br>415.8 | 357 34 10<br>86 38 16 | 177 34 14<br>266 34 47 | Point Zeb<br>Choctaw Point | 4351.9<br>10912.8 | 3.638684<br>4.037934 |
| Choctaw Point L. H. 1848 | 30 40 04.95<br>88 02 05.80 | 152.4<br>154.4 | 288 23 09<br>17 19 50 | 108 26 42<br>197 19 02 | Point Zeb<br>Dog River Point | 11705.4<br>8520.2 | 4.06839<br>3.93045 |
| Sand Island front range L. H. 1892–98 | 30 11 15.027<br>88 03 01.776 | 462.4<br>47.5 | 106 53 23.5 | 286 47 26.9 | Dauphin Island west base | 19818.8 | 4.297078 |
| | | | 129 13 12.5 | 309 10 35.2 | Dauphin Island east base | 10784.0 | 4.032803 |
| | | | 155 50 26.1 | 335 45 22.6 | St. Elmo | 39138.2 | 4.592601 |
| | | | 196 55 51.9 | 17 00 17.7 | Daphne | 48056.0 | 4.681748 |
| | | | 210 10 08.4 | 30 10 58.0 | Fort Morgan | 5243.7 | 3.719635 |
| Dauphin Island west base 1892 | 30 14 35.678<br>88 05 43.756 | 1098.7<br>1170.0 | 283 16 17.6<br>88 19 42.2 | 103 18 28.7<br>268 15 06.6 | Fort Morgan<br>Dauphin Island west base | 7157.8<br>14639.2 | 3.854780<br>4.165518 |
| | | | 324 57 09.6 | 144 58 32.8 | Sand Island front range L. H. | 7545.9 | 3.877710 |
| Dauphin Island east base 1892 | 30 14 45.825<br>88 04 31.650 | 1411.1<br>846.2 | 80 47 59.5 | 260 47 21.6 | Dauphin Island west base, 1892 | 1952.895 | 3.290679 |
| | | | 291 13 24.6 | 111 14 59.5 | Fort Morgan | 5405.2 | 3.732809 |
| | | | 339 40 26.0 | 159 41 11.2 | Sand Island front range L. H. | 6921.7 | 3.840212 |
| Grass 1908 | 30 12 39.803<br>88 05 53.952 | 1225.5<br>1443.0 | 255 06 32.4<br>299 31 59.3 | 75 08 48.7<br>119 33 25.9 | Fort Morgan<br>Sand Island front range L. H. | 7490.9<br>5293.9 | 3.874534<br>3.723772 |
| Beach 1908 | 30 14 32.908<br>88 05 35.010 | 1013.3<br>936.1 | 283 01 46.3<br>326 03 54.9 | 103 03 53.1<br>146 05 12.0 | Fort Morgan<br>Sand Island front range L. H. | 6910.7<br>7343.2 | 3.839525<br>3.865883 |
| | | | 8 16 33.8 | 188 16 24.2 | Grass | 3519.4 | 3.546467 |
| Fort Gaines (U. S. E.) 1908 | 30 14 52.523<br>88 04 28.899 | 1617.4<br>772.8 | 293 32 25.6<br>340 48 38.8 | 113 33 59.1<br>160 49 22.6 | Fort Morgan<br>Sand Island front range L. H. | 5415.7<br>7090.9 | 3.733652<br>3.850704 |
| | | | 29 06 09.3 | 209 05 26.4 | Grass | 4677.0 | 3.669966 |
| Dolphin, Mobile Ship Channel Light No. 2 1908 | 30 16 54.195<br>88 02 01.491 | 1668.9<br>39.9 | 350 10 44.5<br>46 27 15.4 | 170 11 03.8<br>226 26 01.1 | Fort Morgan<br>Fort Gaines (U. S. E.) | 5998.6<br>5437.2 | 3.778047<br>3.735375 |
| Clear 1908 | 30 15 25.616<br>87 56 57.881 | 788.7<br>1547.6 | 65 51 14.9<br>85 12 03.4<br>108 35 55.6 | 245 49 01.3<br>265 08 16.2<br>288 33 22.6 | Fort Morgan<br>Fort Gaines (U. S. E.)<br>Dolphin | 7775.9<br>12100.6<br>8561.5 | 3.890751<br>4.082806<br>3.932549 |
| Sure 1908 | 30 13 58.333<br>87 59 57.105 | 1796.1<br>1527.3 | 102 57 03.0<br>148 27 24.2<br>240 42 00.6 | 282 54 46.2<br>328 26 21.5<br>60 43 30.9 | Fort Gaines (U. S. E.)<br>Dolphin<br>Clear | 7456.2<br>6354.6<br>5494.0 | 3.872517<br>3.803091<br>3.739892 |
| Cedar Point (U. S. E.) 1908 | 30 18 41.082<br>88 08 18.552 | 1265.1<br>495.7 | 188 03 48.6<br>309 37 35.8<br>318 53 30.2 | 108 06 58.7<br>129 41 05.1<br>138 55 26.0 | Dolphin<br>Fort Morgan<br>Fort Gaines (U. S. E.) | 10599.9<br>14419.4<br>9338.4 | 4.025300<br>4.158946<br>3.970273 |
| Little Dauphin (U. S. E.) 1908 | 30 16 42.904<br>88 07 02.835 | 1321.1<br>75.8 | 30 13 00.0 | 210 12 24.0 | Dauphin Island east base | 3795.8 | 3.579298 |
| | | | 115 57 37.6 | 295 54 53.1 | Cat | 9689.8 | 3.986314 |
| | | | 177 19 48.2 | 357 19 41.6 | Cedar | 7564.9 | 3.878803 |
| | | | 301 28 24.7 | 121 31 15.8 | Fort Morgan | 10647.8 | 4.027259 |
| Juliet 1910 | 30 22 59.557<br>88 06 24.453 | 1833.9<br>652.9 | 334 51 08.0<br>5 03 16.3 | 154 53 40.0<br>185 02 56.9 | Fort Morgan<br>Little Dauphin | 18954.9<br>11643.4 | 4.277721<br>4.066080 |
| Mobile Bay L. H. 1910 | 30 26 14.170<br>88 00 40.081 | 436.3<br>1069.5 | 2 51 09.9<br>46 31 05.2<br>56 55 15.6 | 182 50 48.1<br>226 27 44.9<br>236 52 21.3 | Fort Morgan<br>Cedar<br>Juliet | 23182.6<br>14574.6<br>10972.7 | 4.365163<br>4.163596<br>4.040315 |

*Mobile Bay*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points*—Contd. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Mobile Bay L. H. 1897-98 | 30 26 14.242<br>88 00 39.984 | 438.6<br>1067.0 | 30 12 09.3 | 210 08 19.7 | Dauphin Island east base | 24144.1 | 4.382811 |
| | | | 112 04 09.3 | 291 57 52.7 | St. Elmo | 21364.4 | 4.329691 |
| | | | 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<br>88 05 43.067 | 773.0<br>1150.0 | 228 53 05.0 | 48 55 38.4 | Mobile Bay L. H. 1897 | 10734.8 | 4.030794 |
| | | | 336 39 14.0 | 156 41 25.1 | Fort Morgan | 17533.6 | 4.243870 |
| | | | 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<br>87 54 28.853 | 1389.8<br>770.0 | 28 30 06.3 | 208 26 37.1 | Fort Morgan | 23221.0 | 4.365880 |
| | | | 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<br>87 56 11.288 | 1795.2<br>301.0 | 340 40 22.6 | 160 41 14.5 | Mullet Point (U. S. E.) | 8261.0 | 3.917034 |
| | | | 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<br>88 05 48.403 | 590.4<br>1291.3 | 265 29 02.2 | 85 33 54.9 | Point Clear (U. S. E.) | 15440.5 | 4.188661 |
| | | | 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 | 4.037583 |
| Dog River (U. S. E) 1910 | 30 35 58.478<br>88 03 37.233 | 1800.8<br>991.9 | 317 23 41.5 | 137 27 28.1 | Point Clear (U. S. E.) | 17570.3 | 4.244779 |
| | | | 345 16 11.0 | 165 17 40.9 | Mobile Bay L. H. 1897 | 18601.2 | 4.269540 |
| | | | 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<br>87 54 49.090 | 1466.6<br>1307.8 | 9 52 00.8 | 189 51 19.1 | Point Clear (U. S. E.) | 12793.8 | 4.107000 |
| | | | 27 56 32.1 | 207 53 33.8 | Mobile Bay L. H. 1897 | 19982.2 | 4.300643 |
| | | | 51 53 20.2 | 231 47 45.3 | Fowl River (U. S. E.) | 22351.9 | 4.349316 |
| | | | 91 23 51.6 | 271 19 22.8 | Dog River (U. S. E.) | 14073.8 | 4.148410 |
| Apalachee (U. S. E.) 1910 | 30 39 26.398<br>87 57 24.112 | 812.9<br>642.0 | 328 29 15.7 | 148 30 34.7 | Daphne (U. S. E.) | 7901.3 | 3.897698 |
| | | | 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<br>88 01 57.291 | 84.2<br>1525.2 | 278 43 38.3 | 98 45 57.6 | Apalachee (U. S. E.) | 7358.3 | 3.866777 |
| | | | 304 31 58.0 | 124 35 36.2 | Daphne (U. S. E.) | 13847.4 | 4.141367 |
| | | | 19 29 35.0 | 199 28 44.1 | Dog River (U. S. E.) | 7978.7 | 3.901932 |
| *Supplementary points.* | | | | | | | |
| Sand Island rear range 1 1908 | 30 11 52.993<br>88 03 08.770 | 1631.8<br>234.6 | 108 04 48.1 | 288 03 25.0 | Grass | 4647.3 | 3.667202 |
| | | | 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<br>88 03 07.200 | 1637.7<br>192.6 | 107 51 10.8 | 287 49 47.9 | Grass | 4685.4 | 3.670751 |
| | | | 158 25 13.2 | 338 24 32.1 | Fort Gaines (U. S. E.) | 5938.8 | 3.773696 |
| | | | 219 37 08.9 | 39 38 01.2 | Fort Morgan | 4360.0 | 3.639487 |
| Do 1908 | 30 12 25.815<br>88 05 26.446 | 794.9<br>707.4 | 120 21 00.5 | 300 20 46.7 | Grass | 852.5 | 2.930685 |
| | | | 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<br>88 06 35.23 | 1293.3<br>942.1 | 219 46 54 | 39 47 20 | Dauphin Island west base 1892 | 2151.0 | 3.33264 |
| | | | 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<br>88 01 29.52 | 1011.9<br>789.3 | 30 10 48 | 210 10 02 | Sand Island front range L. H. | 4909.1 | 3.69100 |
| | | | 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<br>88 01 26.68 | 1219.0<br>713.4 | 102 16 12 | 282 12 47 | Dauphin Island east base | 11152.4 | 4.04737 |
| | | | 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 05.264<br>88 00 44.330 | 162.1<br>1185.2 | 103 38 22.1 | 283 36 29.1 | Fort Gaines (U. S. E.) | 6178.2 | 3.790859 |
| | | | 158 22 30.8 | 338 21 52.0 | Dolphin | 5595.9 | 3.747867 |
| | | | 247 45 20.9 | 67 47 15.0 | Clear | 6540.4 | 3.815605 |
| | | | 279 35 18.4 | 99 35 42.2 | Sure | 1280.7 | 3.107440 |
| New 1908 | 30 13 49.397<br>88 00 49.457 | 1536.3<br>1322.5 | 36 35 20.4 | 216 34 13.8 | Sand Island front range L. H. | 5938.5 | 3.773876 |
| | | | 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 | 3.777632 |
| Sig 1908 | 30 13 45.751<br>88 00 42.970 | 1408.8<br>1149.1 | 38 39 59.0 | 218 38 49.2 | Sand Island front range L. H. | 5943.3 | 3.774027 |
| | | | 84 16 16.7 | 264 15 56.4 | Fort Morgan | 1081.9 | 3.034198 |
| | | | 160 07 04.0 | 340 06 24.5 | Dolphin | 6170.7 | 3.790332 |

[1] No check on this position.

*Mobile Bay*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Red 1908 | 30 13 32.909<br>88 01 29.203 | 1013.4<br>781.0 | 30 15 21.9 | 210 14 35.3 | Sand Island front range L. H. | 4914.9 | 3.691516 |
| | | | 117 02 39.7 | 297 01 09.2 | Fort Gaines (U. S. E.) | 5394.1 | 3.731915 |
| | | | 209 04 25.0 | 29 04 28.0 | Fort Morgan | 328.8 | 2.516961 |
| Hant[1] 1908 | 30 13 28.71<br>88 00 48.43 | 884.0<br>1295.1 | 40 54 55 | 220 53 48 | Sand Island front range L. H. | 5446.6 | 3.736122 |
| | | | 294 06 52 | 114 07 10 | Fort Morgan | 1019.5 | 3.008405 |
| Out 1908 | 30 14 52.388<br>88 07 51.695 | 1613.2<br>1382.1 | 281 43 12.4 | 101 46 28.0 | Fort Morgan | 10609.1 | 4.025677 |
| | | | 310 46 52.9 | 130 49 18.9 | Sand Island front range L. H. | 10242.7 | 4.010416 |
| | | | 322 21 08.0 | 142 22 07.3 | Grass | 5155.6 | 3.712282 |
| Little Point Clear 1892 | 30 15 43.54<br>87 56 04.28 | 1340.8<br>114.4 | 50 36 07 | 230 34 45 | Jacob | 5603.9 | 3.74849 |
| | | | 60 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<br>88 07 11.53 | 395.7<br>308.2 | 296 27 02 | 116 29 57 | Fort Morgan | 10402.8 | 4.01715 |
| | | | 35 28 18 | 215 27 46 | Dauphin Island east base | 2891.3 | 3.46109 |
| Middle Ground light, M G 1908 | 30 15 12.790<br>88 02 16.225 | 393.8<br>433.8 | 333 03 20.7 | 153 03 47.4 | Fort Morgan | 3127.6 | 3.495211 |
| | | | 267 19 14.7 | 87 21 55.1 | Clear | 8519.6 | 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<br>88 02 07.704 | 353.4<br>205.9 | 345 29 21.6 | 165 29 44.0 | Fort Morgan | 4746.6 | 3.676386 |
| | | | 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<br>88 00 44.401 | 1307.6<br>1184.7 | 352 27 44.8 | 172 27 47.0 | Mobile Bay L. H. | 878.8 | 2.943899 |
| | | | 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<br>88 00 45.701 | 1328.6<br>1219.6 | 2 35 17.9 | 182 34 59.0 | Fort Morgan | 22221.2 | 4.346768 |
| | | | 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<br>88 00 48.556 | 373.1<br>1295.9 | 51 53 10.3 | 231 49 54.4 | Cedar | 13150.3 | 4.118935 |
| | | | 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<br>88 00 49.042 | 1740.2<br>1308.9 | 53 32 10.1 | 233 28 54.4 | Cedar | 12851.8 | 4.108964 |
| | | | 68 06 42.7 | 248 03 53.0 | Juliet | 9650.7 | 3.984558 |
| | | | 185 42 37.6 | 5 42 42.1 | Mobile Bay L. H. | 2403.3 | 3.380801 |
| Mobile Ship Channel Light No. 8 1910 | 30 24 05.246<br>88 00 59.567 | 161.5<br>1590.1 | 1 53 20.7 | 181 53 08.8 | Fort Morgan | 19194.4 | 4.283174 |
| | | | 58 55 27.4 | 238 52 17.1 | Cedar | 11739.6 | 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<br>88 01 08.441 | 78.2<br>225.4 | 1 18 46.4 | 181 18 38.9 | Fort Morgan | 17257.6 | 4.236981 |
| | | | 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 | 3.774461 |
| Mobile Ship Channel Light No. 6 1910 | 30 21 58.818<br>88 01 17.452 | 1811.2<br>466.0 | 0 34 43.4 | 180 34 40.5 | Fort Morgan | 15291.6 | 4.184454 |
| | | | 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<br>88 01 27.952 | 1354.5<br>746.6 | 359 26 33.9 | 179 26 36.3 | Fort Morgan | 12987.3 | 4.113518 |
| | | | 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<br>88 01 39.044 | 868.8<br>1043.0 | 357 43 35.6 | 177 43 43.6 | Fort Morgan | 10661.8 | 4.027829 |
| | | | 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<br>88 01 48.684 | 657.8<br>1300.8 | 355 28 17.8 | 175 28 30.6 | Fort Morgan | 8621.7 | 3.935591 |
| | | | 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<br>88 05 37.245 | 758.8<br>994.5 | 41 39 14.1 | 221 38 24.2 | Cedar | 3969.7 | 3.598758 |
| | | | 130 28 02.0 | 310 27 38.1 | Juliet | 1656.7 | 3.219247 |
| | | | 228 16 35.0 | 48 19 05.4 | Mobile Bay L. H. | 10624.2 | 4.026295 |
| Drury 1910 | 30 15 38.409<br>88 05 17.273 | 1182.7<br>461.7 | 161 36 53.9 | 341 35 54.0 | Cedar | 10056.4 | 4.002444 |
| | | | 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 | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Pine 1910 | 30 16 07.545 | 232.3 | 57 11 12.7 | 237 10 08.7 | Dauphin Island east base | 4042.9 | 3.606690 |
| | 88 06 07.196 | 192.4 | | | | | |
| | | | 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 | 60.8 | 270 35 34.4 | 90 38 00.8 | Point Clear (U. S. E.) | 7697.3 | 3.886337 |
| | 88 00 59.867 | 1596.8 | 307 01 50.4 | 127 05 08.5 | Mullet Point (U. S. E.) | 13073.1 | 4.116380 |
| | | | 354 06 01.9 | 174 06 12.0 | Mobile Bay L. H. 1910 | 5161.6 | 3.712786 |
| | | | 31 49 03.4 | 211 46 40.0 | Alabama Port (U.S.E.) | 14342.9 | 4.156637 |
| | | | 80 31 30.5 | 260 29 04.2 | Fowl River (U. S. E.) | 7803.0 | 3.892262 |
| Mobile Ship Channel Light No. 10A 1910 | 30 30 22.643 | 697.3 | 288 05 32.7 | 108 08 03.8 | Point Clear (U. S. E.) | 8354.0 | 3.921893 |
| | 88 01 09.018 | 240.5 | 354 12 59.9 | 174 13 14.4 | Mobile Bay L. H. 1910 | 7688.3 | 3.885829 |
| | | | 62 59 09.4 | 242 56 47.7 | Fowl River (U. S. E.) | 8365.1 | 3.922473 |
| | | | 159 06 16.9 | 339 05 01.6 | Dog River (U. S. E.) | 11070.4 | 4.044165 |
| | | | 225 18 38.7 | 45 21 51.8 | Daphne (U. S. E.) | 14236.9 | 4.153416 |
| Mobile Ship Channel Light No. 12 1910 | 30 31 43.932 | 1352.8 | 48 49 30.2 | 228 47 13.2 | Fowl River (U. S. E.) | 9573.6 | 3.981075 |
| | 88 01 18.254 | 486.6 | 154 43 08.2 | 334 41 57.5 | Dog River (U. S. E.) | 8069.4 | 3.937990 |
| | | | 234 05 01.5 | 54 08 19.4 | Daphne (U. S. E.) | 12801.4 | 4.107257 |
| | | | 301 54 21.9 | 121 56 57.8 | Point Clear (U. S. E.) | 9644.4 | 3.984276 |
| Mobile Ship Channel Light No. 12A 1910 | 30 33 05.017 | 154.5 | 38 23 28.9 | 218 21 16.3 | Fowl River (U. S. E.) | 11227.5 | 4.050282 |
| | 88 01 27.007 | 719.8 | 147 00 01.1 | 326 58 54.9 | Dog River (U. S. E.) | 6369.7 | 3.804120 |
| | | | 244 41 32.9 | 64 44 55.3 | Daphne (U. S. E.) | 11726.1 | 4.069154 |
| | | | 312 02 42.3 | 132 05 22.7 | Point Clear (U. S. E.) | 11339.3 | 4.054585 |
| Mobile Ship Channel Light No. 14 1910 | 30 34 26.609 | 819.4 | 30 43 52.1 | 210 41 44.1 | Fowl River (U. S. E.) | 13160.8 | 4.119281 |
| | 88 01 36.280 | 966.7 | 131 17 14.2 | 311 16 12.7 | Dog River (U. S. E.) | 4288.2 | 3.632272 |
| | | | 257 01 13.3 | 77 04 40.5 | Daphne (U. S. E.) | 11132.2 | 4.046580 |
| | | | 319 22 52.0 | 139 25 37.2 | Point Clear (U. S. E.) | 13314.5 | 4.124324 |
| Mobile Ship Channel Light No. 14A 1910 | 30 35 45.786 | 1409.9 | 25 15 53.9 | 205 13 50.3 | Fowl River (U. S. E.) | 15205.4 | 4.181999 |
| | 88 01 45.109 | 1201.7 | 97 27 45.6 | 277 26 48.5 | Dog River (U. S. E.) | 3012.5 | 3.478923 |
| | | | 177 39 11.0 | 357 39 04.7 | Choctaw (U. S. E.) | 7919.2 | 3.898680 |
| | | | 269 40 38.3 | 89 44 10.0 | Daphne (U. S. E.) | 11083.1 | 4.044662 |
| | | | 324 38 03.6 | 144 40 53.2 | Point Clear (U. S. E.) | 15382.9 | 4.187039 |
| Mobile Ship Channel Light No. 16 1910 | 30 37 06.456 | 198.8 | 52 44 02.0 | 232 43 09.4 | Dog River (U. S. E.) | 3456.5 | 3.538634 |
| | 88 01 53.975 | 1437.7 | 179 04 06.0 | 359 04 04.2 | Choctaw (U. S. E.) | 5429.1 | 3.734729 |
| | | | 239 01 50.5 | 59 04 07.9 | Apalachee (U. S. E.) | 8379.3 | 3.923210 |
| | | | 282 04 30.6 | 102 08 06.9 | Daphne (U. S. E.) | 11575.3 | 4.063531 |
| Mobile Ship Channel Light No. 16A 1910 | 30 38 01.404 | 43.2 | 39 13 25.4 | 219 12 26.3 | Dog River (U. S. E.) | 4885.8 | 3.688939 |
| | 88 01 41.258 | 1098.7 | 173 28 58.2 | 353 28 50.0 | Choctaw (U. S. E.) | 3760.6 | 3.575256 |
| | | | 249 03 43.5 | 69 05 54.5 | Apalachee (U. S. E.) | 7330.3 | 3.865119 |
| | | | 290 32 20.9 | 110 35 50.8 | Daphne (U. S. E.) | 11725.7 | 4.069140 |
| Mobile Ship Channel Light No. 3 1910 | 30 38 56.033 | 1725.5 | 31 35 40.5 | 211 34 36.2 | Dog River (U. S. E.) | 6418.5 | 3.807434 |
| | 88 01 31.004 | 825.6 | 161 11 14.7 | 341 11 01.2 | Choctaw (U. S. E.) | 2170.0 | 3.336458 |
| | | | 261 53 11.0 | 81 55 16.8 | Apalachee (U. S. E.) | 6639.7 | 3.822149 |
| | | | 298 25 45.5 | 118 29 10.2 | Daphne (U. S. E.) | 12175.5 | 4.085487 |
| Mobile Ship Channel Light No. 18 1910 | 30 38 55.377 | 1705.3 | 32 50 37.9 | 212 49 30.7 | Dog River (U. S. E.) | 6483.2 | 3.811790 |
| | 88 01 25.243 | 672.1 | 157 38 32.6 | 337 38 16.2 | Choctaw (U. S. E.) | 2242.9 | 3.350804 |
| | | | 261 31 10.8 | 81 33 13.7 | Apalachee (U. S. E.) | 6490.8 | 3.812298 |
| | | | 298 41 36.2 | 118 44 58.0 | Daphne (U. S. E.) | 12031.1 | 4.080306 |
| Mobile Ship Channel Light No. 1 [1] 1910 | 30 37 24.722 | 761.3 | 45 09 15.4 | 225 08 24.4 | Dog River (U. S. E.) | 3765.6 | 3.575831 |
| | 88 01 57.014 | 1518.7 | 179 54 47.0 | 359 54 46.8 | Choctaw (U. S. E.) | 4865.9 | 3.687162 |
| | | | 242 42 16.3 | 62 44 35.3 | Apalachee (U. S. E.) | 8176.1 | 3.912546 |
| | | | 284 40 03.9 | 104 43 41.8 | Daphne (U. S. E.) | 11784.1 | 4.071298 |
| Battery Gladden unused L. H. 1910 | 30 40 02.758 | 85.0 | 2 13 36.1 | 182 13 42.7 | Mobile Ship Channel Light No. 18 | 2076.5 | 3.317337 |
| | 88 01 22.210 | 591.1 | | | | | |
| | | | 25 33 26.8 | 205 32 18.1 | Dog River (U. S. E.) | 8337.6 | 3.921042 |
| | | | 89 57 29.3 | 269 57 11.4 | Choctaw (U. S. E.) | 934.0 | 2.970356 |
| | | | 280 00 01.5 | 100 02 04.7 | Apalachee (U. S. E.) | 6436.8 | 3.808669 |
| | | | 306 51 30.7 | 126 54 51.0 | Daphne (U. S. E.) | 13089.7 | 4.116913 |
| Mobile Ship Channel Light No. 22 1910 | 30 40 05.647 | 173.9 | 20 42 49.7 | 200 41 54.7 | Dog River (U. S. E.) | 8137.0 | 3.910464 |
| | 88 01 49.196 | 1309.7 | 67 23 58.2 | 247 23 54.0 | Choctaw (U. S. E.) | 233.4 | 2.368098 |
| | | | 279 41 58.7 | 99 44 13.8 | Apalachee (U. S. E.) | 7160.0 | 3.854910 |
| | | | 305 21 09.1 | 125 24 43.1 | Daphne (U. S. E.) | 13722.1 | 4.137421 |
| Mobile Ship Channel Light No. 20 1910 | 30 39 45.167 | 1390.9 | 27 08 43.4 | 207 07 35.0 | Dog River (U. S. E.) | 7844.1 | 3.894545 |
| | 88 01 22.889 | 609.3 | 120 34 23.2 | 300 34 05.6 | Choctaw (U. S. E.) | 1063.7 | 3.026813 |
| | | | 275 10 40.5 | 95 12 42.2 | Apalachee (U. S. E.) | 6383.2 | 3.805041 |
| | | | 304 52 02.0 | 124 55 22.6 | Daphne (U. S. E.) | 12786.4 | 4.106750 |

[1] Removed January, 1911.

*Mobile Bay*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Mobile Ship Channel Light No. 5 1910 | 30 39 46.906 | 1444.4 | 25 26 22.8 | 205 25 18.8 | Dog River (U. S. E.) | 7789.0 | 3.891481 |
| | 88 01 31.637 | 842.2 | 125 31 00.1 | 305 30 46.8 | Choctaw (U. S. E.) | 839.0 | 2.923783 |
| | | | 275 27 24.0 | 95 29 30.0 | Apalachee (U. S. E.) | 6620.1 | 3.820863 |
| | | | 304 28 23.6 | 124 31 48.6 | Daphne (U. S. E.) | 13008.5 | 4.114226 |
| Blakely (U. S. E.) 1909 | 30 41 05.567 | 171.5 | 340 36 13.7 | 160 36 26.8 | Battery Gladden unused L.H. | 2050.5 | 3.311866 |
| | 88 01 47.790 | 1272.0 | 351 29 00.5 | 171 29 12.1 | Mobile Ship Channel Light No. 18 | 4053.8 | 3.607863 |
| | | | 7 26 50.5 | 187 26 45.7 | Choctaw (U. S. E.) | 1951.4 | 3.290336 |
| Battery Mackintosh 1911 | 30 40 06.553 | 201.7 | 25 44 57.1 | 205 44 37.0 | Mobile Ship Channel Light No. 18 | 2433.4 | 3.386215 |
| | 88 00 45.540 | 1212.3 | 83 10 30.6 | 263 10 11.9 | Battery Gladden unused L. H. | 983.2 | 2.992627 |
| | | | 86 28 54.9 | 266 28 18.4 | Choctaw (U. S. E.) | 1913.7 | 3.281876 |
| | | | 137 38 44.5 | 317 38 12.7 | Blakely (U. S. E.) | 2459.3 | 3.390815 |
| Boat Clubhouse 1911 | 30 39 11.693 | 360.0 | 230 48 34.5 | 50 49 11.4 | Choctaw (U. S. E.) | 2487.7 | 3.395793 |
| | 88 03 09.717 | 258.7 | 246 14 03.6 | 66 15 17.1 | Battery Mackintosh | 4193.8 | 3.622603 |
| | | | 241 12 27.3 | 61 13 22.1 | Battery Gladden unused L. H. | 3265.7 | 3.513978 |
| Monroe Park water tower 1911 | 30 39 30.143 | 928.2 | 245 51 34.4 | 65 52 17.3 | Choctaw (U. S. E.) | 2454.5 | 3.389970 |
| | 88 03 21.429 | 570.6 | 254 52 14.7 | 74 53 34.2 | Battery Mackintosh | 4298.9 | 3.633361 |
| | | | 252 25 57.0 | 72 26 57.8 | Battery Gladden unused L. H. | 3329.0 | 3.522319 |
| Wireless 1911 | 30 41 34.333 | 1057.3 | 310 27 07.9 | 130 27 27.8 | Blakely (U. S. E.) | 1365.2 | 3.135207 |
| | 88 02 26.822 | 713.8 | 315 04 11.6 | 135 05 03.2 | Battery Mackintosh | 3817.7 | 3.581799 |
| | | | 328 37 05.0 | 148 37 38.0 | Battery Gladden unused L. H. | 3303.1 | 3.518917 |
| | | | 344 25 36.3 | 164 25 51.4 | Choctaw (U. S. E.) | 2928.2 | 3.466601 |
| Van Antwerp Building chimney 1911 | 30 41 30.313 | 933.5 | 306 05 01.6 | 126 05 21.6 | Blakely (U. S. E.) | 1293.8 | 3.111855 |
| | 88 02 27.072 | 720.5 | 313 39 22.2 | 133 40 13.9 | Battery Mackintosh | 3735.9 | 3.572394 |
| | | | 343 37 04.4 | 163 37 19.6 | Choctaw (U. S. E.) | 2811.0 | 3.448865 |
| Pinto Island, stack 1911 | 30 40 58.021 | 1786.7 | 234 12 47.7 | 54 12 53.9 | Blakely (U. S. E.) | 397.4 | 2.599208 |
| | 88 01 59.900 | 1594.3 | 329 28 31.6 | 149 28 50.9 | Battery Gladden unused L. H. | 1975.5 | 3.295686 |
| | | | 357 39 46.0 | 177 39 47.3 | Choctaw (U. S. E.) | 1703.9 | 3.231454 |
| Pinto Island, water tank 1911 | 30 40 57.640 | 1775.0 | 308 44 33.5 | 128 45 11.0 | Battery Mackintosh | 2513.5 | 3.400278 |
| | 88 01 59.182 | 1575.2 | 329 47 00.9 | 149 47 19.8 | Battery Gladden unused L. H. | 1955.7 | 3.291311 |
| | | | 358 17 38.5 | 178 17 39.5 | Choctaw (U. S. E.) | 1691.5 | 3.228281 |
| Mobile, stack, Canal and Water Streets 1911 | 30 40 57.894 | 1782.8 | 254 09 07.0 | 74 09 22.9 | Blakely (U. S. E.) | 865.4 | 2.937203 |
| | 88 02 19.067 | 507.5 | 302 24 38.8 | 122 25 26.4 | Battery Mackintosh | 2949.2 | 3.469702 |
| | | | 318 16 56.2 | 138 17 25.2 | Battery Gladden unused L. H. | 2274.5 | 3.356891 |
| | | | 341 09 21.4 | 161 09 32.5 | Choctaw (U. S. E.) | 1794.8 | 3.254014 |
| Mobile, light and power plant stack 1911 | 30 41 13.096 | 403.2 | 285 07 14.8 | 105 07 31.2 | Blakely (U. S. E.) | 888.7 | 2.948774 |
| | 88 02 20.024 | 532.9 | 324 36 09.3 | 144 36 38.8 | Battery Gladden unused L. H. | 2657.1 | 3.424405 |
| | | | 344 23 39.5 | 164 23 51.1 | Choctaw (U. S. E.) | 2249.7 | 3.352121 |

*Mobile Bay to Florida.*

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Jacob 1892 | 30 13 47.993 | 1477.9 | 55 26 44.5 | 235 24 35.9 | Sand Island front range L. H. | 8300.6 | 3.919112 |
| | 87 58 46.228 | 1236.2 | 87 35 44.5 | 267 34 25.5 | Fort Morgan | 4202.0 | 3.623454 |
| Roy 1892 | 30 13 51.766 | 1594.2 | 70 07 49.0 | 250 03 38.2 | Sand Island front range L. H. | 14176.2 | 4.151560 |
| | 87 54 43.406 | 1160.7 | 88 27 23.9 | 268 24 02.6 | Fort Morgan | 10695.4 | 4.029193 |
| | | | 88 59 30.2 | 268 57 28.1 | Jacob | 6494.2 | 3.812523 |
| Azimuth I 1892 | 30 13 43.601 | 1342.6 | 91 48 51.3 | 271 46 20.1 | Roy | 8034.11 | 3.904938 |
| | 87 49 43.103 | 1152.6 | | | | | |
| Azimuth II 1892 | 30 14 14.045 | 432.5 | 81 56 06.0 | 261 54 01.7 | Azimuth I | 6667.70 | 3.823976 |
| | 87 45 36.221 | 968.5 | | | | | |
| Azimuth III 1892 | 30 14 53.113 | 1635.5 | 80 40 34.6 | 260 38 16.9 | Azimuth II | 7410.25 | 3.869833 |
| | 87 41 02.743 | 73.3 | | | | | |

*Mobile Bay to Florida*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points*—Contd. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Azimuth IV | 30 15 02.440 | 75.1 | 84 08 52.3 | 264 07 59.6 | Azimuth III | 2813.17 | 3.449196 |
| 1892 | 87 39 18.069 | 483.0 | | | | | |
| Azimuth V | 30 15 33.294 | 1025.2 | 74 00 02.2 | 253 58 59.8 | Azimuth IV | 3445.09 | 3.537201 |
| 1892 | 87 37 14.198 | 379.5 | | | | | |
| Cotton | 30 16 20.852 | 642.1 | 74 02 25.4 | 254 00 48.9 | Azimuth V | 5321.57 | 3.726040 |
| 1889–92 | 87 34 02.802 | 74.9 | | | | | |
| Perdido Range | 30 16 45.586 | 1403.6 | 67 47 59.7 | 247 47 24.5 | Cotton | 2015.3 | 3.304332 |
| 1889 | 87 32 52.994 | 1416.3 | | | | | |
| Johnson | 30 17 36.265 | 1116.7 | 6 59 25.1 | 186 59 21.5 | Perdido Range | 1572.2 | 3.196512 |
| 1889 | 87 32 45.835 | 1224.8 | 41 32 26.0 | 221 31 47.2 | Cotton | 3102.2 | 3.491667 |
| Perdido III (Fla.) | 30 16 56.892 | 1751.9 | 83 58 47.7 | 263 57 45.5 | Perdido Range | 3314.8 | 3.520460 |
| 1889 | 87 30 49.652 | 1327.0 | 111 20 14.9 | 291 19 16.3 | Johnson | 3333.2 | 3.522866 |
| Bear Point | 30 18 03.401 | 104.7 | 357 54 26.9 | 177 54 28.3 | Perdido III | 2049.3 | 3.311614 |
| 1889 | 87 30 52.452 | 1401.6 | 53 21 56.8 | 233 20 56.0 | Perdido Range | 4024.0 | 3.604663 |
| | | | 74 35 23.5 | 254 34 26.3 | Johnson | 3142.9 | 3.497334 |
| Perdido II (Fla.) | 30 17 18.074 | 556.6 | 78 07 00.4 | 258 06 01.9 | Perdido III | 3165.4 | 3.500432 |
| 1889 | 87 28 53.751 | 1436.5 | 113 45 29.9 | 293 44 30.0 | Bear Point | 3465.5 | 3.539767 |
| Hummock (Fla.) | 30 18 50.531 | 1556.0 | 6 56 02.1 | 186 55 55.6 | Perdido II | 2867.9 | 3.457571 |
| 1889 | 87 28 40.795 | 1090.0 | 44 32 50.4 | 224 31 45.4 | Perdido III | 4909.3 | 3.691016 |
| | | | 67 35 26.3 | 247 34 19.9 | Bear Point | 3805.4 | 3.580397 |
| Goat (Fla.) | 30 17 55.764 | 1717.1 | 63 13 40.7 | 243 12 19.9 | Perdido Range | 4795.5 | 3.680836 |
| 1889 | 87 30 12.800 | 342.0 | 102 31 03.3 | 282 30 43.3 | Bear Point | 1085.3 | 3.035557 |
| | | | 235 32 35.8 | 55 33 22.2 | Hummock | 2981.2 | 3.474390 |
| Perdido I (Fla.) | 30 17 29.512 | 908.8 | 78 16 32.2 | 258 16 00.2 | Perdido II | 1732.5 | 3.238666 |
| 1889 | 87 27 50.276 | 1343.5 | 151 35 11.1 | 331 34 45.6 | Hummock | 2836.6 | 3.452796 |
| Nelson (Fla.) | 30 18 49.862 | 1535.4 | 32 23 53.0 | 212 23 23.4 | Perdido I | 2930.2 | 3.466894 |
| 1889 | 87 26 51.527 | 1376.6 | 49 08 07.2 | 229 07 05.6 | Perdido II | 4319.1 | 3.635394 |
| | | | 72 48 13.0 | 252 46 31.5 | Goat | 5630.0 | 3.750511 |
| | | | 90 24 43.2 | 270 23 48.1 | Hummock | 2919.4 | 3.465300 |
| Inerarity west (Fla.) | 30 19 00.198 | 6.1 | 16 24 57.5 | 196 24 46.5 | Goat | 2068.4 | 3.315637 |
| 1889 | 87 29 50.925 | 1360.5 | 43 13 54.1 | 223 13 23.1 | Bear Point | 2400.3 | 3.380259 |
| Rockwood | 30 18 32.651 | 1005.4 | 242 50 48.8 | 62 51 20.0 | Inerarity west | 1858.9 | 3.269265 |
| 1889 | 87 30 52.836 | 1411.7 | 316 42 50.6 | 136 43 10.8 | Goat | 1560.3 | 3.193212 |
| | | | 359 20 48.0 | 179 20 48.2 | Bear Point | 900.7 | 2.954603 |
| Ross | 30 19 11.426 | 351.8 | 280 36 39.3 | 100 37 14.1 | Inerarity west | 1876.7 | 3.273406 |
| 1889 | 87 30 59.970 | 1602.2 | 331 35 09.6 | 151 35 33.4 | Goat | 2648.9 | 3.423062 |
| | | | 350 55 47.7 | 170 55 51.3 | Rockwood | 1209.1 | 3.082460 |
| Red Bluff | 30 20 36.755 | 1131.8 | 312 05 37.2 | 132 06 46.0 | Nelson | 4909.3 | 3.691018 |
| 1889 | 87 29 07.877 | 210.4 | 347 31 34.9 | 167 31 48.6 | Hummock | 3350.0 | 3.525041 |
| | | | 21 08 51.7 | 201 08 30.1 | Inerarity west | 3187.9 | 3.503499 |
| | | | 30 37 00.6 | 210 36 08.0 | Bear Point | 5486.7 | 3.739310 |
| | | | 48 44 27.3 | 228 43 30.9 | Ross | 3983.7 | 3.600282 |
| Manuel | 30 21 37.485 | 1154.3 | 343 03 41.5 | 163 04 11.2 | Nelson | 5395.5 | 3.732035 |
| 1889 | 87 27 50.363 | 1345.0 | 14 41 11.8 | 194 40 46.3 | Hummock | 5314.5 | 3.725466 |
| | | | 33 37 41.6 | 213 36 40.8 | Inerarity west | 5816.2 | 3.764636 |
| | | | 36 26 05.0 | 216 24 33.1 | Bear Point | 8192.5 | 3.913417 |
| | | | 47 54 45.5 | 227 54 06.4 | Red Bluff | 2789.8 | 3.445566 |
| Dupont (Fla.) | 30 21 56.308 | 1733.9 | 6 46 30.4 | 186 46 17.5 | Nelson | 5781.6 | 3.762045 |
| 1889 | 87 26 25.998 | 694.2 | 32 11 43.3 | 212 10 35.3 | Hummock | 6759.3 | 3.829904 |
| | | | 45 16 51.2 | 225 15 07.9 | Inerarity west | 7705.1 | 3.886777 |
| | | | 55 15 55.4 | 235 13 37.3 | Ross | 8906.5 | 3.949709 |
| | | | 60 28 26.2 | 240 27 04.5 | Red Bluff | 4969.0 | 3.696270 |
| | | | 75 34 41.1 | 255 33 58.5 | Manuel | 2326.3 | 3.366660 |
| Suarez | 30 22 54.134 | 1667.0 | 331 01 00.5 | 151 01 19.2 | Dupont | 2035.5 | 3.308671 |
| 1889 | 87 27 02.933 | 78.3 | 28 13 14.2 | 208 12 50.2 | Manuel | 2678.6 | 3.427900 |
| Nix (Fla.) | 30 23 26.709 | 822.5 | 22 08 42.8 | 202 08 21.4 | Dupont | 3005.4 | 3.477898 |
| 1890 | 87 25 43.573 | 1163.3 | 45 11 45.9 | 225 10 41.9 | Manuel | 4772.1 | 3.678710 |
| | | | 64 40 14.9 | 244 39 34.8 | Suarez | 2344.2 | 3.369997 |
| Chagrin | 30 24 16.026 | 493.5 | 332 09 04.2 | 152 09 19.4 | Nix | 1717.5 | 3.234898 |
| 1890 | 87 26 13.626 | 363.7 | 4 23 27.5 | 184 23 21.3 | Dupont | 4315.0 | 3.634981 |
| | | | 27 34 02.8 | 207 33 37.9 | Suarez | 2844.6 | 3.454021 |
| Cummings (Fla.) | 30 24 07.334 | 225.8 | 11 11 23.0 | 191 11 18.3 | Nix | 1275.2 | 3.105579 |
| 1890 | 87 25 34.303 | 915.7 | 18 53 17.3 | 198 52 51.2 | Dupont | 4264.2 | 3.629840 |
| | | | 46 23 42.8 | 226 22 58.0 | Suarez | 3267.9 | 3.514270 |
| | | | 104 18 29.4 | 284 18 09.5 | Chagrin | 1083.2 | 3.034723 |
| Grassy | 30 25 23.150 | 712.9 | 47 01 45.4 | 227 00 12.1 | Suarez | 6730.4 | 3.828038 |
| 1890 | 87 23 58.484 | 1560.8 | 47 36 53.6 | 227 36 05.1 | Cummings | 3462.8 | 3.539430 |
| | | | 60 11 41.1 | 240 10 32.7 | Chagrin | 4157.2 | 3.618805 |
| Double (Fla.) | 30 24 40.782 | 1255.8 | 72 50 02.2 | 252 48 59.0 | Cummings | 3488.0 | 3.542575 |
| 1890 | 87 23 29.456 | 786.1 | 80 08 34.8 | 260 07 11.8 | Chagrin | 4447.8 | 3.648148 |
| | | | 149 17 57.2 | 329 17 42.5 | Grassy | 1517.4 | 3.181088 |

*Mobile Bay to Florida*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points*—Contd. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| River east (Fla.) | 30 27 13.511 | 416.0 | 10 08 26.0 | 190 08 10.0 | Double | 4777.6 | 3.679211 |
| 1890 | 87 22 57.941 | 1545.9 | 25 25 46.9 | 205 25 16.2 | Grassy | 3762.8 | 3.575510 |
| River west | 30 26 47.335 | 1457.6 | 214 29 39.8 | 34 29 50.3 | River east | 978.0 | 2.990337 |
| 1890 | 87 23 18.701 | 499.0 | 4 12 46.5 | 184 12 41.0 | Double | 3907.5 | 3.591902 |
| | | | 22 16 21.6 | 202 16 01.3 | Grassy | 2801.3 | 3.447353 |
| Boom (Fla.) | 30 27 08.692 | 267.7 | 264 56 52.9 | 84 57 24.8 | River east | 1686.5 | 3.226983 |
| 1891 | 87 24 00.908 | 24.2 | 300 16 54.5 | 120 17 15.9 | River west | 1304.1 | 3.115308 |
| Squid | 30 27 01.259 | 38.8 | 224 00 20.2 | 44 00 24.4 | Boom | 318.2 | 2.502711 |
| 1891 | 87 24 09.194 | 245.3 | 258 46 14.1 | 78 46 50.2 | River east | 1938.1 | 3.287377 |
| | | | 287 39 04.0 | 107 39 29.6 | River west | 1413.8 | 3.150387 |
| Juniper | 30 27 14.003 | 431.2 | 281 59 28.5 | 101 59 43.1 | Boom | 787.1 | 2.896016 |
| 1891 | 87 24 29.765 | 796.1 | 305 33 50.7 | 125 34 01.1 | Squid | 674.7 | 2.829111 |
| Hirse (Fla.) | 30 27 33.054 | 1017.8 | 310 35 32.3 | 130 35 48.9 | Boom | 1152.9 | 3.061798 |
| 1891 | 87 24 33.722 | 899.6 | 326 14 25.8 | 146 14 38.2 | Squid | 1177.6 | 3.071012 |
| | | | 349 47 53.6 | 169 47 55.6 | Juniper | 596.1 | 2.775302 |
| Hard (Fla.) | 30 27 36.924 | 1137.0 | 282 01 55.1 | 102 02 05.7 | Hirse | 571.6 | 2.757123 |
| 1891 | 87 24 54.678 | 1464.2 | 316 43 07.3 | 136 43 19.9 | Juniper | 969.5 | 2.986559 |
| Wire | 30 27 33.799 | 1040.8 | 247 18 57.4 | 67 19 01.8 | Hard | 249.5 | 2.397139 |
| 1891 | 87 25 03.308 | 88.2 | 271 39 46.8 | 91 40 01.8 | Hirse | 789.7 | 2.897437 |
| | | | 304 15 34.5 | 124 15 51.5 | Juniper | 1082.8 | 3.034553 |
| Steamboat (Fla.) | 30 27 58.030 | 1787.0 | 317 47 48 | 137 47 59 | Hard | 877.3 | 2.94317 |
| 1891 | 87 25 16.770 | 447.4 | 334 17 52 | 154 17 58 | Wire | 828.1 | 2.91807 |
| Roots | 30 28 08.606 | 265.0 | 293 25 02 | 113 25 17 | Steamboat | 819.4 | 2.91350 |
| 1891 | 87 25 44.957 | 1199.3 | 306 01 38 | 126 02 04 | Hard | 1658.6 | 3.21973 |
| | | | 313 58 04 | 133 58 25 | Wire | 1543.8 | 3.18858 |
| Kee (Fla.) | 30 28 12.344 | 380.1 | 305 05 16 | 125 05 28 | Steamboat | 766.8 | 2.88467 |
| 1891 | 87 25 40.291 | 1074.8 | 311 52 11 | 131 52 33 | Hard | 1634.1 | 3.21327 |
| | | | 320 15 54 | 140 16 11 | Wire | 1543.4 | 3.18848 |
| | | | 47 14 16 | 227 14 13 | Roots | 169.5 | 2.22927 |
| Alabama Cut-off | 30 28 28.393 | 874.3 | 323 06 12 | 143 06 19 | Kee | 618.0 | 2.79096 |
| 1891 | 87 25 54.199 | 1445.7 | 337 58 15 | 157 58 19 | Roots | 657.3 | 2.81776 |
| Florida Cut-off (Fla.) | 30 28 32.796 | 1009.9 | 347 55 25 | 167 55 28 | Kee | 644.1 | 2.80892 |
| 1891 | 87 25 45.342 | 1209.5 | 359 12 35 | 179 12 35 | Roots | 745.0 | 2.87214 |
| | | | 60 08 43 | 240 08 39 | Alabama Cut-off | 272.4 | 2.43521 |
| Titi | 30 28 45.514 | 1401.5 | 301 04 51 | 121 05 03 | Florida Cut-off | 758.6 | 2.88000 |
| 1891 | 87 26 09.699 | 258.7 | 321 53 53 | 141 54 01 | Alabama Cut-off | 670.0 | 2.82607 |
| Bay (Fla.) | 30 28 46.825 | 1441.9 | 308 47 55 | 128 48 05 | Florida Cut-off | 689.4 | 2.83848 |
| 1891 | 87 26 05.486 | 146.3 | 332 03 31 | 152 03 36 | Alabama Cut-off | 642.5 | 2.80786 |
| | | | 70 14 48 | 250 14 46 | Titi | 119.4 | 2.07701 |
| Log | 30 28 58.436 | 1799.4 | 358 40 41 | 178 40 41 | Bay | 357.6 | 2.55345 |
| 1891 | 87 26 05.795 | 154.6 | 14 39 52 | 194 39 50 | Titi | 411.3 | 2.61416 |
| Goat 2 (Fla.) | 30 17 56.004 | 1724.5 | 81 23 10.3 | 261 21 54.6 | Johnson | 4053.3 | 3.607809 |
| 1911 | 87 30 15.868 | 424.0 | 200 08 46.6 | 20 09 20.9 | Red Bluff | 5272.7 | 3.722035 |
| | | | 236 31 49.1 | 56 32 37.1 | Hummock | 3045.1 | 3.483597 |
| | | | 275 08 50.7 | 95 08 52.3 | Goat | 82.32 | 1.915505 |
| Ross 2 | 30 19 12.494 | 384.7 | 229 22 47.8 | 49 23 45.0 | Red Bluff | 3986.0 | 3.600537 |
| 1911 | 87 31 01.153 | 30.8 | 332 48 25.6 | 152 48 48.5 | Goat 2 | 2647.9 | 3.422908 |
| Inerarity west 2 (Fla.) | 30 18 59.392 | 1828.9 | 200 46 45.3 | 20 47 06.7 | Red Bluff | 3206.7 | 3.506060 |
| 1911 | 87 29 50.470 | 1348.4 | 19 10 23.3 | 199 10 10.5 | Goat 2 | 2066.5 | 3.315236 |
| | | | 102 03 52.6 | 282 03 16.9 | Ross 2 | 1931.0 | 3.285784 |
| Bear Point 2 | 30 18 03.558 | 109.6 | 211 01 31.2 | 31 02 24.7 | Red Bluff | 5505.3 | 3.740783 |
| 1911 | 87 30 54.114 | 1446.0 | 224 40 50.5 | 44 41 22.6 | Inerarity west 2 | 2418.2 | 3.383490 |
| | | | 247 53 27.0 | 67 54 34.3 | Hummock | 3844.7 | 3.584857 |
| | | | 282 49 11.5 | 102 49 30.8 | Goat 2 | 1048.1 | 3.020404 |
| | | | 74 17 07.9 | 254 16 11.5 | Johnson | 3101.5 | 3.491567 |
| Inlet (Fla.) | 30 17 03.169 | 97.6 | 117 05 39.0 | 297 05 01.4 | Johnson | 2238.0 | 3.349853 |
| 1911 | 87 31 31.279 | 835.9 | 208 06 15.6 | 28 06 34.4 | Bear Point 2 | 2108.1 | 3.323900 |
| | | | 216 57 41.2 | 36 58 32.0 | Inerarity west 2 | 4479.3 | 3.651211 |
| | | | 231 04 50.3 | 51 05 28.4 | Goat 2 | 2590.0 | 3.413300 |
| Ala | 30 16 43.910 | 1352.1 | 196 34 10.7 | 16 34 19.7 | Johnson | 1682.0 | 3.225824 |
| 1911 | 87 33 03.785 | 101.2 | 234 42 08.7 | 54 43 14.1 | Bear Point 2 | 4245.4 | 3.627921 |
| | | | 256 30 18.4 | 76 31 05.0 | Inlet | 2542.5 | 3.405255 |
| *Supplementary points* | | | | | | | |
| North Range (Fla.) | 30 16 41.715 | 1284.5 | 95 56 19.8 | 275 56 07.6 | Ala | 653.4 | 2.815164 |
| | 87 32 39.470 | 1054.9 | 174 13 02.7 | 354 12 59.5 | Johnson | 1688.3 | 3.227452 |
| | | | 250 04 14.9 | 70 04 49.3 | Inlet | 1938.5 | 3.287471 |
| South Range (Fla.) | 30 16 40.737 | 1254.4 | 98 21 02.3 | 278 20 49.8 | Ala | 673.0 | 2.828005 |
| | 87 32 38.872 | 1038.9 | 173 47 20.8 | 353 47 16.8 | Johnson | 1719.9 | 3.235515 |
| | | | 249 04 13.0 | 69 04 47.1 | Inlet | 1934.1 | 3.286472 |

*Mobile Bay to Florida*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| 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 06.8 | 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 | 51 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 |
| | | | 159 19 27.5 | 339 19 05.1 | Chagrin | 3336.8 | 3.523336 |
| Fell 1890 | 30 24 00.169 | 5.2 | 263 59 23.3 | 84 00 03.1 | Cummings | 2109.2 | 3.324125 |
| | 87 26 52.886 | 1411.7 | 299 06 19.7 | 119 06 54.8 | Nix | 2117.8 | 3.325895 |
| | | | 349 20 19.1 | 169 20 32.8 | Dupont | 3881.0 | 3.588946 |
| | | | 7 30 55.6 | 187 30 50.5 | Suarez | 2051.0 | 3.311974 |
| May 1890 | 30 25 04.553 | 140.2 | 284 17 08.4 | 104 18 02.9 | Double | 2964.9 | 3.472009 |
| | 87 25 17.104 | 456.5 | 14 36 18.6 | 194 36 09.9 | Cummings | 1820.8 | 3.260256 |
| | | | 45 16 40.0 | 225 16 11.4 | Chagrin | 2123.4 | 3.327035 |
| Cove (Fla.)[1] 1890 | 30 23 53.43 | 1645.3 | 191 24 08 | 11 24 18 | Grassy | 2818.5 | 3.45002 |
| | 87 24 19.36 | 516.8 | 222 24 38 | 42 25 03 | Double | 1975.1 | 3.29559 |
| Fish house southeast gable 1890 | 30 24 59.65 | 1836.7 | 278 45 00 | 98 46 11 | Double | 3815.3 | 3.58153 |
| | 87 25 50.74 | 1354.2 | 344 46 05 | 164 46 13 | Cummings | 1669.6 | 3.22262 |
| Powell (Fla.) 1890 | 30 24 59.975 | 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 |
| | | | 154 54 06.0 | 334 53 29.5 | River east | 4540.9 | 3.657143 |
| Head (Fla.) 1890 | 30 26 51.322 | 1580.4 | 14 27 12.8 | 194 26 56.0 | Powell | 3540.8 | 3.549096 |
| | 87 21 12.634 | 337.1 | 42 15 33.9 | 222 14 24.6 | Double | 5430.5 | 3.734837 |
| | | | 58 28 58.7 | 238 27 34.7 | Grassy | 5192.1 | 3.715343 |
| | | | 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 |
| Hester (Fla.) 1890 | 30 24 52.170 | 1606.5 | 80 03 24.5 | 260 02 46.6 | Double | 2029.7 | 3.307439 |
| | 87 22 14.553 | 388.4 | 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 |
| | | | 252 38 15.4 | 72 38 30.0 | Powell | 805.5 | 2.906085 |
| Marcus (Fla.) 1890 | 30 26 10.618 | 327.0 | 40 15 32.9 | 220 14 57.9 | Powell | 2850.4 | 3.454899 |
| | 87 20 36.730 | 980.2 | 59 02 35.8 | 239 01 08.2 | Double | 5376.0 | 3.730462 |
| | | | 74 49 30.7 | 254 47 48.4 | Grassy | 5578.9 | 3.746550 |
| | | | 104 40 17.8 | 284 38 55.8 | River west | 4467.3 | 3.650046 |
| Millview Seminole Mill smokestack (Fla.) 1890 | 30 25 12.469 | 384.0 | 73 50 41.9 | 253 49 38.0 | Double | 3505.0 | 3.544685 |
| | 87 21 23.325 | 622.4 | 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 |
| Millview schoolhouse flagstaff (Fla.) 1890 | 30 25 23.327 | 718.3 | 121 58 14.5 | 301 56 55.8 | River west | 4887.1 | 3.689051 |
| | 87 20 43.320 | 1156.1 | 133 22 30.0 | 313 21 21.8 | River east | 4941.2 | 3.693833 |
| | | | 163 53 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 | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| 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 56.6 | 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 06 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 | 19540.6 | 4.290938 |

*Mississippi Sound and Lake Borgne*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points*—Contd. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Petit | 30 12 35.506 | 1093.3 | 177 10 19.9 | 357 10 08.3 | Grand | 12457.4 | 4.095427 |
| 1910 | 88 25 13.482 | 360.6 | 210 19 27.8 | 30 22 48.2 | Pins | 21007.5 | 4.322375 |
| | | | 258 51 49.0 | 78 57 02.4 | Dauphin Island west base | 16962.2 | 4.229483 |
| Horn | 30 13 40.012 | 1232.1 | 238 09 26.5 | 58 14 44.7 | Grand | 19843.0 | 4.297607 |
| 1910 | 88 36 07.460 | 199.5 | 276 26 00.9 | 96 31 30.1 | Petit | 17601.9 | 4.245560 |
| Pascagoula | 30 20 40.572 | 1249.3 | 281 25 13.8 | 101 29 06.6 | Grand | 12561.4 | 4.099038 |
| 1910 | 88 33 17.372 | 464.0 | 319 04 38.7 | 139 08 42.7 | Petit | 19757.6 | 4.295734 |
| | | | 19 21 12.3 | 199 19 46.5 | Horn | 13724.7 | 4.137504 |
| Belle | 30 20 31.850 | 980.8 | 268 59 36.8 | 89 04 38.6 | Pascagoula | 15955.5 | 4.202910 |
| 1910 | 88 43 14.658 | 391.5 | 317 58 25.3 | 138 02 00.8 | Horn | 17063.7 | 4.232074 |
| Club | 30 15 11.973 | 368.7 | 178 28 35.8 | 358 28 30.8 | Belle | 9853.4 | 3.993584 |
| 1910 | 88 43 04.851 | 129.7 | 237 09 17.4 | 57 14 13.8 | Pascagoula | 18676.7 | 4.271301 |
| | | | 284 12 29.8 | 104 16 00.0 | Horn | 11513.6 | 4.061212 |
| Deer | 30 21 27.210 | 837.9 | 281 01 08.0 | 101 03 53.2 | Belle | 8900.6 | 3.949421 |
| 1910 | 88 48 41.749 | 1114.9 | 322 03 18.4 | 142 06 08.4 | Club | 14647.2 | 4.165755 |
| | | | 42 46 59.5 | 222 42 19.2 | Ship Island L. H. | 21881.6 | 4.340080 |
| | | | 115 21 21.8 | 295 18 38.9 | Biloxi L. H. | 9514.5 | 3.978387 |
| Ship | 30 15 10.016 | 308.4 | 67 47 18.9 | 247 43 53.7 | Ship Island L. H. | 11770.3 | 4.070786 |
| 1910 | 88 51 10.027 | 268.1 | 163 31 26.4 | 343 29 58.6 | Biloxi L. H. | 16358.6 | 4.213746 |
| | | | 198 49 29.8 | 18 50 44.6 | Deer | 12272.0 | 4.088914 |
| | | | 232 00 25.6 | 52 04 25.3 | Belle | 16111.2 | 4.207129 |
| | | | 269 41 59.6 | 89 46 04.0 | Club | 12970.9 | 4.112969 |
| Monk | 30 21 01.577 | 48.6 | 343 03 56.0 | 163 04 57.9 | Club | 11252.7 | 4.051256 |
| 1910 | 88 45 07.453 | 199.1 | 41 51 08.7 | 221 48 05.8 | Ship | 14527.7 | 4.162197 |
| | | | 97 52 02.7 | 277 50 14.4 | Deer | 5777.3 | 3.761724 |
| Bill | 30 22 19.320 | 594.9 | 305 37 54.8 | 125 38 58.0 | Monk | 4108.3 | 3.613663 |
| 1910 | 88 47 12.479 | 333.2 | 56 03 39.7 | 236 02 54.6 | Deer | 2873.6 | 3.458424 |
| | | | 102 41 12.9 | 282 37 44.8 | Biloxi L. H. | 11255.9 | 4.051379 |
| Marsh | 30 23 10.189 | 313.7 | 302 31 43.4 | 122 32 29.9 | Bill | 2912.5 | 3.464271 |
| 1910 | 88 48 44.444 | 1186.6 | 358 41 59.7 | 178 42 01.1 | Deer | 3171.8 | 3.501311 |
| Ox | 30 22 11.954 | 368.1 | 219 38 17.3 | 39 38 45.4 | Marsh | 2328.7 | 3.367117 |
| 1910 | 88 49 40.088 | 1070.5 | 266 41 46.4 | 86 43 01.0 | Bill | 3948.0 | 3.596374 |
| | | | 311 29 08.9 | 131 29 38.4 | Deer | 2079.7 | 3.318009 |
| Plum | 30 24 37.607 | 1158.0 | 314 39 29.0 | 134 40 20.6 | Marsh | 3829.3 | 3.583122 |
| 1910 | 88 50 26.469 | 706.5 | 344 33 47.3 | 164 34 10.8 | Ox | 4652.9 | 3.667722 |
| Cad | 30 24 22.285 | 686.2 | 256 12 10.1 | 76 12 46.5 | Plum | 1979.0 | 3.296444 |
| 1910 | 88 51 38.473 | 1026.9 | 295 31 46.9 | 115 33 14.9 | Marsh | 5149.0 | 3.711719 |
| | | | 321 46 12.9 | 141 47 12.8 | Ox | 5108.4 | 3.708286 |
| Fort | 30 25 25.961 | 799.4 | 320 32 32.1 | 140 32 55.3 | Plum | 1928.4 | 3.285198 |
| 1910 | 88 51 12.383 | 330.5 | 19 33 13.1 | 199 32 59.9 | Cad | 2080.7 | 3.318219 |
| Can | 30 25 19.362 | 596.2 | 264 54 54.6 | 84 55 38.0 | Fort | 2295.4 | 3.360855 |
| 1910 | 88 52 38.054 | 1015.6 | 290 05 56.5 | 110 07 03.1 | Plum | 3739.9 | 3.572865 |
| | | | 317 51 26.3 | 137 51 56.5 | Cad | 2370.2 | 3.374786 |
| Barn | 30 24 43.927 | 1352.7 | 191 14 16.8 | 11 14 20.9 | Can | 1112.5 | 3.046301 |
| 1910 | 88 52 46.178 | 1232.5 | 242 39 05.5 | 62 39 53.0 | Fort | 2818.1 | 3.449963 |
| | | | 272 58 39.3 | 92 59 50.0 | Plum | 3734.1 | 3.572181 |
| Ship Island L. H. | 30 12 48.449 | 1491.9 | 105 18 24.1 | 285 15 18.8 | Cat Island | 10203.0 | 4.008726 |
| 1855 | 88 57 56.096 | 1500.3 | 160 49 54.4 | 340 47 53.1 | Mississippi City | 19552.1 | 4.291194 |
| | | | 247 24 31.0 | 67 26 50.4 | Ship Island | 8020.2 | 3.904186 |
| Biloxi L. H. | 30 23 39.419 | 1213.8 | 295 44 59.9 | 115 47 20.5 | Deer Island 1 | 8248.9 | 3.916395 |
| 1855 | 88 54 03.820 | 102.0 | 355 58 23.7 | 175 58 46.2 | Ship Island | 17008.6 | 4.230668 |
| | | | 17 13 12.5 | 197 11 15.3 | Ship Island L. H. | 20984.0 | 4.321888 |
| | | | 42 47 00.4 | 222 41 57.4 | Cat Island | 23632.2 | 4.373504 |
| | | | 82 54 08.4 | 262 50 09.2 | Mississippi City | 12718.9 | 4.104450 |
| Ship Island L. H. (new) | 30 12 45.341 | 1396.2 | 197 12 19.7 | 17 14 17.6 | Biloxi L. H. | 21086.2 | 4.323998 |
| 1902 | 88 57 57.464 | 1536.8 | 200 18 41.0 | 20 18 41.7 | Ship Island L. H., 1855 | 101.1 | 2.004599 |
| Wharf | 30 21 13.257 | 408.2 | 255 38 18.8 | 75 43 52.8 | Biloxi L. H. | 18203.0 | 4.260144 |
| 1902 | 89 05 04.383 | 117.1 | 323 51 30.1 | 143 55 05.4 | Ship Island L. H. (new) | 19359.6 | 4.286896 |
| Gulfport front light | 30 21 23.493 | 723.4 | 256 51 30.3 | 76 57 11.0 | Biloxi L. H. | 18474.9 | 4.266581 |
| 1902 | 89 05 17.750 | 474.1 | 311 26 39.9 | 131 26 46.6 | Wharf | 476.2 | 2.677812 |
| | | | 323 33 38.4 | 143 37 20.4 | Ship Island L. H. (new) | 19824.9 | 4.297212 |
| Pitcher Point | 30 19 57.555 | 1772.3 | 253 32 35.5 | 73 35 25.2 | Gulfport Front Light | 9354.2 | 3.971008 |
| 1903 | 89 10 53.668 | 1433.6 | 302 37 31.4 | 122 44 02.7 | Ship Island L. H. (new) | 24648.8 | 4.391796 |
| Cat Island L. H. | 30 13 50.605 | 1558.3 | 170 17 51.4 | 350 17 14.9 | Pitcher Point | 11463.5 | 4.059317 |
| 1903 | 89 09 41.344 | 1105.5 | 206 46 48.9 | 26 49 01.8 | Gulfport Front Light | 15623.7 | 4.193783 |
| | | | 208 28 57.7 | 28 31 17.3 | Wharf | 15510.3 | 4.190619 |

*Mississippi Sound and Lake Borgne*—Continued

| Station | Latitude and longitude | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Principal points*—Contd. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Merrills Shell Bank L. H. | 30 14 28.347 | 872.9 | 212 32 04.3 | 32 34 06.4 | Pitcher Point | 12026.4 | 4.080137 |
| 1903 | 89 14 55.799 | 1492.0 | 277 50 51.5 | 97 53 29.9 | Cat Island L. H., 1903 | 8488.0 | 3.928807 |
| Cabbage | 30 09 49.234 | 1516.1 | 148 37 11.4 | 328 35 32.7 | Merrills Shell Bank L. H. | 10068.5 | 4.002963 |
| 1903 | 89 11 39.713 | 1062.6 | 203 03 59.1 | 23 04 58.6 | Cat Island L. H., 1903 | 8078.7 | 3.907339 |
| Grand Pass | 30 07 32.258 | 993.4 | 177 40 30.7 | 357 40 20.9 | Merrills Shell Bank L. H. | 12822.8 | 4.107984 |
| 1903 | 89 14 36.345 | 972.9 | 214 05 44.5 | 34 08 12.8 | Cat Island L. H., 1903 | 14071.8 | 4.148350 |
| | | | 228 14 51.4 | 48 16 20.1 | Cabbage | 6335.3 | 3.801769 |
| Turkey | 30 05 39.636 | 1220.5 | 198 06 58.4 | 18 08 38.5 | Merrills Shell Bank L. H. | 17130.6 | 4.233773 |
| 1903 | 89 18 15.023 | 402.3 | 239 20 42.1 | 59 22 31.8 | Grand Pass | 6804.6 | 3.832802 |
| Grand Island | 30 07 47.950 | 1476.6 | 233 54 39.7 | 53 59 58.1 | Merrills Shell Bank L. H. | 20953.0 | 4.321246 |
| 1903 | 89 25 29.081 | 778.4 | 288 44 51.8 | 108 48 29.6 | Turkey | 12273.9 | 4.088984 |
| Three Mile | 30 03 14.493 | 446.3 | 144 21 29.0 | 324 19 35.9 | Grand Island | 10363.1 | 4.015490 |
| 1903 | 89 21 43.479 | 1164.8 | 231 18 28.8 | 51 20 13.3 | Turkey | 7151.4 | 3.854391 |
| Bayou | 30 03 44.333 | 1365.2 | 195 05 57.7 | 15 06 35.6 | Grand Island | 7769.8 | 3.890409 |
| 1903 | 89 26 44.695 | 1197.2 | 276 28 32.9 | 96 31 03.7 | Three Mile | 8120.7 | 3.909595 |
| Lake Borgne L. H. | 30 10 25.143 | 774.2 | 249 55 13.7 | 70 01 41.4 | Merrills Shell Bank L. H. | 21868.9 | 4.339827 |
| 1903 | 89 27 44.006 | 1177.4 | 323 16 05.5 | 143 17 13.3 | Grand Island | 6038.7 | 3.780944 |
| | | | 352 39 53.6 | 172 40 23.4 | Bayou | 12443.3 | 4.094937 |
| Malheureux Point 2 | 30 04 49.735 | 1531.5 | 117 03 40.8 | 296 58 40.2 | East Rigolets unused L. H. | 18000.6 | 4.255287 |
| 1909 | 89 29 04.950 | 132.6 | 226 28 12.9 | 46 30 01.2 | Grand Island | 7969.8 | 3.901448 |
| | | | 298 11 08.1 | 118 12 18.4 | Bayou | 4262.2 | 3.629637 |
| Lake Borgne L. H. | 30 10 25.204 | 776.1 | 249 55 26.7 | 70 01 53.0 | Merrills Shell Bank L. H. | 21866.8 | 4.339786 |
| 1909 | 89 27 43.949 | 1175.9 | 323 17 27.0 | 143 18 34.7 | Grand Island | 6039.3 | 3.780990 |
| | | | 352 40 23.0 | 172 40 52.7 | Bayou | 12445.1 | 4.094997 |
| | | | 11 51 36.9 | 191 50 56.2 | Malheureux Point 2 | 10554.9 | 4.023453 |
| Pearl River L. H. | 30 09 39.493 | 1216.1 | 255 35 29.4 | 75 37 12.5 | Lake Borgne L. H. | 5662.2 | 3.752987 |
| 1909 | 89 31 08.919 | 238.7 | 290 39 52.1 | 110 42 42.8 | Grand Island | 9722.1 | 3.987758 |
| | | | 339 35 18.4 | 159 36 20.6 | Malheureux Point 2 | 9519.4 | 3.978609 |
| | | | 86 40 51.4 | 266 36 52.7 | East Rigolets unused L. H. | 12733.7 | 4.104956 |
| Biloxi Bayou | 29 59 46.854 | 1442.7 | 152 50 08.6 | 332 47 20.4 | East Rigolets unused L. H. | 19677.9 | 4.293978 |
| 1909 | 89 33 28.250 | 757.2 | 191 32 48.8 | 11 33 58.7 | Pearl River L. H. | 18625.9 | 4.270118 |
| | | | 217 05 08.4 | 37 07 20.2 | Malheureux Point 2 | 11693.6 | 4.067950 |
| Creole | 30 08 16.772 | 516.4 | 160 07 34.1 | 340 06 16.3 | Merrills Shell Bank L. H. | 12167.0 | 4.085183 |
| 1909 | 89 12 21.102 | 564.8 | 202 33 54.8 | 22 35 15.1 | Cat Island L. H. | 11132.5 | 4.046593 |
| Pitre | 30 10 05.792 | 178.4 | 52 35 42.8 | 232 34 20.5 | Creole | 5524.9 | 3.742325 |
| 1909 | 89 09 37.128 | 993.4 | 133 30 30.8 | 313 27 50.5 | Merrills Shell Bank L. H. | 11747.9 | 4.069959 |
| | | | 179 04 00.8 | 359 03 58.7 | Cat Island L. H. | 6923.4 | 3.840319 |
| Spit | 30 11 21.525 | 662.8 | 67 35 09.2 | 247 33 23.0 | Pitre | 6112.1 | 3.786194 |
| 1909 | 89 06 05.952 | 159.2 | 128 33 52.4 | 308 32 04.0 | Cat Island L. H. | 7366.1 | 3.867235 |
| | | | 112 07 56.8 | 292 03 30.1 | Merrills Shell Bank L. H. | 15293.5 | 4.184508 |
| Middle | 30 12 43.447 | 1337.8 | 349 42 29.0 | 169 42 37.3 | Spit | 2563.8 | 3.408880 |
| 1909 | 89 06 23.076 | 617.1 | 46 55 56.8 | 226 54 19.2 | Pitre | 7107.3 | 3.851706 |
| | | | 111 19 13.4 | 291 17 33.6 | Cat Island L. H. | 5691.2 | 3.755204 |
| South | 30 13 37.997 | 1170.1 | 294 06 56.5 | 114 08 07.3 | Middle | 4109.6 | 3.613799 |
| 1909 | 89 08 43.322 | 1158.5 | 314 56 34.7 | 134 57 53.9 | Spit | 5947.7 | 3.774348 |
| | | | 12 25 31.3 | 192 25 04.2 | Pitre | 6690.9 | 3.825485 |
| North | 30 13 52.545 | 1618.0 | 325 34 17.4 | 145 35 17.4 | Spit | 5637.2 | 3.751066 |
| 1909 | 89 08 05.093 | 136.2 | 66 20 20.3 | 246 20 01.1 | South | 1116.1 | 3.047704 |
| | | | 95 45 40.7 | 275 42 13.9 | Merrills Shell Bank L. H. | 11036.9 | 4.042847 |
| *Supplementary points.* | | | | | | | |
| Ran | 30 20 00.695 | 21.4 | 76 01 13.4 | 255 58 53.0 | Cat | 7656.9 | 3.884055 |
| 1910 | 88 07 50.817 | 1357.4 | 212 21 44.6 | 32 22 02.2 | Cedar | 1735.8 | 3.239501 |
| | | | 318 20 20.1 | 138 23 35.5 | Fort Morgan | 15592.0 | 4.192902 |
| | | | 3 49 51.8 | 183 49 40.0 | Dauphin Island east base | 9391.7 | 3.972742 |
| Jules house, gable [1] | 30 20 16.98 | 522.9 | 252 02 36 | 72 03 32 | Cedar | 3130.3 | 3.495583 |
| 1910 | 88 09 07.52 | 200.9 | 351 47 48 | 171 48 14 | Dauphin Island east base | 9974.2 | 3.998877 |

[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 |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Heron | 30 19 46.643 | 1436.3 | 75 16 39.6 | 255 14 57.6 | Cat | 5580.7 | 3.746685 |
| 1910 | 88 09 06.901 | 184.3 | 237 19 30.0 | 57 20 26.0 | Cedar | 3518.0 | 3.546203 |
| | | | 351 03 22.5 | 171 03 49.0 | Dauphin Island east base | 9047.9 | 3.956549 |
| Pear | 30 18 45.926 | 1414.2 | 93 48 28.4 | 273 46 20.1 | Cat | 6809.0 | 3.833081 |
| 1910 | 88 08 14.631 | 390.9 | 202 33 14.1 | 22 33 43.7 | Cedar | 4080.7 | 3.610737 |
| | | | 359 55 32.4 | 179 55 32.6 | Dauphin Island east base | 7068.3 | 3.849318 |
| Gull | 30 17 53.411 | 1644.7 | 107 14 46.9 | 287 12 41.0 | Cat | 6979.1 | 3.843801 |
| 1910 | 88 08 19.444 | 519.6 | 197 27 26.8 | 17 27 58.8 | Cedar | 5645.8 | 3.751722 |
| | | | 358 33 05.5 | 178 33 08.1 | Dauphin Island east base | 5453.0 | 3.736637 |
| Grant (flag) | 30 17 35.020 | 1078.4 | 110 23 13.2 | 290 20 59.2 | Cat | 7566.2 | 3.878877 |
| 1910 | 88 08 03.465 | 92.6 | 192 01 00.1 | 12 01 24.0 | Cedar | 6085.3 | 3.784282 |
| | | | 3 23 23.9 | 183 23 18.4 | Dauphin Island east base | 4893.5 | 3.689623 |
| Grant house, south gable | 30 17 34.830 | 1072.5 | 110 25 41.1 | 290 23 27.1 | Cat | 7568.4 | 3.879006 |
| 1910 | 88 08 03.456 | 92.4 | 192 00 11.1 | 12 00 35.0 | Cedar | 6091.0 | 3.784688 |
| | | | 3 23 48.2 | 183 23 42.7 | Dauphin Island east base | 4887.7 | 3.689103 |
| Grants Pass, house, west gable [1] | 30 17 35.74 | 1100.6 | 303 54 48 | 123 58 09 | Fort Morgan | 12877.7 | 4.10984 |
| 1897 | 88 08 02.88 | 77.0 | 3 33 19 | 183 33 13 | Dauphin Island east base | 4916.8 | 3.69168 |
| Grants Pass Beacon 14 | 30 17 27.950 | 860.7 | 295 35 17.0 | 115 36 11.6 | Little Dauphin | 3210.7 | 3.506600 |
| 1910 | 88 08 51.182 | 1367.8 | 348 03 59.9 | 168 04 18.5 | Dauphin Island east base | 4770.3 | 3.678547 |
| | | | 116 07 20.2 | 296 05 30.3 | Cat | 6479.2 | 3.811522 |
| Grants Pass Beacon 12 | 30 17 29.006 | 893.2 | 298 41 52.4 | 118 42 41.3 | Little Dauphin | 2955.7 | 3.470657 |
| 1910 | 88 08 39.838 | 1064.6 | 351 43 48.4 | 171 44 01.3 | Dauphin Island east base | 4749.1 | 3.676615 |
| | | | 114 44 26.4 | 294 42 30.8 | Cat | 6739.0 | 3.828598 |
| Grants Pass Beacon 10 | 30 17 30.057 | 925.5 | 302 22 57.1 | 122 23 40.3 | Little Dauphin | 2710.6 | 3.433073 |
| 1910 | 88 08 28.483 | 761.2 | 355 24 53.3 | 175 25 00.5 | Dauphin Island east base | 4747.3 | 3.676451 |
| | | | 113 27 44.7 | 293 25 43.4 | Cat | 7002.8 | 3.845273 |
| Grants Pass Beacon 8 | 30 17 31.020 | 955.2 | 306 16 13.2 | 126 16 51.3 | Little Dauphin | 2504.1 | 3.398653 |
| 1910 | 88 08 18.373 | 491.0 | 358 41 10.0 | 178 41 12.1 | Dauphin Island east base | 4763.0 | 3.677885 |
| | | | 112 23 50.5 | 292 21 44.1 | Cat | 7240.1 | 3.859745 |
| Grants Pass Beacon 6 | 30 17 32.247 | 993.0 | 312 13 32.4 | 132 14 04.0 | Little Dauphin | 2260.6 | 3.354231 |
| 1910 | 88 08 05.469 | 146.1 | 2 48 44.6 | 182 48 40.2 | Dauphin Island east base | 4805.4 | 3.681727 |
| | | | 111 08 10.1 | 291 05 57.2 | Cat | 7546.4 | 3.877738 |
| Grants Pass Beacon 4 | 30 17 36.874 | 1135.4 | 319 37 29.7 | 139 37 56.3 | Little Dauphin | 2181.3 | 3.338724 |
| 1910 | 88 07 55.705 | 1488.6 | 5 44 26.3 | 185 44 16.9 | Dauphin Island east base | 4967.0 | 3.696090 |
| | | | 109 27 26.6 | 289 25 08.7 | Cat | 7741.7 | 3.888836 |
| Grants Pass Beacon 2 | 30 17 45.608 | 1404.4 | 326 25 37.6 | 146 26 01.8 | Little Dauphin | 2317.3 | 3.364982 |
| 1910 | 88 07 50.781 | 1357.0 | 6 52 36.1 | 186 52 24.3 | Dauphin Island east base | 5248.7 | 3.720054 |
| | | | 107 16 04.3 | 287 13 44.0 | Cat | 7781.9 | 3.891083 |
| Bar | 30 19 11.187 | 344.5 | 330 31 04.6 | 150 32 28.2 | Dauphin Island east base | 9012.3 | 3.954836 |
| 1910 | 88 11 00.190 | 5.1 | 34 41 07.5 | 214 39 11.1 | Dauphin Island west base | 10846.2 | 4.035278 |
| | | | 82 08 03.9 | 262 07 19.1 | Cat | 2393.2 | 3.378986 |
| Mid | 30 14 49.606 | 1527.5 | 80 50 26.7 | 260 48 45.8 | Dauphin Island west base | 5430.3 | 3.734826 |
| 1910 | 88 11 30.527 | 816.1 | 168 35 05.1 | 348 34 35.7 | Cat | 7883.0 | 3.896693 |
| | | | 267 42 35.6 | 87 44 14.5 | Dauphin Island east base | 5250.7 | 3.720216 |
| Tree | 30 20 24.483 | 753.9 | 48 46 21.3 | 228 45 25.6 | Cat | 3921.4 | 3.593438 |
| 1910 | 88 10 38.535 | 1029.3 | 106 09 12.3 | 286 05 10.9 | Pins | 13280.0 | 4.123197 |
| | | | 262 15 40.6 | 82 17 22.9 | Cedar | 5458.4 | 3.737064 |
| Y Tree | 30 20 37.941 | 1168.3 | 44 36 45.8 | 224 35 49.9 | Cat | 4212.5 | 3.624542 |
| 1910 | 88 10 38.189 | 1020.0 | 104 24 41.9 | 284 20 40.3 | Pins | 13179.7 | 4.119904 |
| | | | 266 36 07.0 | 86 37 49.1 | Cedar | 5408.9 | 3.733112 |
| Herb | 30 19 19.491 | 600.2 | 138 08 11.7 | 318 06 35.2 | Pins | 7639.8 | 3.883082 |
| 1910 | 88 15 25.307 | 670.1 | 277 02 46.2 | 97 04 15.3 | Cat | 4748.2 | 3.676529 |
| | | | 354 17 49.4 | 174 18 06.7 | Dauphin Island west base. | 9221.8 | 3.964815 |

[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 |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| 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 36.574 | 976.7 | 53 40 40.1 | 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 | 364.6 | 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 37.9 | 174 44 48.9 | Herb | 6366.6 | 3.803910 |
| | | | 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 | 206 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 | 5590.3 | 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. | 17062.9 | 4.232053 |
| | | | 46 45 37.2 | 226 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 | 4663.3 | 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 | 324 52 47.9 | 144 53 13.2 | Bat | 2321.5 | 3.365775 |
| | | | 33 52 47.3 | 213 51 22.6 | Grand | 8035.4 | 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 23.6 | 225 49 09.8 | Lost | 5441.4 | 3.735711 |
| Clear | 30 21 26.445 | 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 | 16511.2 | 4.217779 |
| | | | 22 42 57.6 | 202 42 30.0 | Lost | 3785.5 | 3.578126 |
| Brown | 30 20 29.673 | 913.7 | 317 20 36.9 | 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 | 3.321775 |

[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 |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| 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 16.561 | 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 | 4.052812 |
| 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 43.1 | 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 | 4.146131 |
| | | | 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 | 286 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 | 264 23 38.0 | Grave | 7212.6 | 3.858090 |
| Keeper's house, south chimney[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 |
| | | | 129 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 | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Cut | 30 14 01.332 | 41.0 | 152 57 11.3 | 332 55 15.3 | Belle | 13503.6 | 4.130450 |
| 1910 | 88 39 24.767 | 662.3 | 218 35 13.7 | 38 38 19.0 | Pascagoula | 15733.2 | 4.196817 |
| | | | 226 26 29.5 | 46 28 37.3 | Round Island L. H. | 9347.6 | 3.970701 |
| Shoe | 30 14 06.142 | 189.1 | 79 20 36.9 | 259 20 22.0 | Cut | 636.1 | 2.803526 |
| 1910 | 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 | 30 15 16.953 | 522.0 | 87 44 53.9 | 267 43 12.2 | Ship | 5402.8 | 3.732618 |
| 1910 | 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 | 30 23 22.908 | 705.4 | 312 38 06.1 | 132 38 46.3 | Bill | 2890.6 | 3.460985 |
| 1910 | 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 | 2840.2 | 3.453354 |
| | | | 40 01 58.7 | 220 01 52.4 | Marsh | 511.5 | 2.708860 |
| Greenhouse, chimney | 30 23 50.353 | 1550.5 | 354 01 46.0 | 174 01 48.4 | Marsh | 1243.5 | 3.094653 |
| 1910 | 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] | 30 22 32.19 | 991.2 | 274 47 38.9 | 94 49 08.2 | Bill | 4731.3 | 3.674978 |
| 1910 | 88 50 09.05 | 241.6 | 308 51 55.8 | 128 52 10.5 | Ox | 993.2 | 2.997033 |
| Ocean Springs hotel, northwestern end of ridge piece on roof | 30 24 21.274 | 655.1 | 323 08 31.6 | 143 09 02.7 | Marsh | 2735.6 | 3.437052 |
| 1910 | 88 49 45.906 | 1225.3 | 342 16 22.1 | 162 16 54.6 | Deer | 5627.0 | 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 | 30 23 25.632 | 789.3 | 215 25 37.0 | 35 26 06.9 | Plum | 2720.0 | 3.434576 |
| 1910 | 88 51 25.541 | 681.9 | 276 17 53.7 | 96 19 15.2 | Marsh | 4327.1 | 3.636195 |
| | | | 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 | 30 23 24.603 | 757.6 | 215 40 07.5 | 35 40 38.1 | Plum | 2767.3 | 3.442050 |
| 1910 | 88 51 26.922 | 718.7 | 275 49 52.0 | 95 51 14.2 | Marsh | 4360.4 | 3.639526 |
| | | | 286 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] | 30 23 29.02 | 893.6 | 276 33 56.3 | 96 35 31.6 | Marsh | 5061.8 | 3.704303 |
| 1910 | 88 51 52.80 | 1409.6 | 285 58 56.4 | 106 01 18.2 | Bill | 7785.9 | 3.891307 |
| Eastern cupola | 30 23 31.451 | 968.5 | 219 06 41.9 | 39 07 13.3 | Plum | 2625.6 | 3.419234 |
| 1910 | 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 | 3.856606 |
| | | | 310 12 27.3 | 130 13 22.2 | Ox | 3791.4 | 3.578796 |
| Western cupola | 30 23 31.268 | 962.8 | 219 16 29.1 | 39 17 00.8 | Plum | 2639.0 | 3.421444 |
| 1910 | 88 51 29.059 | 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 | 30 24 30.028 | 924.7 | 76 28 00.2 | 256 27 41.4 | Cad | 1018.7 | 3.008055 |
| 1910 | 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 | 30 24 42.042 | 1294.6 | 72 09 08.4 | 252 08 32.6 | Cad | 1984.4 | 3.297637 |
| 1910 | 88 50 27.706 | 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 | 30 24 58.847 | 1812.1 | 56 21 50.3 | 236 21 18.2 | Cad | 2032.3 | 3.307989 |
| 1910 | 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 | 30 25 40.012 | 1232.1 | 35 22 50.3 | 215 22 17.7 | Cad | 2973.2 | 3.473221 |
| 1910 | 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 | 30 25 48.143 | 1482.5 | 40 51 10.0 | 220 50 58.8 | Fort | 903.0 | 2.955696 |
| 1910 | 88 50 50.250 | 1341.0 | 57 25 27.3 | 237 24 28.6 | Barn | 3671.9 | 3.564886 |
| | | | 72 53 09.8 | 252 52 15.2 | Can | 3010.4 | 3.478621 |
| East chimney | 30 25 29.086 | 895.7 | 273 28 43.0 | 93 29 13.0 | Fort | 1583.9 | 3.199718 |
| 1910 | 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] | 30 25 13.46 | 414.5 | 262 19 37.7 | 82 20 03.3 | Can | 1362.0 | 3.134193 |
| 1910 | 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] | 30 24 43.95 | 1353.4 | 229 42 42.9 | 49 43 07.3 | Can | 1686.4 | 3.226971 |
| 1910 | 88 53 26.26 | 700.9 | 250 05 14.0 | 70 06 21.8 | Fort | 3799.9 | 3.579776 |
| Sawmill stack | 30 24 43.371 | 1335.5 | 164 23 38.4 | 344 23 38.3 | Barn | 17.8 | 1.249508 |
| 1910 | 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 | Seconds in meters | Azimuth | Back azimuth | To station | Distance | Logarithm |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Fertilizer-factory cupola | 30 24 51.158 | 1575.3 | 187 37 23.8 | 7 37 26.0 | Can | 876.2 | 2.942626 |
| 1910 | 88 52 42.409 | 1131.9 | 245 57 17.8 | 65 58 03.4 | Fort | 2630.9 | 3.420102 |
| | | | 297 30 49.6 | 117 31 22.0 | Cad | 1924.3 | 3.284262 |
| Planing-mill stack | 30 24 41.670 | 1283.2 | 181 02 23.1 | 1 02 23.5 | Can | 1160.8 | 3.064774 |
| 1910 | 88 52 38.843 | 1036.8 | 239 24 33.2 | 59 25 17.0 | Fort | 2680.5 | 3.428210 |
| | | | 272 01 08.0 | 92 02 15.0 | Plum | 3535.4 | 3.548443 |
| Small leaning stack | 30 24 41.671 | 1283.2 | 106 59 48.9 | 286 59 44.6 | Barn | 237.6 | 2.375832 |
| 1910 | 88 52 37.665 | 1005.3 | 179 29 15.0 | 359 29 14.8 | Can | 1160.7 | 3.064707 |
| | | | 239 03 52.0 | 59 04 35.2 | Fort | 2653.4 | 3.423808 |
| Stack, in operation | 30 24 37.090 | 1142.1 | 133 27 48.7 | 313 27 44.5 | Barn | 306.1 | 2.485820 |
| 1910 | 88 52 37.855 | 1010.4 | 179 45 57.5 | 359 45 57.4 | Can | 1301.7 | 3.114517 |
| | | | 236 34 51.6 | 56 35 34.9 | Fort | 2732.9 | 3.436619 |
| Stack near water tower [1] | 30 23 55.40 | 1705.9 | 199 07 26.3 | 19 07 43.3 | Can | 2736.7 | 3.437223 |
| 1910 | 88 53 11.65 | 311.0 | 228 46 15.4 | 48 47 15.8 | Fort | 4232.1 | 3.626559 |
| Biloxi water tower | 30 23 55.507 | 1709.2 | 314 50 19.9 | 134 55 25.8 | Club | 22846.0 | 4.358810 |
| 1910 | 88 53 10.818 | 288.8 | 348 42 49.1 | 168 43 50.1 | Ship | 16499.9 | 4.217482 |
| | | | 70 42 21.4 | 250 41 54.0 | Biloxi L. H. | 1499.1 | 3.175828 |
| Cook | 30 14 31.144 | 959.0 | 66 41 58.7 | 246 39 36.4 | Ship Island L. H. | 8229.8 | 3.915388 |
| 1910 | 88 53 14.846 | 396.9 | 175 34 18.9 | 355 33 54.2 | Biloxi L. H. | 16933.6 | 4.228748 |
| | | | 235 15 19.2 | 55 20 21.8 | Belle | 19509.5 | 4.290246 |
| | | | 250 15 32.2 | 70 16 35.1 | Ship | 3545.3 | 3.549650 |
| Ship Island water tank | 30 13 43.257 | 1332.0 | 75 13 39.4 | 255 11 32.2 | Ship Island L. H. | 6985.9 | 3.844225 |
| 1910 | 88 53 44.892 | 1200.5 | 178 25 23.7 | 358 25 14.1 | Biloxi L. H. | 18364.4 | 4.263977 |
| | | | 209 32 01.7 | 29 34 34.6 | Deer | 16423.3 | 4.215460 |
| | | | 233 11 47.7 | 53 17 05.4 | Belle | 21023.5 | 4.322706 |
| | | | 237 09 33.6 | 57 10 51.6 | Ship | 4927.7 | 3.692643 |
| | | | 260 53 07.9 | 80 58 30.2 | Club | 17329.6 | 4.238789 |
| East Ballast Ground beacon, B G [1] | 30 13 13.36 | 411.4 | 79 15 30.1 | 259 14 04.6 | Ship Island L. H. | 4623.4 | 3.664960 |
| 1910 | 88 55 07.62 | 203.8 | 231 31 58.3 | 51 32 55.1 | Cook | 3851.2 | 3.585591 |
| West Ballast Ground beacon, B G [1] | 30 13 11.15 | 343.3 | 72 36 44.3 | 252 35 56.6 | Ship Island L. H. | 2658.1 | 3.424575 |
| 1910 | 88 56 22.62 | 604.9 | 243 51 16.5 | 63 52 51.1 | Cook | 5592.7 | 3.747621 |
| Chandeleur L. H. | 30 02 52.412 | 1613.8 | 153 33 31.0 | 333 30 40.5 | Ship Island L. H. | 20394.6 | 4.309515 |
| 1910 | 88 52 17.910 | 479.8 | 184 34 06.2 | 4 34 40.3 | Ship | 22784.8 | 4.357645 |
| | | | 212 58 58.7 | 33 03 36.5 | Club | 27159.7 | 4.433925 |
| Biloxi Harbor Light, A | 30 22 28.692 | 883.5 | 181 30 38.3 | 1 30 39.3 | Biloxi L. H. | 2178.7 | 3.338190 |
| 1910 | 88 54 05.971 | 159.4 | 282 18 43.2 | 102 21 27.1 | Deer | 8862.4 | 3.947552 |
| | | | 340 47 59.0 | 160 49 27.8 | Ship | 14302.6 | 4.155414 |
| | | | 354 41 21.0 | 174 41 46.7 | Cook | 14768.3 | 4.169330 |
| Biloxi Harbor Light, B | 30 23 04.087 | 125.9 | 181 27 09.5 | 1 27 10.0 | Biloxi L. H. | 1088.4 | 3.036774 |
| 1910 | 88 54 04.854 | 129.6 | 289 03 03.2 | 109 05 46.6 | Deer | 9128.7 | 3.960411 |
| | | | 342 14 43.0 | 162 16 11.3 | Ship | 15326.9 | 4.185455 |
| | | | 355 09 40.9 | 175 10 06.1 | Cook | 15851.3 | 4.200064 |
| Biloxi Harbor Light, C | 30 23 11.830 | 364.3 | 178 33 50.9 | 358 33 50.4 | Biloxi L. H. | 849.8 | 2.929322 |
| 1910 | 88 54 03.022 | 80.7 | 290 33 37.8 | 110 36 20.2 | Deer | 9163.5 | 3.962063 |
| | | | 342 41 07.3 | 162 42 34.6 | Ship | 15539.6 | 4.191439 |
| | | | 355 24 24.6 | 175 24 48.8 | Cook | 16084.9 | 4.206418 |
| Biloxi Harbor Light, D | 30 23 19.446 | 598.8 | 162 51 32.9 | 342 51 29.3 | Biloxi L. H. | 643.6 | 2.808627 |
| 1910 | 88 53 56.715 | 1514.1 | 292 19 04.8 | 112 21 44.0 | Deer | 9092.5 | 3.958683 |
| | | | 343 31 36.8 | 163 33 01.0 | Ship | 15715.1 | 4.196316 |
| | | | 356 03 48.6 | 176 04 09.7 | Cook | 16306.3 | 4.212356 |
| Gulfport Channel Light, No. 2 | 30 16 12.625 | 388.8 | 218 14 38.9 | 38 18 04.1 | Biloxi L. H. | 17524.6 | 4.243647 |
| 1910 | 89 00 50.175 | 1341.1 | 277 02 43.7 | 97 07 36.1 | Ship | 15627.7 | 4.193896 |
| | | | 284 21 57.1 | 104 25 46.5 | Cook | 12567.1 | 4.099234 |
| | | | 324 06 09.6 | 144 07 36.5 | Ship Island L. H. | 7878.0 | 3.896418 |
| Gulfport Channel Light, No. 4 | 30 16 59.724 | 1839.1 | 224 02 31.0 | 44 06 16.3 | Biloxi L. H. | 17131.0 | 4.233782 |
| 1910 | 89 01 29.929 | 799.9 | 281 28 47.1 | 101 33 59.6 | Ship | 16910.8 | 4.228163 |
| | | | 289 02 09.1 | 109 06 18.6 | Cook | 14002.8 | 4.146214 |
| | | | 324 02 11.2 | 144 03 58.2 | Ship Island L. H. | 9675.9 | 3.985691 |
| Gulfport Channel Light, No. 6 | 30 17 49.998 | 1539.6 | 230 27 50.3 | 50 31 57.2 | Biloxi L. H. | 16915.0 | 4.228273 |
| 1910 | 89 02 12.486 | 333.7 | 293 02 25.8 | 113 06 56.8 | Cook | 15621.0 | 4.193709 |
| | | | 323 58 29.2 | 144 00 37.7 | Ship Island L. H. | 11596.8 | 4.064338 |
| Gulfport Channel Light, No. 8 | 30 18 53.386 | 1643.9 | 238 39 31.8 | 58 44 05.9 | Biloxi L. H. | 16952.3 | 4.229228 |
| 1910 | 89 03 06.180 | 165.1 | 297 01 20.8 | 117 06 19.0 | Cook | 17748.1 | 4.249152 |
| | | | 323 55 02.4 | 143 57 38.0 | Ship Island L. H. | 14019.2 | 4.146724 |
| Gulfport Channel Light, No. 10 | 30 20 01.348 | 41.5 | 247 13 07.2 | 67 18 10.5 | Biloxi L. H. | 17372.4 | 4.239859 |
| 1910 | 89 04 03.810 | 101.8 | 300 20 10.9 | 120 25 38.2 | Cook | 20104.1 | 4.303285 |
| | | | 323 52 10.8 | 143 55 15.5 | Ship Island L. H. | 16617.2 | 4.220559 |
| Gulfport powerhouse stack | 30 21 51.684 | 1591.5 | 259 57 51.6 | 80 03 48.5 | Biloxi L. H. | 19130.9 | 4.281735 |
| 1910 | 89 05 49.485 | 1321.4 | 303 52 39.4 | 123 59 00.2 | Cook | 24302.7 | 4.385654 |
| | | | 323 06 12.8 | 143 10 10.9 | Ship Island L. H. | 21027.3 | 4.322784 |

[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 |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Gulfport Southern Hotel cupola [1] 1909 | 30 21 13.75<br>89 05 05.10 | 423.4<br>136.3 | 28 25 56<br>51 42 08 | 208 23 37<br>231 37 10 | Cat Island L. H.<br>Merrills Shell Bank L. H. | 15514.4<br>20124.3 | 4.190736<br>4.303721 |
| Jesuits' Rest cupola [1] 1909 | 30 20 05.72<br>89 10 43.72 | 176.3<br>1168.0 | 351 46 57<br>32 58 45 | 171 47 29<br>212 56 38 | Cat Island L. H.<br>Merrills Shell Bank L. H. | 11670.6<br>12381.7 | 4.067093<br>4.092781 |
| Pass Christian Catholic church spire [1] 1909 | 30 18 54.56<br>89 14 42.16 | 1680.2<br>1126.5 | 319 18 51<br>2 32 47 | 139 21 23<br>182 32 40 | Cat Island L. H.<br>Merrills Shell Bank L. H. | 12339.0<br>8205.5 | 4.091281<br>3.914106 |
| Bay St. Louis St. Stanislaus College, highest cupola 1909 | 30 18 23.261<br>89 19 42.232 | 716.3<br>1128.4 | 297 33 17<br>313 21 18<br>25 23 34<br>41 13 07 | 117 38 21<br>133 23 43<br>205 20 40<br>221 09 04 | Cat Island L. H.<br>Merrills Shell Bank L. H.<br>Grand Island<br>Lake Borgne L. H. | 18123.6<br>10532.7<br>21650.5<br>19559.8 | 4.258244<br>4.022539<br>4.335467<br>4.291364 |
| Bay St. Louis Church, bell tower 1909 | 30 18 27.623<br>89 19 39.588 | 850.6<br>1057.7 | 298 02 07<br>314 08 52<br>25 24 35<br>41 06 58 | 118 07 08<br>134 11 14<br>205 21 39<br>221 02 54 | Cat Island L. H.<br>Merrills Shell Bank L. H.<br>Grand Island<br>Lake Borgne L. H. | 18123.7<br>10574.6<br>21802.1<br>19707.4 | 4.258247<br>4.024262<br>4.338498<br>4.294629 |
| East 1909 | 30 09 01.451<br>89 12 08.886 | 44.7<br>237.8 | 156 05 28.8<br>203 53 48.5<br>243 59 00.1 | 336 04 04.8<br>23 55 02.7<br>64 00 16.2 | Merrills Shell Bank L. H.<br>Cat Island L. H.<br>Pitre | 11011.6<br>9739.3<br>4518.5 | 4.041852<br>3.988526<br>3.654990 |
| West 1909 | 30 08 33.079<br>89 12 41.740 | 1018.6<br>1117.2 | 161 51 33.3<br>206 15 27.9<br>239 57 54.1 | 341 50 25.9<br>26 16 58.6<br>59 59 26.7 | Merrills Shell Bank L. H.<br>Cat Island L. H.<br>Pitre | 11512.3<br>10903.5<br>5705.8 | 4.061161<br>4.037564<br>3.756319 |
| Shell 1909 | 30 10 07.196<br>89 10 16.796 | 221.6<br>449.4 | 187 50 46.3<br>137 09 28.7<br>44 22 53.6 | 7 51 04.1<br>317 07 08.3<br>224 21 51.1 | Cat Island L. H.<br>Merrills Shell Bank L. H.<br>Creole | 6944.3<br>10970.6<br>4756.8 | 3.841628<br>4.040229<br>3.677313 |
| Malheureux Point [1] 1903 | 30 04 49.57<br>89 29 05.80 | 1526.5<br>155.2 | 226 33 20<br>297 58 57 | 46 35 09<br>118 00 08 | Grand Island<br>Bayou | 7989.7<br>4279.8 | 3.902531<br>3.631425 |
| St. Joseph Island Beacon 1909 | 30 11 03.135<br>89 25 32.957 | 96.5<br>881.7 | 249 36 35.3<br>359 00 39.2<br>26 16 55.7<br>74 02 08.1 | 69 41 55.9<br>179 00 41.2<br>206 15 09.3<br>253 59 19.3 | Merrills Shell Bank L. H.<br>Grand Island<br>Malheureux Point 2<br>Pearl River L. H. | 18174.6<br>6011.0<br>12821.7<br>9350.6 | 4.259465<br>3.778947<br>4.107944<br>3.970841 |
| Miss 1909 | 30 11 43.618<br>89 26 45.472 | 1343.1<br>1216.3 | 344 15 46.2<br>16 20 11.7<br>61 32 56.9 | 164 16 24.6<br>196 19 01.7<br>241 30 44.5 | Grand Island<br>Malheureux Point 2<br>Pearl River L. H. | 7539.1<br>13279.8<br>8017.9 | 3.877319<br>4.123190<br>3.904063 |
| Heron 1909 | 30 10 38.159<br>89 27 52.917 | 1175.0<br>1415.8 | 323 41 42.8<br>10 11 36.3<br>71 00 26.4 | 143 42 55.1<br>190 11 00.2<br>250 58 47.9 | Grand Island<br>Malheureux Point 2<br>Pearl River L. H. | 6502.7<br>10900.5<br>5546.8 | 3.813094<br>4.037447<br>3.744041 |
| Moon 1909 | 30 08 26.161<br>89 26 00.255 | 805.6<br>6.8 | 36 35 16.5<br>105 18 36.0<br>142 52 54.2 | 216 33 43.9<br>285 16 01.0<br>322 52 02.1 | Malheureux Point 2<br>Pearl River L. H.<br>Lake Borgne L. H. | 8298.3<br>8563.5<br>4597.4 | 3.918990<br>3.932649<br>3.662513 |
| Half 1909 | 30 08 43.210<br>89 24 54.374 | 1330.5<br>1455.3 | 43 02 11.0<br>99 50 08.8<br>124 41 59.3 | 223 00 05.2<br>279 47 00.6<br>304 40 34.1 | Malheureux Point 2<br>Pearl River L. H.<br>Lake Borgne L. H. | 9832.9<br>10172.0<br>5518.5 | 3.992682<br>4.007405<br>3.741823 |
| Pearl 1909 | 30 10 51.276<br>89 31 51.402 | 1578.9<br>1375.2 | 276 53 47.4<br>298 51 39.8<br>338 10 35.1 | 96 55 51.8<br>118 54 51.8<br>158 11 58.6 | Lake Borgne L. H.<br>Grand Island<br>Malheureux Point 2 | 6669.0<br>11685.1<br>11991.0 | 3.824060<br>4.067631<br>4.078855 |
| River 1909 | 30 10 58.856<br>89 31 47.960 | 1812.3<br>1283.1 | 279 00 06.2<br>300 04 41.8<br>338 59 15.0 | 99 02 08.9<br>120 07 52.1<br>159 00 36.9 | Lake Borgne L. H.<br>Grand Island<br>Malheureux Point 2 | 6610.1<br>11719.7<br>12174.6 | 3.820205<br>4.068917<br>4.085456 |
| Start 1909 | 30 09 05.242<br>89 25 39.361 | 161.4<br>1053.4 | 34 59 22.3<br>96 50 32.5<br>126 27 25.9 | 214 57 39.2<br>276 47 47.0<br>306 26 23.4 | Malheureux Point 2<br>Pearl River L. H.<br>Lake Borgne L. H. | 9601.6<br>8881.9<br>4144.5 | 3.982343<br>3.948506<br>3.617467 |
| Pearl River Beacon B 1909 | 30 10 23.147<br>89 31 25.509 | 712.8<br>682.4 | 269 22 19.4<br>296 35 10.2<br>339 51 46.9 | 89 24 10.8<br>116 38 09.2<br>159 52 57.4 | Lake Borgne L. H.<br>Grand Island<br>Malheureux Point 2 | 5928.3<br>10668.7<br>10934.1 | 3.772932<br>4.028111<br>4.038784 |
| Dunbar factory lower stack 1909 | 30 10 59.593<br>89 33 21.618 | 1835.1<br>578.2 | 276 39 42<br>294 59 02<br>304 46 41<br>328 52 54 | 96 42 31<br>115 03 00<br>124 47 47<br>148 55 03 | Lake Borgne L. H.<br>Grand Island<br>Pearl River L. H.<br>Malheureux Point 2 | 9095.9<br>13954.3<br>4323.1<br>13300.4 | 3.958848<br>4.144708<br>3.635797<br>4.123866 |
| Dunbar Church spire 1909 | 30 10 59.192<br>89 33 13.245 | 1822.7<br>354.3 | 276 45 04.8<br>295 19 58.5<br>306 24 36.2<br>329 41 21.3 | 96 47 50.3<br>115 23 51.7<br>126 25 38.7<br>149 43 25.9 | Lake Borgne L. H.<br>Grand Island<br>Pearl River L. H.<br>Malheureux Point 2 | 8872.0<br>13746.3<br>4133.7<br>13175.3 | 3.948021<br>4.138185<br>3.616340<br>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 |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Con. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Rigolets Church spire 1909 | 30 08 50.153 | 1544.4 | 262 46 57.0 | 82 50 43.2 | Pearl River L. H. | 12145.7 | 4.084421 |
| | 89 38 39.216 | 1049.5 | 295 40 17.6 | 115 45 05.7 | Malheureux Point 2 | 17063.5 | 4.232068 |
| | | | 333 30 42.8 | 153 33 18.6 | Biloxi Bayou | 18687.5 | 4.271552 |
| Rigolets factory highest stack 1909 | 30 08 50.730 | 1562.2 | 262 45 15.5 | 82 48 58.2 | Pearl River L. H. | 11956.1 | 4.077589 |
| | 89 38 32.160 | 860.7 | 296 00 15.2 | 116 04 59.8 | Malheureux Point 2 | 16901.3 | 4.227920 |
| | | | 334 03 26.3 | 154 05 58.6 | Biloxi Bayou | 18620.1 | 4.269982 |
| L. & N. drawbridge, Pearl River center light 1909 | 30 11 40.061 | 1233.6 | 288 20 25.7 | 108 22 36.3 | Lake Borgne L. H. | 7318.1 | 3.864399 |
| | 89 32 03.572 | 95.6 | 338 29 56.2 | 158 30 23.7 | Pearl River L. H. | 3990.1 | 3.600983 |
| | | | 339 15 40.6 | 159 17 10.3 | Malheureux Point 2 | 13509.0 | 4.130623 |
| L. & N. drawbridge, Rigolets, center light 1909 | 30 09 14.741 | 453.9 | 265 56 29.1 | 85 59 52.2 | Pearl River L. H. | 10844.5 | 4.035211 |
| | 89 37 53.172 | 1422.9 | 299 57 00.6 | 120 01 25.7 | Malheureux Point 2 | 16326.3 | 4.212889 |
| | | | 337 53 46.8 | 157 55 59.6 | Biloxi Bayou | 18870.7 | 4.275789 |
| Rabbitt Island Shoal Beacon 1909 | 30 07 49.844 | 1534.9 | 116 45 33.3 | 296 43 55.4 | East Rigolets unused L. H. | 5847.9 | 3.767002 |
| | 89 35 48.835 | 1307.2 | | | | | |
| | | | 245 43 10.4 | 65 45 31.0 | Pearl River L. H. | 8217.1 | 3.914718 |
| | | | 297 07 24.0 | 117 10 46.6 | Malheureux Point 2 | 12152.8 | 4.084676 |
| Long Point L. H. 1909 | 30 08 50.469 | 1554.0 | 258 09 19.6 | 78 11 35.0 | Pearl River L. H. | 7366.0 | 3.867233 |
| | 89 35 38.332 | 1025.8 | 305 06 45.0 | 125 10 02.4 | Malheureux Point 2 | 12878.6 | 4.109870 |
| | | | 348 14 00.4 | 168 15 05.6 | Biloxi Bayou | 17097.5 | 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 | 266.7 | Apalacha River 1848 | 30 39 46.73 | 1439.0 |
| | 87 43 00.73 | 19.5 | | 87 57 19.92 | 530.4 |
| East Gulf Shore, 1868 1868 | 30 14 32.23 | 992.4 | Little Point Clear 2 1846 | 30 15 27.37 | 842.8 |
| | 87 43 18.25 | 488.0 | | 87 57 01.51 | 40.4 |
| Bon Secours Harbor 1849 | 30 17 44.78 | 1378.9 | Upper Tensaw 1848 | 30 44 40.98 | 1262.0 |
| | 87 45 42.25 | 1129.1 | | 87 57 33.00 | 877.8 |
| New Bon Secours Harbor 1848 | 30 17 45.33 | 1395.8 | Azimuth 1 1847 | 30 13 50.53 | 1555.9 |
| | 87 45 42.46 | 1134.7 | | 87 57 36.72 | 982.0 |
| West Gulf Shore 1849 | 30 13 47.96 | 1476.8 | Mobile Beach 1846 | 30 13 50.15 | 1544.2 |
| | 87 48 17.34 | 463.7 | | 87 57 37.45 | 1001.5 |
| West Gulf Shore, 1869 1869 | 30 13 47.89 | 1474.6 | Navy Cove 1846 | 30 14 39.81 | 1225.8 |
| | 87 48 17.33 | 463.4 | | 87 57 45.17 | 1207.7 |
| Cypress Point 1849 | 30 19 57.43 | 1768.4 | Middle Tensaw 1848 | 30 43 06.66 | 205.1 |
| | 87 48 35.24 | 941.4 | | 87 58 40.97 | 1090.0 |
| Shell Bank Bayou 1849 | 30 15 07.76 | 239.0 | Tensaw River 1848 | 30 41 29.50 | 908.5 |
| | 87 49 41.07 | 1097.9 | | 87 59 34.63 | 921.6 |
| Azimuth 3 1847 | 30 13 40.21 | 1238.2 | Crab Creek 1848 | 30 42 57.06 | 1757.2 |
| | 87 50 25.79 | 689.7 | | 87 59 55.00 | 1463.6 |
| Fish River 1848 | 30 22 52.97 | 1631.1 | Beach A 1847 | 30 13 28.98 | 892.4 |
| | 87 51 39.25 | 1048.0 | | 88 00 38.59 | 1032.0 |
| Oyster Cove 1848 | 30 14 19.82 | 610.3 | Spanish River 1848 | 30 43 26.26 | 808.7 |
| | 87 52 31.54 | 843.3 | | 88 01 01.82 | 48.4 |
| Alabama City 1848 | 30 31 48.30 | 1487.3 | Mobile Point L. H., 1868 1868 | 30 13 39.43 | 1214.1 |
| | 87 54 26.41 | 704.1 | | 88 01 27.17 | 726.6 |
| Azimuth 2 1847 | 30 13 52.04 | 1602.5 | Mobile Point 1847 | 30 13 18.73 | 576.7 |
| | 87 54 35.43 | 947.5 | | 88 01 21.90 | 585.6 |
| Blakely 1848 | 30 44 10.04 | 309.1 | Mobile Point L. H., 1846–47 1846 | 30 13 39.59 | 1219.1 |
| | 87 55 51.30 | 1364.6 | | 88 01 26.70 | 714.0 |
| Minetta Bay 1848 | 30 42 22.96 | 707.1 | Mobile River 1848 | 30 46 14.81 | 456.1 |
| | 87 55 56.95 | 1515.4 | | 88 01 38.15 | 1014.5 |
| Little Point Clear 1846 | 30 15 44.86 | 1381.3 | Opposite Mobile Island 1848 | 30 41 56.58 | 1742.4 |
| | 87 56 05.24 | 140.1 | | 88 02 05.25 | 139.7 |
| Middle Apalacha 1848 | 30 42 44.87 | 1381.8 | Opposite Chickasaw Bayou 1848 | 30 44 20.81 | 640.8 |
| | 87 56 28.41 | 756.0 | | 88 02 20.62 | 548.5 |

| Station | Latitude and longitude | Seconds in meters | Station | Latitude and longitude | Seconds in meters |
|---|---|---|---|---|---|
| | ° ′ ″ | | | ° ′ ″ | |
| St. Louis Point<br>1848 | 30 43 58.59<br>88 02 45.00 | 1804.3<br>1197.2 | Round Island L. H.<br>1855 | 30 17 24.51<br>88 35 07.55 | 754.7<br>201.8 |
| Barton Academy, Mobile<br>1848 | 30 41 17.65<br>88 02 51.39 | 543.5<br>1367.7 | Round Island<br>1846 | 30 17 58.17<br>88 35 23.98 | 1791.2<br>640.8 |
| Sand Island L. H., 1868<br>1868 | 30 11 11.47<br>88 02 52.95 | 353.2<br>1416.5 | Horn Island 1<br>1847 | 30 13 40.76<br>88 36 08.42 | 1255.1<br>225.2 |
| Sand Island L. H., 1846–47<br>1846 | 30 11 11.63<br>88 02 56.41 | 358.1<br>1509.0 | Bayou Gravelline<br>1846 | 30 21 38.18<br>88 38 10.55 | 1175.7<br>281.7 |
| Garrows Bend<br>1848 | 30 39 00.93<br>88 03 42.92 | 28.6<br>1142.7 | Horn Island 2<br>1847 | 30 14 08.55<br>88 38 54.94 | 263.3<br>1469.1 |
| East Dauphin Island<br>1846 | 30 14 53.80<br>88 04 27.77 | 1656.6<br>742.3 | Monks Point<br>1851 | 30 20 56.07<br>88 45 00.50 | 1726.6<br>13.4 |
| East Dauphin Island 2<br>1847 | 30 14 50.15<br>88 04 31.45 | 1544.2<br>840.9 | Marsh Point<br>1850 | 30 23 00.85<br>88 48 15.06 | 26.2<br>402.0 |
| Deer River Point<br>1848 | 30 32 19.11<br>88 04 52.44 | 588.5<br>1397.8 | Deer Island east<br>1850 | 30 21 25.05<br>88 48 35.86 | 771.4<br>957.6 |
| Pelican Island 1868<br>1868 | 30 13 12.40<br>88 05 51.03 | 381.8<br>1364.6 | Deer Island middle<br>1850 | 30 21 30.34<br>88 49 01.94 | 934.3<br>51.8 |
| Pelican Island<br>1846 | 30 13 13.94<br>88 05 51.65 | 429.2<br>1381.2 | Deer Island<br>1846 | 30 21 30.85<br>88 49 03.88 | 950.0<br>103.6 |
| Little Dauphin Island<br>1846 | 30 16 47.73<br>88 07 03.98 | 1469.7<br>106.4 | Plummer<br>1851 | 30 24 45.98<br>88 50 28.94 | 1415.9<br>772.3 |
| Grants Pass<br>1846 | 30 17 35.56<br>88 08 02.72 | 1095.0<br>72.7 | Point Cadde<br>1851 | 30 24 17.74<br>88 51 32.22 | 546.3<br>860.0 |
| Johns House<br>1846 | 30 18 38.56<br>88 08 03.73 | 1187.4<br>99.7 | Ship Island east<br>1846 | 30 14 41.61<br>88 51 32.99 | 1281.3<br>882.1 |
| Camp Dauphin<br>1846 | 30 14 50.52<br>88 08 07.55 | 1555.7<br>201.9 | Chandeleur L. H.<br>1855 | 30 03 01.74<br>88 52 35.73 | 53.6<br>957.2 |
| Grants Light<br>1846 | 30 17 31.22<br>88 08 27.35 | 961.4<br>730.9 | Jolis Point<br>1851 | 30 25 18.49<br>88 52 38.56 | 569.4<br>1029.1 |
| Pass Baron<br>1846 | 30 19 14.22<br>88 10 48.89 | 437.9<br>1306.0 | Rhodes Ship Yard<br>1851 | 30 24 42.54<br>88 52 40.02 | 1309.9<br>1068.2 |
| Murder Point<br>1846 | 30 20 17.95<br>88 11 53.67 | 552.7<br>1433.5 | Ship Island Main 1851<br>1851 | 30 14 28.90<br>88 53 19.06 | 889.9<br>509.6 |
| Bayou Coq d'Inde<br>1846 | 30 22 16.39<br>88 14 02.11 | 504.7<br>56.3 | Biloxi Pier<br>1846 | 30 22 53.02<br>88 53 52.58 | 1632.7<br>1403.9 |
| Marsh Island<br>1846 | 30 19 18.03<br>88 15 23.33 | 555.2<br>623.2 | Point Pierre<br>1851 | 30 25 43.98<br>88 54 43.44 | 1354.2<br>1159.3 |
| Petit Bois east<br>1846 | 30 13 55.24<br>88 17 11.30 | 1701.0<br>302.2 | Point Blanc<br>1851 | 30 25 15.39<br>88 54 45.74 | 473.9<br>1220.7 |
| Petit Bois west<br>1846 | 30 12 10.49<br>88 27 13.34 | 323.0<br>356.8 | Harvey<br>1851 | 30 24 59.92<br>88 56 39.10 | 1845.1<br>1043.7 |
| East Grand Bay<br>1846 | 30 24 07.34<br>88 20 30.93 | 226.0<br>825.6 | Marsh Island<br>1850 | 30 25 19.27<br>88 56 46.10 | 593.4<br>1230.3 |
| Bayou La Fourche<br>1846 | 30 23 12.29<br>88 21 55.04 | 378.4<br>1469.3 | Montgomery<br>1851 | 30 23 30.02<br>88 57 52.62 | 924.4<br>1404.7 |
| East Grand Batture<br>1846 | 30 20 53.47<br>88 23 24.85 | 1646.5<br>663.7 | Fowler<br>1851 | 30 24 53.24<br>88 58 15.69 | 1639.4<br>418.8 |
| West Grand Bay<br>1846 | 30 21 57.92<br>88 24 42.91 | 1783.5<br>1145.9 | Hawley<br>1851 | 30 25 27.50<br>88 58 29.07 | 846.8<br>775.8 |
| Point aux Chenes<br>1846 | 30 18 59.11<br>88 28 59.84 | 1820.1<br>1598.7 | Saw Mill<br>1850 | 30 26 05.72<br>88 59 26.64 | 176.1<br>710.9 |
| Beebie<br>1846 | 30 20 16.97<br>88 30 28.53 | 522.5<br>762.0 | Bernards Bayou<br>1850 | 30 24 56.02<br>89 00 08.08 | 1725.0<br>215.7 |
| Horn Island Pass L. H.<br>1846 | 30 13 17.83<br>88 30 58.09 | 549.0<br>1553.4 | Point Blanc<br>1852 | 30 21 21.53<br>89 06 53.63 | 663.0<br>1432.2 |
| Little Bayou Casotte<br>1846 | 30 20 25.53<br>88 31 19.47 | 786.1<br>520.0 | Cuevas Tree<br>1846 | 30 13 54.96<br>89 07 11.10 | 1692.3<br>296.8 |
| Horn Island east 1847<br>1847 | 30 13 15.19<br>88 31 56.45 | 467.7<br>1509.6 | Pitcher Point 1<br>1852 | 30 19 56.15<br>89 10 53.98 | 1729.0<br>1441.9 |
| Ship Yard<br>1846 | 30 20 39.20<br>88 33 37.85 | 1207.1<br>1011.0 | Pass Christian<br>1850 | 30 18 24.08<br>89 16 06.31 | 741.2<br>168.6 |
| East Pascagoula River L. H.<br>1855 | 30 20 56.98<br>88 34 05.90 | 1754.6<br>157.6 | Merrills Coquille<br>1850 | 30 13 39.57<br>89 16 50.46 | 1218.4<br>1349.4 |

| Station | Latitude and longitude | Seconds in meters | Station | Latitude and longitude | Seconds in meters |
|---|---|---|---|---|---|
| | ° ′ ″ | | | ° ′ ″ | |
| Delectable Point<br>1851 | 30 19 31.33<br>89 17 32.20 | 964.7<br>860.2 | St. Josephs Island L. H.<br>1857 | 30 11 03.27<br>89 25 31.20 | 100.7<br>834.6 |
| Hendersons Point<br>1850 | 30 18 18.59<br>89 17 35.31 | 572.4<br>943.4 | Heron<br>1856 | 30 10 21.55<br>89 27.42.59 | 663.6<br>1139.5 |
| Cedar Hammock<br>1850 | 30 21 59.81<br>89 17 58.48 | 1841.7<br>1561.7 | Lower Point Clear.<br>1852 | 30 10 20.65<br>89 27 46.38 | 635.9<br>1240.9 |
| Cowards Point<br>1850 | 30 20 13.20<br>89 19 56.56 | 406.5<br>1510.7 | Gull<br>1856 | 30 07 23.34<br>89 27 59.86 | 718.7<br>1602.5 |
| Shieldsboro<br>1850 | 30 17 51.18<br>89 20 13.14 | 1576.0<br>351.2 | Grassy Island<br>1852 | 30 07 12.98<br>89 28 08.58 | 399.7<br>229.7 |
| St. Louis Bay<br>1850 | 30 21 48.88<br>89 21 25.65 | 1505.2<br>685.0 | Mouth of Pearl River<br>1852 | 30 11 03.06<br>89 31 28.14 | 94.2<br>752.8 |
| Fisher<br>1856 | 30 11 10.21<br>89 25 28.40 | 314.4<br>759.7 | Pearl River Island<br>1852 | 30 10 01.32<br>89 34 19.11 | 40.6<br>511.3 |
| St. Josephs Island<br>1852 | 30 11 10.21<br>89 25 27.97 | 314.4<br>748.2 | Claiborne<br>1852 | 30 13 15.16<br>89 34 30.19 | 466.8<br>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.

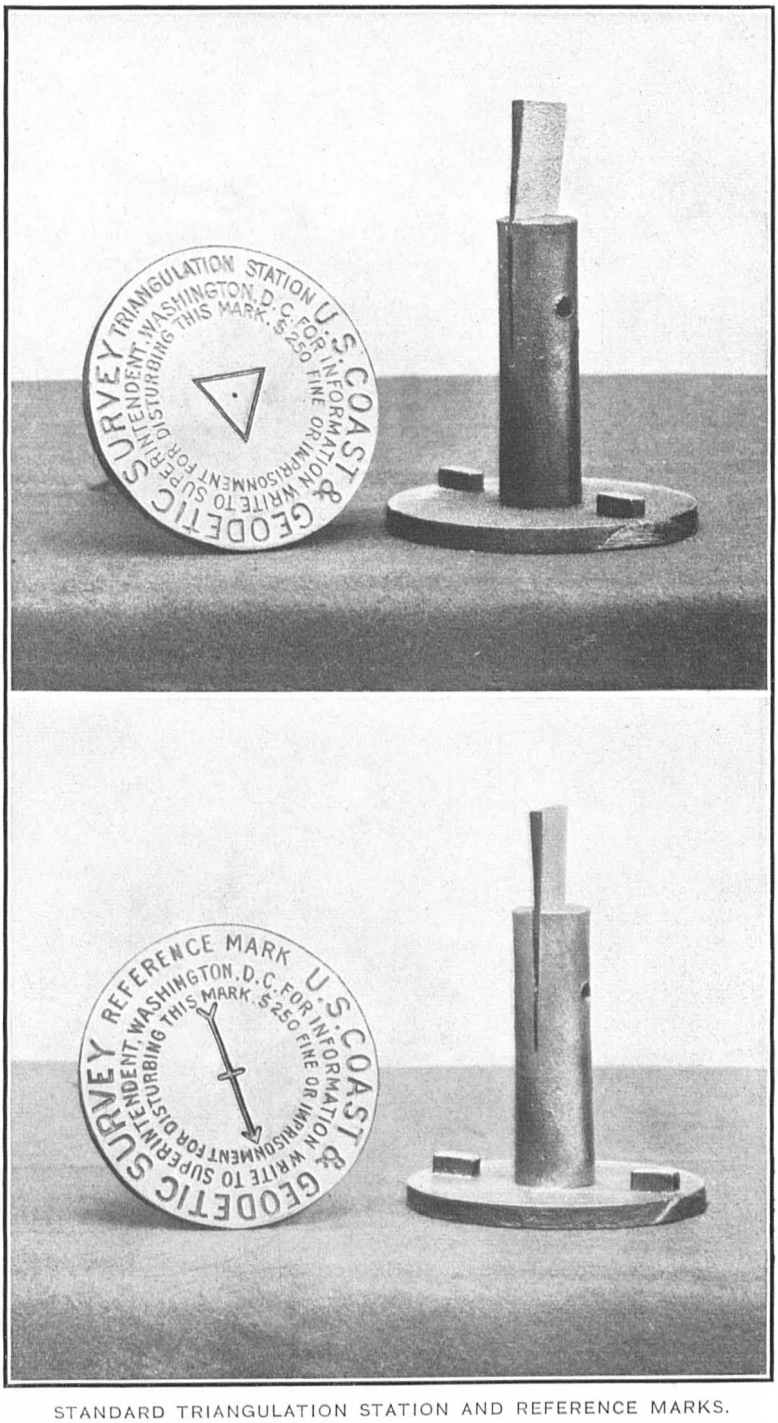
### MARKING OF STATIONS.

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 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 2½ 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, 2½ 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 fortypenny 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 2½ 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 2½ 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 1½ miles west of Georgia and Alabama State line, about 4½ 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 2[1] 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 Swearengin (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 Swearengin. 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 southwesterly 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.

*Cheehahaw* (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 101½° 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° 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 60½° 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 87½° 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, Hunstville 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 6½ 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° 49′; cross 2, 5.44 feet, 47° 49′; cross 3, 5.22 feet, 166° 49′; cross 4, 12.10 feet, 175° 09′; cross 5, 5.95 feet, 243° 59′; cross 6, 10.69 feet, 251° 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 41¼° 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 21½° 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° 53′; second cross, 7.95 feet from the station in azimuth 301° 40′; third cross, 8.33 feet from the station in azimuth 180° 51′. Crumpler's house is in azimuth 214° 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 2¼ 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 2½ feet deep was dug about the center in which an irregular mass of stone common to the locality 2 by 1½ by 1¼ 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 3½ 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, 3½ by 2¼ 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 4½ 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° 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 2½ by 1½ 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 1½ 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° 30′ west (magnetic) and is about 150 meters from the center. The new well of Monroe Parker bears south 189° 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 27⅓ feet to the near fence and 57¾ 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° 38′; 26.9 feet, 86° 38′; 56.88 feet, 353° 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 northwest 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 northwest 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 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 6½ 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 1¼ 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 4½ 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° 03′ W. and is 1483½ 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 1½ 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° 33′ E.; 44.58 feet, S. 95° 46′ W.; 39.75 feet, N. 18° 17′ W.; 39.9 feet, S. 29° 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 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° 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 2½ 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 3½ 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 5½ 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 3¼ 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 2½ 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 2½ 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 2½ 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 2½ 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 37⅓ feet from its outer corner and 2⅔ 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 1½ 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 bridle 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 1½ 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 2½ 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 7½ 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 northeast 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 346½° (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° 26′. 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, ¼ 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, ¼ 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 ¼-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 ¼ 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, ¼ 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, ¼ 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 ¼ 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 ¼ 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 ¼ 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 2½ 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 ½ 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, 4¼ miles east of Jacob triangulation station, 6⅞ miles east of Fort Morgan triangulation station, 1¼ 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 traingle with a nail at each vertex and the center, is on the sand ridge 25.85 meters from the station in azimuth 105° 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° 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 statiou.

*Goat* (Escambia County, Fla., A. T. M., 1889; 1911). This station is 82.32 meters from *Goat 2* (see p. —) in azimuth 95° 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° 27′; 31.02 meters, 184° 10′; and 20.77 meters, 215° 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° 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° 07′; 9.34 meters, 125° 39′; and 8.17 meters, 153° 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° 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° 28′; 21.75 meters, 253° 26′; 20.10 meters, 284° 31′; and 20.73 meters, 312° 22′.

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[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° 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° 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° 40′ and 24.92 meters in azimuth 111° 23′. A dead tree is 15.32 meters distant in azimuth 160° 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° 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° 17′ 57″. Another reference mark, described in note 16,[1] is on hard ground 36.6 meters from the station in azimuth 358° 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° 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° 07′ from the station. A dead juniper tree, similarly marked, is 9.21 meters from the station in azimuth 323° 44′. Other distances and azimuths were measured as follows: Stump, 13.30 meters, 40° 15′; pine tree, 9.16 meters, 219° 43′; and stump, 3.46 meters, 294° 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, 1½ 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 11[1] and 12,[1] are, respectively, 17.30 meters from the station in azimuth 107° 39′, and 55.54 meters from the station in azimuth 196° 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 11[1] and 12,[1] are, respectively, 11.83 meters from the station in azimuth 185° 37′, and 15.31 meters from the station in azimuth 48° 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 12,[1] are, respectively, 22.36 meters from the station in azimuth 142° 24′, and 42.28 meters from the station in azimuth 209° 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° 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 11[1] and 12,[1] are, respectively, 73.02 meters from the station in azimuth 167° 57′, and 39.64 meters from the station in azimuth 253° 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 12[1] are, respectively, 42.25 meters from the station in azimuth 306° 03′, and 71.98 meters from the station in azimuth 7° 01′. A lone pine tree off the eastern end of the pine forest is in azimuth 2° 37′. The western tangent to the forest is in azimuth 68° 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 12,[1] are, respectively, 49.00 meters from the station in azimuth 352° 57′, and 37.74 meters from the station in azimuth 42° 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° 14′, and 37.92 meters from the station in azimuth 44° 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 12,[1] 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° 19′, and 76.47 meters from the station

[1] See pp. 40 and 41.

in zimuth 234° 06′. A triangular blaze with 4 nails on an oak is 0.495 meter from reference mark 1 in azimuth 174° 51′, and reference mark 2 is 66.96 meters from reference mark 1 in azimuth 277° 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° 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 12[1] are, respectively, 76.70 meters from the station in azimuth 304° 26′, and 25.03 meters from the station in azimuth 356° 48′. Another reference mark, a triangular blaze with 4 nails on the lone pine, is 77.43 meters from the station in azimuth 304° 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° 54′, and 25.37 meters from the station in azimuth 213° 29′. A lone dead oak is 94.2 meters from the station in azimuth 269° 29′. Reference mark 2 is 53.70 meters from reference mark 1 in azimuth 268° 54′, and the dead oak is from reference mark 1 in azimuth 277° 30′. The dead oak is 82.3 meters from reference mark 2 in azimuth 283° 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° 07′, and 30.335 meters from the station in azimuth 23° 51′. Reference mark 3, described in note 11,[1] is in azimuth 342° 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° 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° 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° 20′. The northern end of a narrow strip of scrub growth is in azimuth 204° 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° 21′. The Biloxi water tank is in azimuth 101° 07′.

*Ox* (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 12[1] 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° 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° 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 12[1] is 19.315 meters from the station in azimuth 242° 51′. A triangular blaze with 4 nails on a pine tree is 9.01 meters from the station in azimuth 207° 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° 51′. A triangular blaze with 4 nails on a small lone pine is 24.68 meters from the station in azimuth 339° 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° 17′. A triangular blaze with 4 nails on the lone pine is 33.35 meters from the station in azimuth 237° 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° 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° 34′. A triangular blaze with 4 nails on a live oak is 16.02 meters from the station in azimuth 46° 34′.

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[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 1¾ 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 7[1] 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 6[1] 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 6[1] 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 6[1] 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 blzae 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′.

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[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 "Horseshoe 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 9[1] 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 9[1] 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 7[1] 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 7[1] 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

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

in which $h_2$ and $h_1$ are elevations of the stations, $\zeta_2$ and $\zeta_1$ are the measured zenith distances, as corrected for height of instrument and of object observed, $s$ is the horizontal distance between the stations, and $\rho$ 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 $p$ | Observed difference of elevation $h_2-h_1$ | Adjusted difference of elevation $h_2-h_1$ | Observed minus adjusted $v$ | $pv^2$ |
|---|---|---|---|---|---|---|
| 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 | −230.53 | + .78 | .213 |
| Cockspur | do | .51 | −408.01 | −408.49 | + .48 | .118 |
| Roy | do | .50 | − 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 | .060 |
| 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 | +458.28 | +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 | +1.32 | .314 |
| Harvey | do | .37 | +203.59 | +203.35 | + .24 | .021 |
| Roy | Owen | 9.38 | −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 | − 2.36 | − 1.58 | − .78 | .172 |
| Do | Bean | .14 | +190.32 | +191.34 | −1.02 | .146 |
| Cohutta | do | .89 | −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 | +689.75 | +688.73 | +1.02 | .333 |
| Pine Log | do | .25 | +554.69 | +552.55 | +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 | − 23.82 | − 25.30 | +1.38 | .362 |
| Grassy | Pine Log | .89 | −289.61 | −289.73 | + .12 | .013 |
| Sawnee | do | .50 | +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 | − 95.63 | − 95.47 | − .16 | .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 | 1.68 | −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 | .216 |
| 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 | − 86.91 | − 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 | +259.53 | − .81 | .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 | Rowe | .35 | − .39 | − 1.44 | +1.05 | .382 |
| Summit | do | .72 | + 87.32 | + 87.25 | + .07 | .004 |
| Wornock | do | .26 | − 8.94 | − 8.64 | − .30 | .023 |
| Aurora | Summit | 1.23 | − 87.72 | − 88.69 | + .97 | 1.157 |
| Wornock | Aurora | .40 | − 6.14 | − 7.20 | +1.06 | .449 |
| Do | Wilson | .43 | − 75.11 | − 74.31 | − .80 | .275 |
| Summit | do | .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 (19⅔ 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 | .531 |
| Indian | Cheehahaw | .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 |
| Cheehahaw | do | .69 | −261.57 | −261.00 | − .57 | .224 |
| Alpine | Horn | 3.20 | +111.45 | +112.00 | − .55 | .968 |
| Cheehahaw | do | .96 | −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 | .500 |
| Cahaba | Laurel | .66 | + 20.69 | + 20.18 | + .51 | .172 |
| Alpine | do | .83 | + 7.86 | + 7.39 | + .47 | .183 |
| Kahatchee | do | 1.28 | + 82.90 | + 83.81 | − .91 | 1.060 |
| Laurel | Weogufka | .13 | −130.41 | −128.51 | −1.90 | .469 |
| 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 | − 97.75 | + .41 | .229 |
| Laurel | do | .12 | −227.72 | −226.26 | −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 | − 36.58 | − 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 | 1.245 |
| 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 | + 7.79 | + 7.89 | − .10 | .013 |
| Lowndesboro | do | .34 | + 56.48 | + 56.72 | − .24 | .020 |
| Mount Carmel | do | .53 | − 19.96 | − 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 | − 9.22 | − 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 | −15.76 | + .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 (19⅔ 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

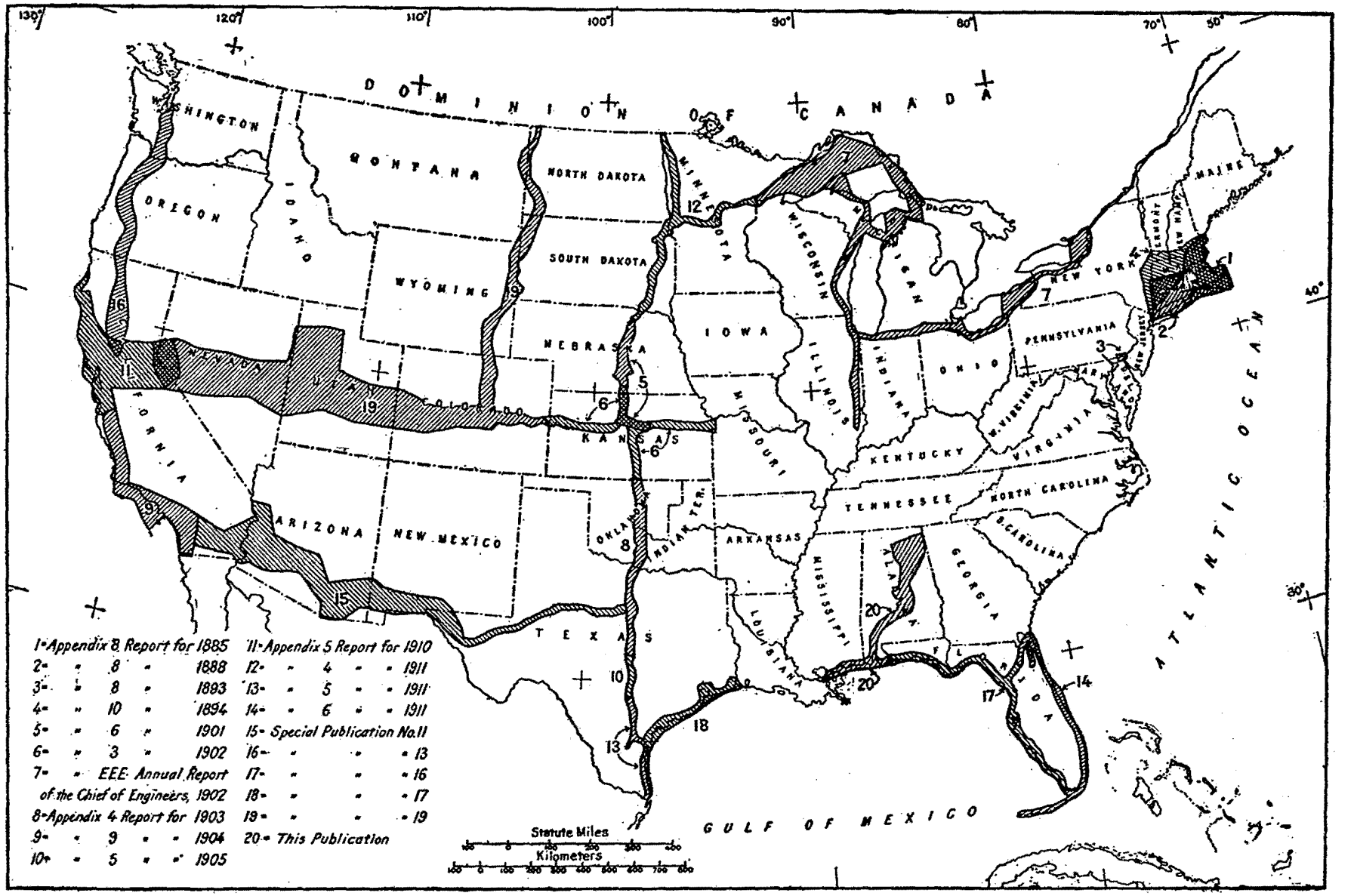
[1] See Special Publication No. 18, p. 91.

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.

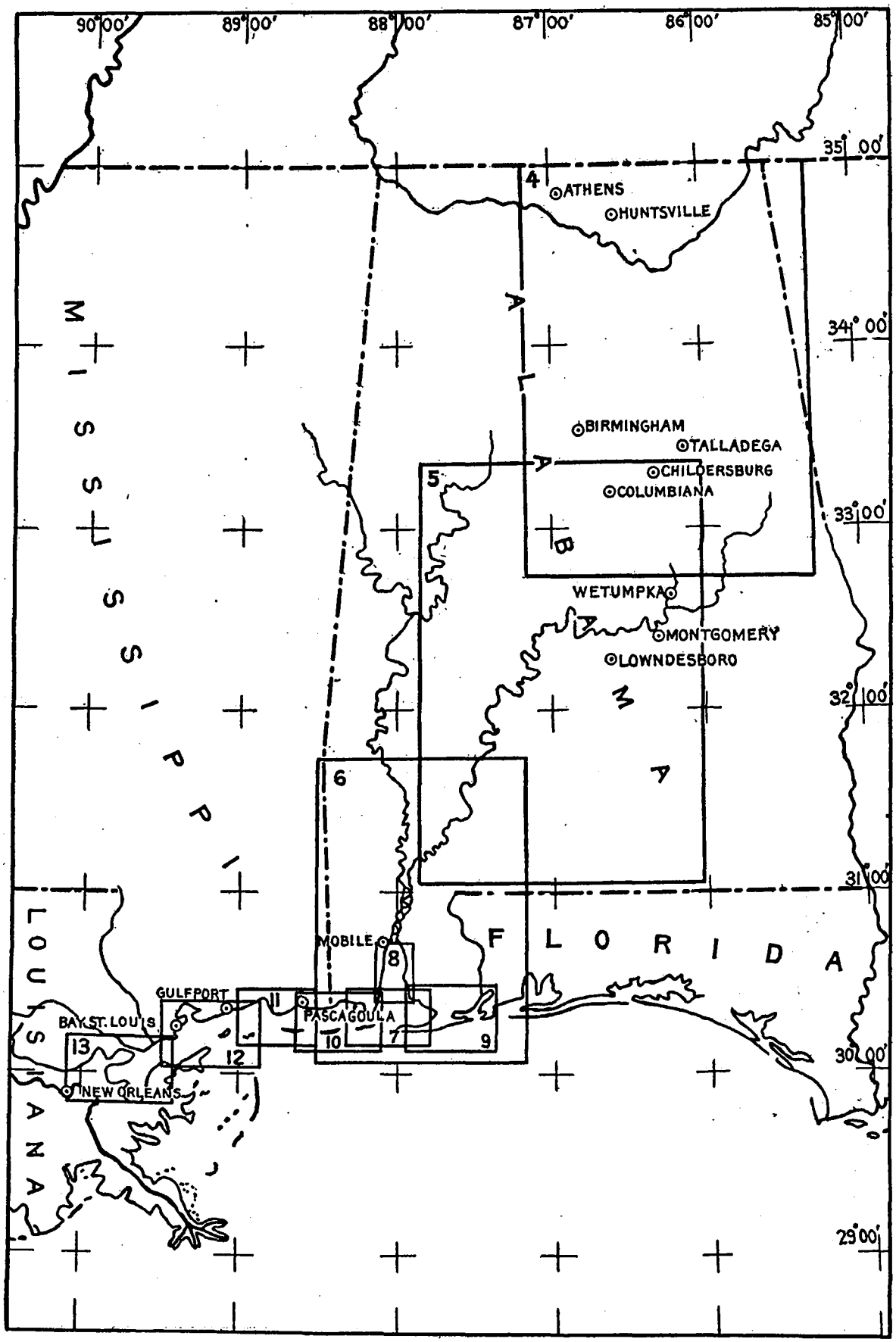
The accuracy with which the elevation of a station in the main scheme is determined depends mainly upon the distance of that station from the nearest station whose elevation is fixed by spirit leveling. The spirit-leveling stations are given in the following table, under the heading "Class 1." Station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

*Table of elevations.*

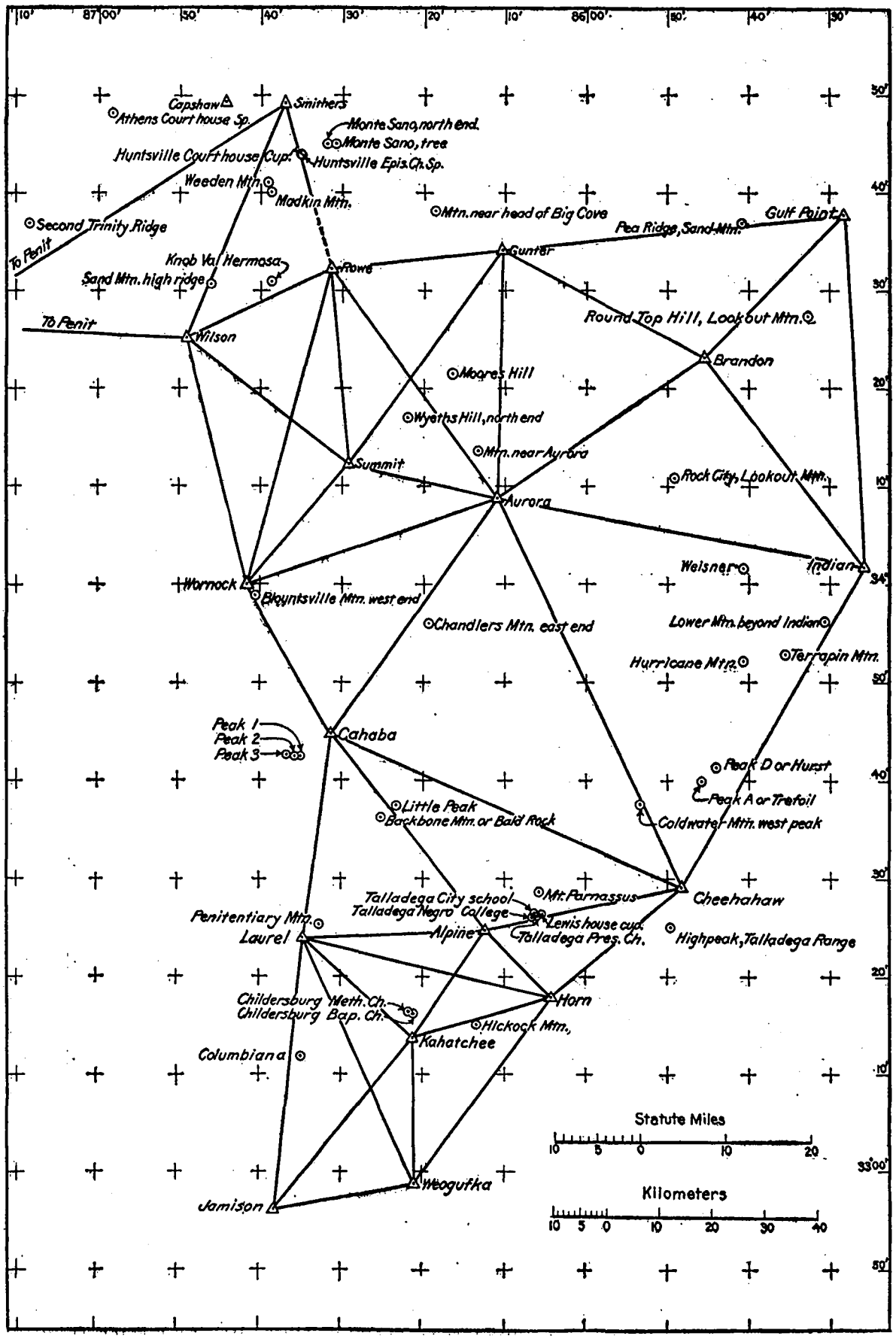
| Station | Point to which elevation refers | Elevation | | Station | Point to which elevation refers | Elevation | |
|---|---|---|---|---|---|---|---|
| | | Meters | Feet | | | Meters | Feet |
| *Class 1.* | | | | *Class 2*—Continued. | | | |
| Melton, Tenn | Station mark | 413.11 | 1355.35 | County Line, Ala | Station mark | 177.7 | 583.0 |
| Stone Mountain, Ga | do | 513.95 | 1686.18 | 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 |
| | | | | White, Ala | do | 121.8 | 399.6 |
| *Class 2.* | | | | Coon, Ala | do | 81.2 | 266.4 |
| | | | | Red Hill, Ala | do | 96.9 | 317.9 |
| House Mountain, Tenn | do | 643.6 | 2111.5 | Dean, Ala | do | 88.6 | 290.7 |
| Cockspur, Tenn | do | 821.6 | 2695.5 | Cold Creek, Ala | do | 84.4 | 276.9 |
| Brushy, Tenn | do | 983.0 | 3225.1 | Minette, Ala | do | 75.4 | 247.4 |
| Luper, Tenn | do | 831.2 | 2727.0 | Daphne, Ala | do | 48.2 | 158.1 |
| Hinch Mountain, Tenn | do | 931.4 | 3055.8 | Spring Hill, Ala | do | 66.1 | 216.9 |
| Owen, Tenn | do | 375.8 | 1232.9 | | | | |
| Roy, Tenn | do | 478.2 | 1568.9 | *Class 3.* | | | |
| Harvey, Tenn | do | 728.0 | 2388.4 | | | | |
| 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 | 1259.2 |
| 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 |
| Sweat, Ga | do | 516.1 | 1693.2 | Athens courthouse spire | Base of cone of spire. | 243.1 | 797.6 |
| Kenesaw, Ga | do | 551.3 | 1808.7 | | | | |
| Carnes, Ga | do | 395.5 | 1297.6 | Penit | Station mark | 327.6 | 1074.8 |
| Johns, Ga | do | 576.3 | 1890.7 | Second Trinity Ridge | Top of trees | 278.4 | 913.4 |
| Lavender, Ga | do | 514.0 | 1686.3 | Knob Val Hermosa | do | 401.5 | 1317.3 |
| Indian, Ala | do | 601.6 | 1973.7 | Wyeths Hill, north end | do | 352.8 | 1157.5 |
| Gulf Point, Ala | do | 671.8 | 2204.1 | Moores Hill | Station mark | 347.3 | 1139.4 |
| Brandon, Ala | do | 509.9 | 1672.9 | Mountain near Aurora | Top of trees | 406.7 | 1334.3 |
| Aurora, Ala | do | 428.4 | 1405.5 | Round Top Hill, east side of Lookout Mountain. | do | 515.1 | 1690.0 |
| Rowe, Ala | do | 427.0 | 1400.9 | | | | |
| Summit, Ala | do | 339.7 | 1114.5 | Rock City, Lookout Mountain | do | 517.7 | 1698.5 |
| Wornock, Ala | do | 435.6 | 1429.1 | Weisner | Station mark | 574.0 | 1883.2 |
| Wilson, Ala | do | 361.3 | 1185.4 | Lower Mountain beyond Indian. | Top of trees | 581.1 | 1906.5 |
| Cahaba, Ala | do | 461.6 | 1514.4 | | | | |
| Cheehahaw, Ala | do | 735.4 | 2412.7 | Terrapin Mountain | do | 658.1 | 2159.1 |
| Alpine, Ala | do | 474.4 | 1556.4 | Hurricane Mountain | do | 582.3 | 1910.4 |
| Laurel, Ala | do | 481.8 | 1580.7 | Chandlers Mountain, east end | do | 484.1 | 1588.3 |
| Horn, Ala | do | 586.4 | 1923.9 | Blountsville Mountain, west end. | do | 437.1 | 1434.1 |
| Kahatchee, Ala | do | 398.0 | 1305.8 | | | | |
| Weogufka, Ala | do | 353.3 | 1159.1 | Backbone Mountain or Bald Rock. | Ground | 485.7 | 1593.5 |
| Jamison, Ala | do | 255.5 | 838.3 | | | | |
| Perry, Ala | do | 210.0 | 689.0 | Peak A or Trefoil | Top of trees | 622.4 | 2042.0 |
| Wilder, Ala | do | 218.6 | 717.2 | Peak D or Hurst | do | 650.7 | 2134.8 |
| Wetumpka, Ala | do | 175.9 | 577.1 | Coldwater Mountain, west peak. | do | 534.6 | 1753.9 |
| Parker, Ala | do | 173.0 | 567.6 | | | | |
| Lowndesboro, Ala | do | 125.1 | 410.4 | Columbiana | Station mark | 296.4 | 972.4 |
| Lovers Leap, Ala | do | 173.9 | 570.5 | Montgomery Capitol | Top of dome | 90.3 | 296.3 |
| Mount Carmel, Ala | do | 201.0 | 659.4 | Montgomery water tank | Top | 121.2 | 397.6 |
| Bargenier, Ala | do | 181.8 | 596.5 | | | | |



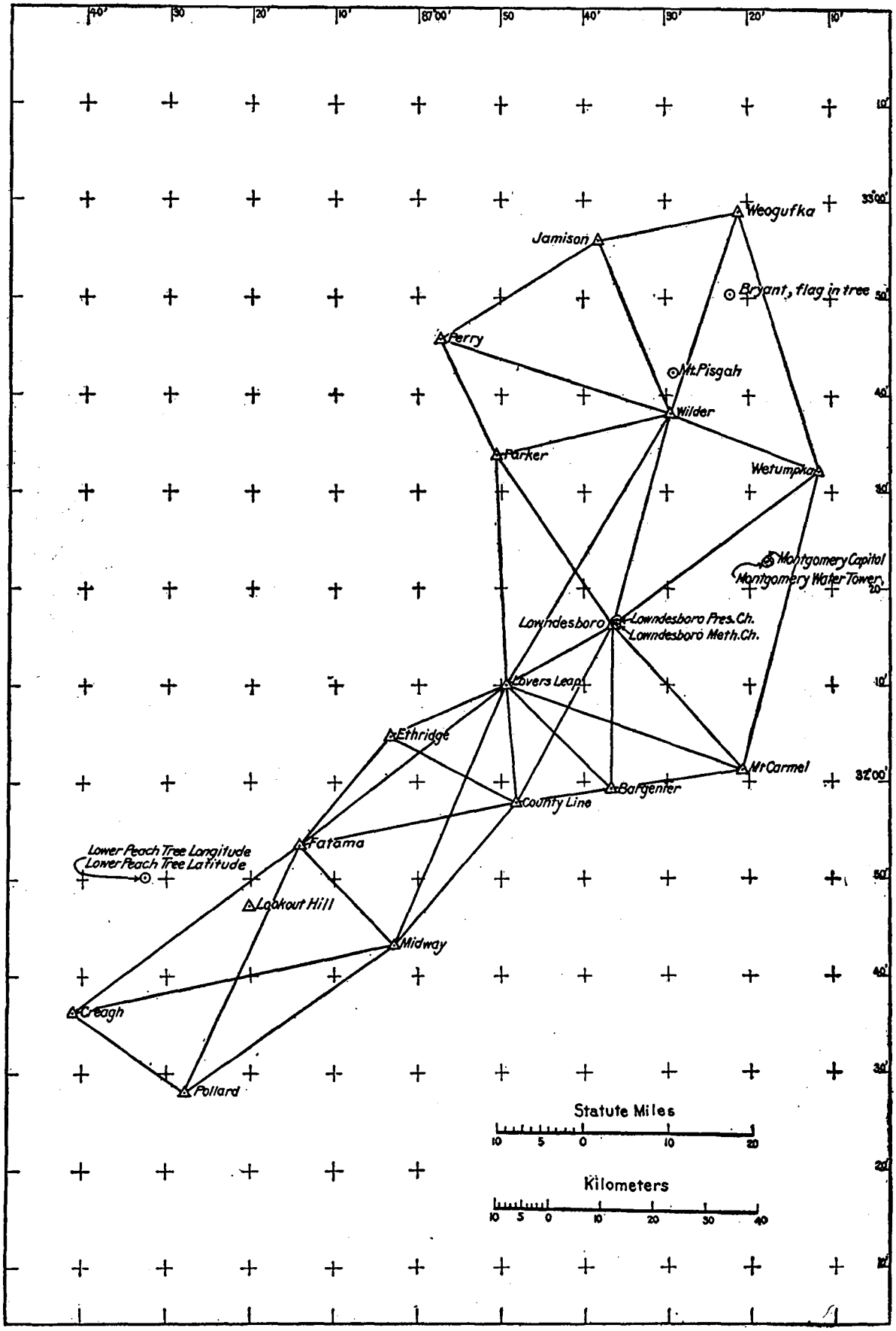

INDEX MAP SHOWING AREAS COVERED BY PUBLISHED TRIANGULATION WHICH HAS BEEN RIGIDLY COMPUTED ON THE NORTH AMERICAN DATUM.



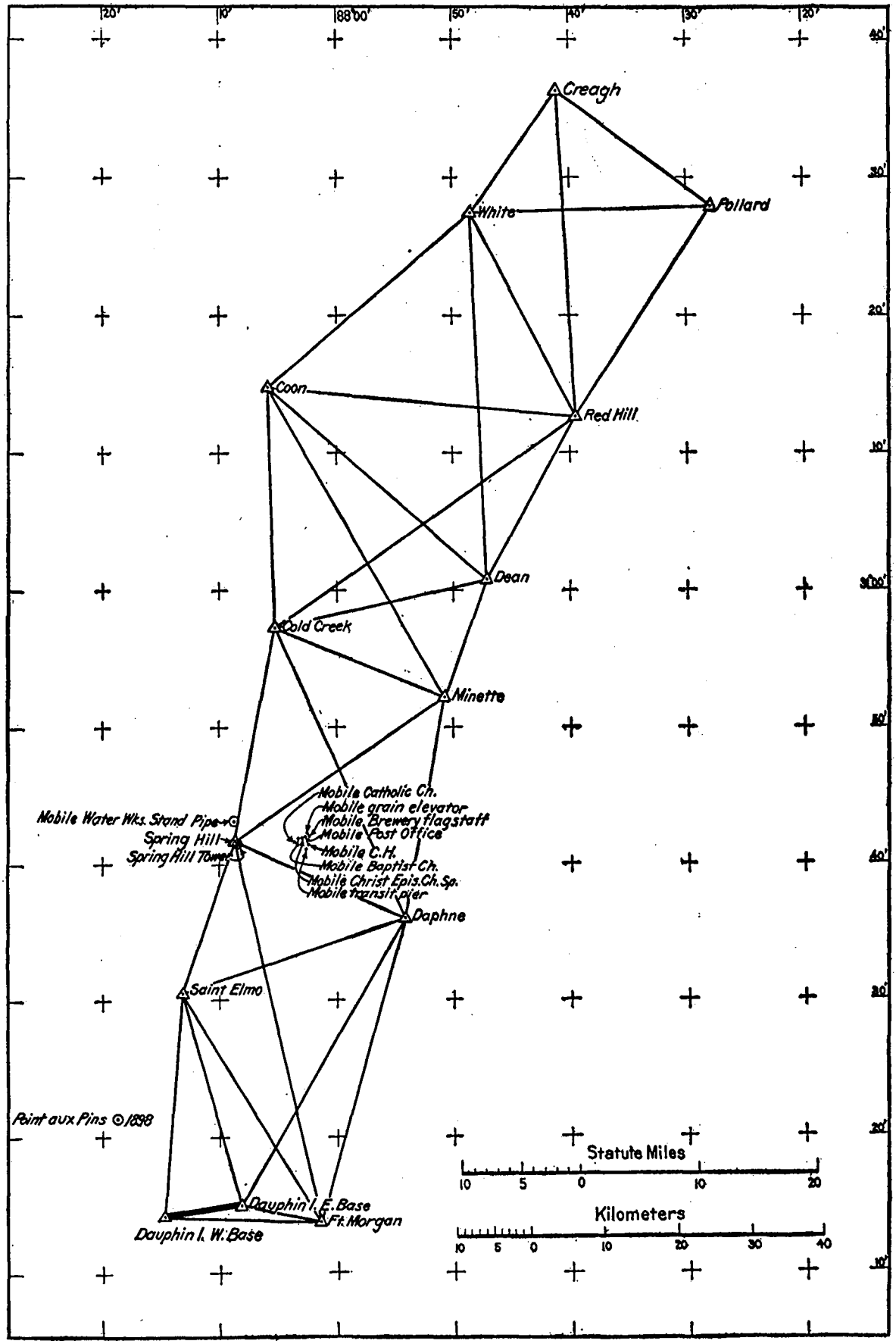

INDEX MAP SHOWING THE LIMITS OF EACH OF THE FOLLOWING SKETCHES—NOS. 4 TO 13.



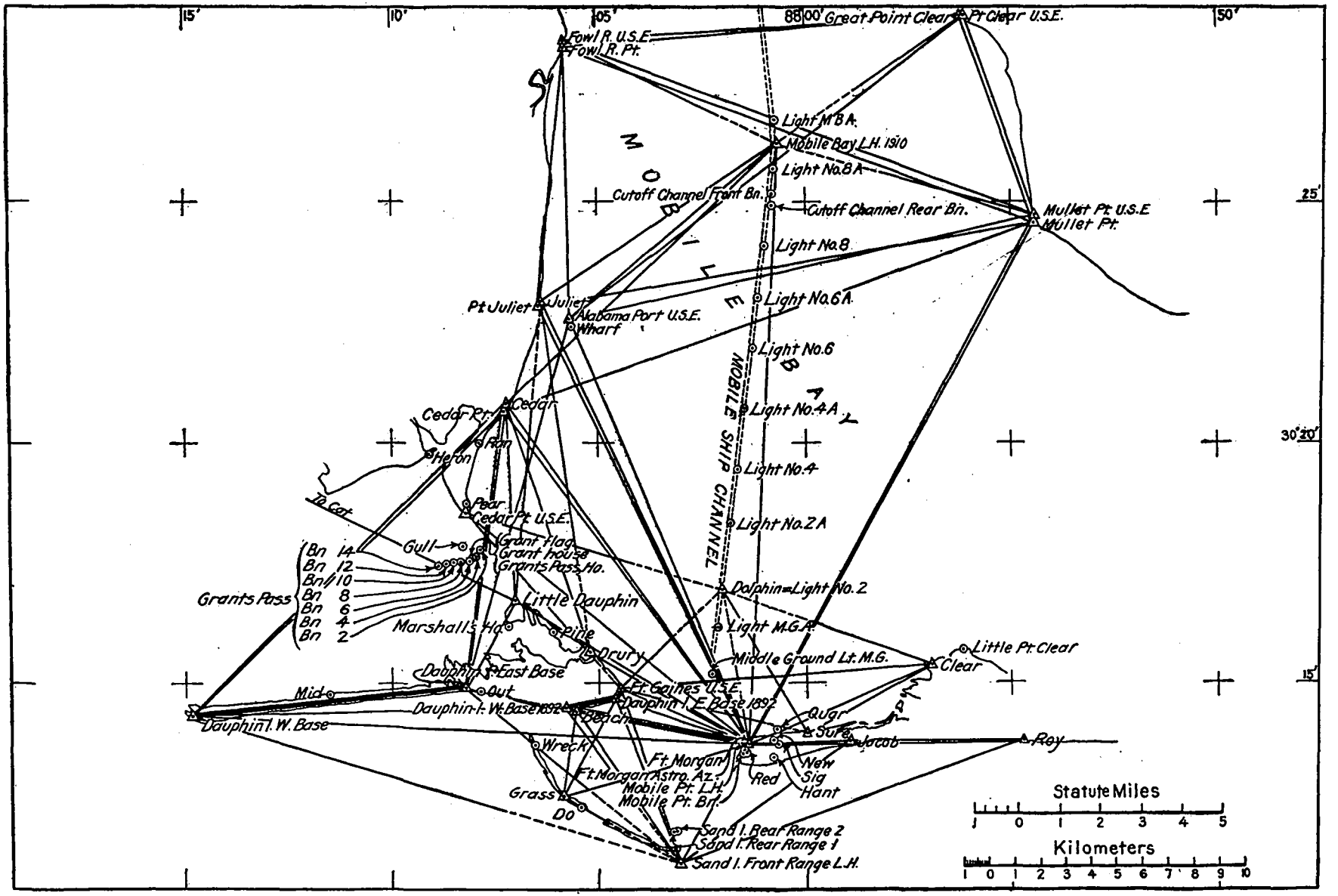

TRIANGULATION, EASTERN OBLIQUE ARC, STATIONS GULF POINT AND INDIAN TO JAMISON AND WEOGUFKA.



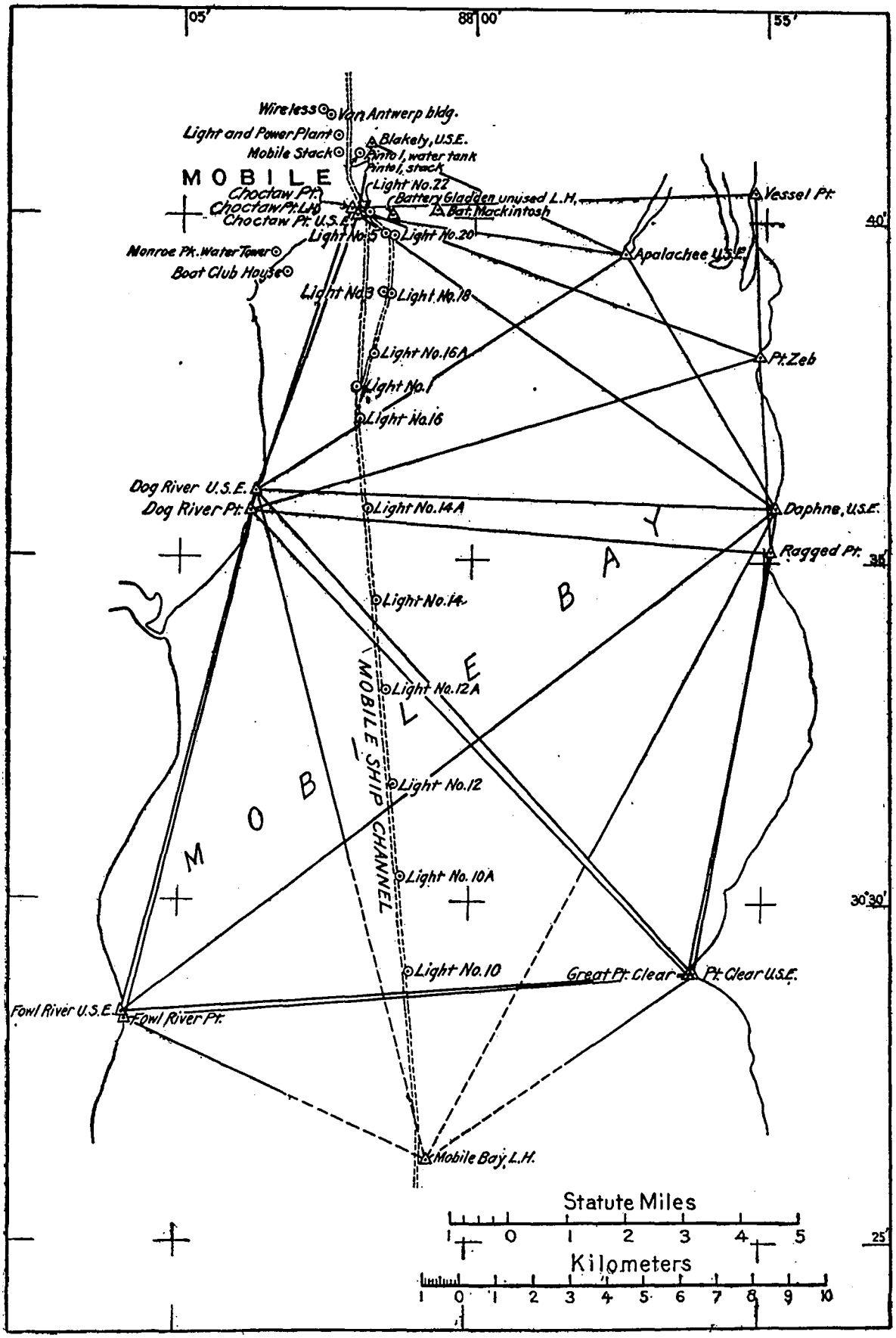

TRIANGULATION, EASTERN OBLIQUE ARC, STATIONS JAMISON AND WEOGUFKA TO CREAGH AND POLLARD.



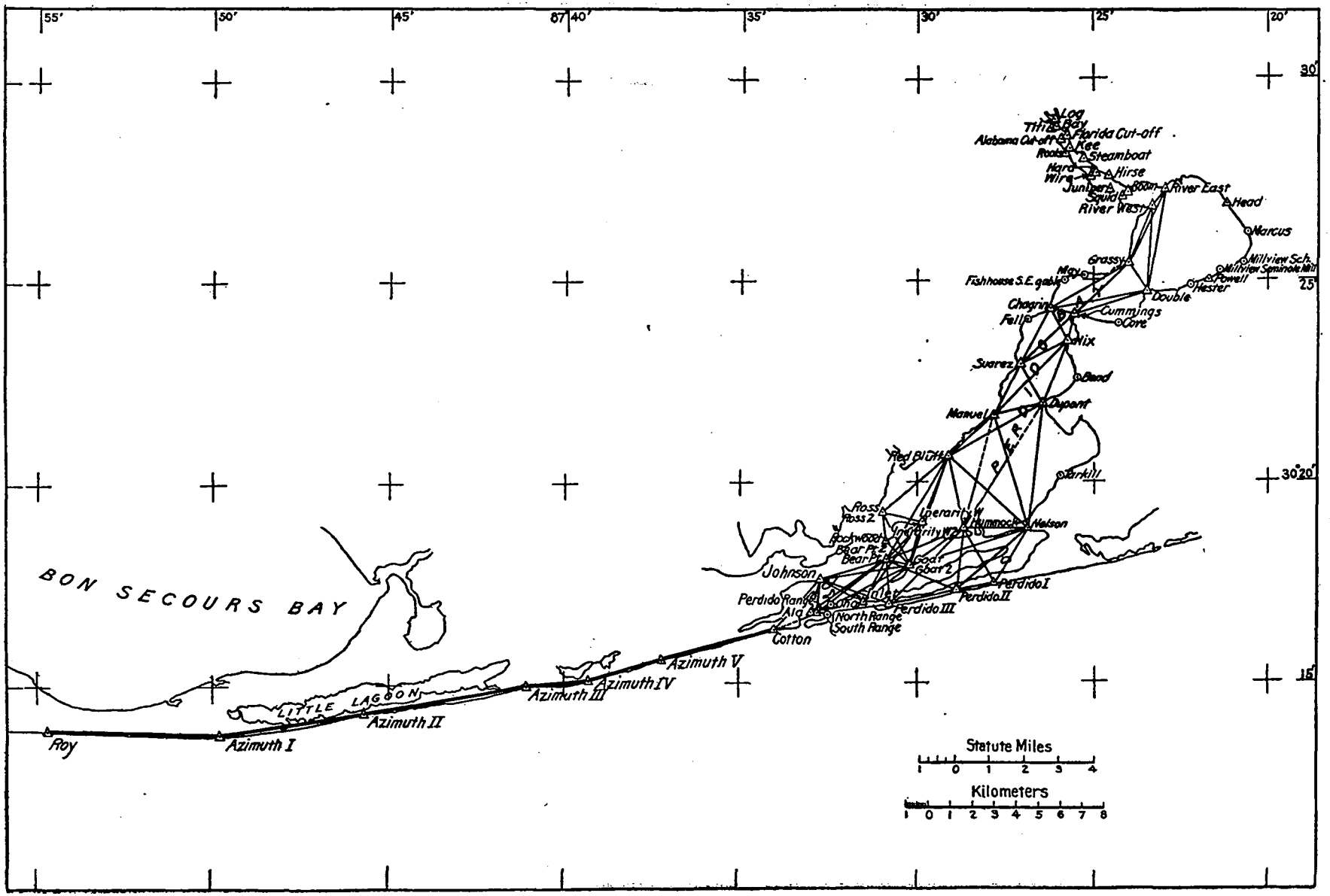

TRIANGULATION, EASTERN OBLIQUE ARC, STATIONS CREAGH AND POLLARD TO DAUPHIN ISLAND BASE.



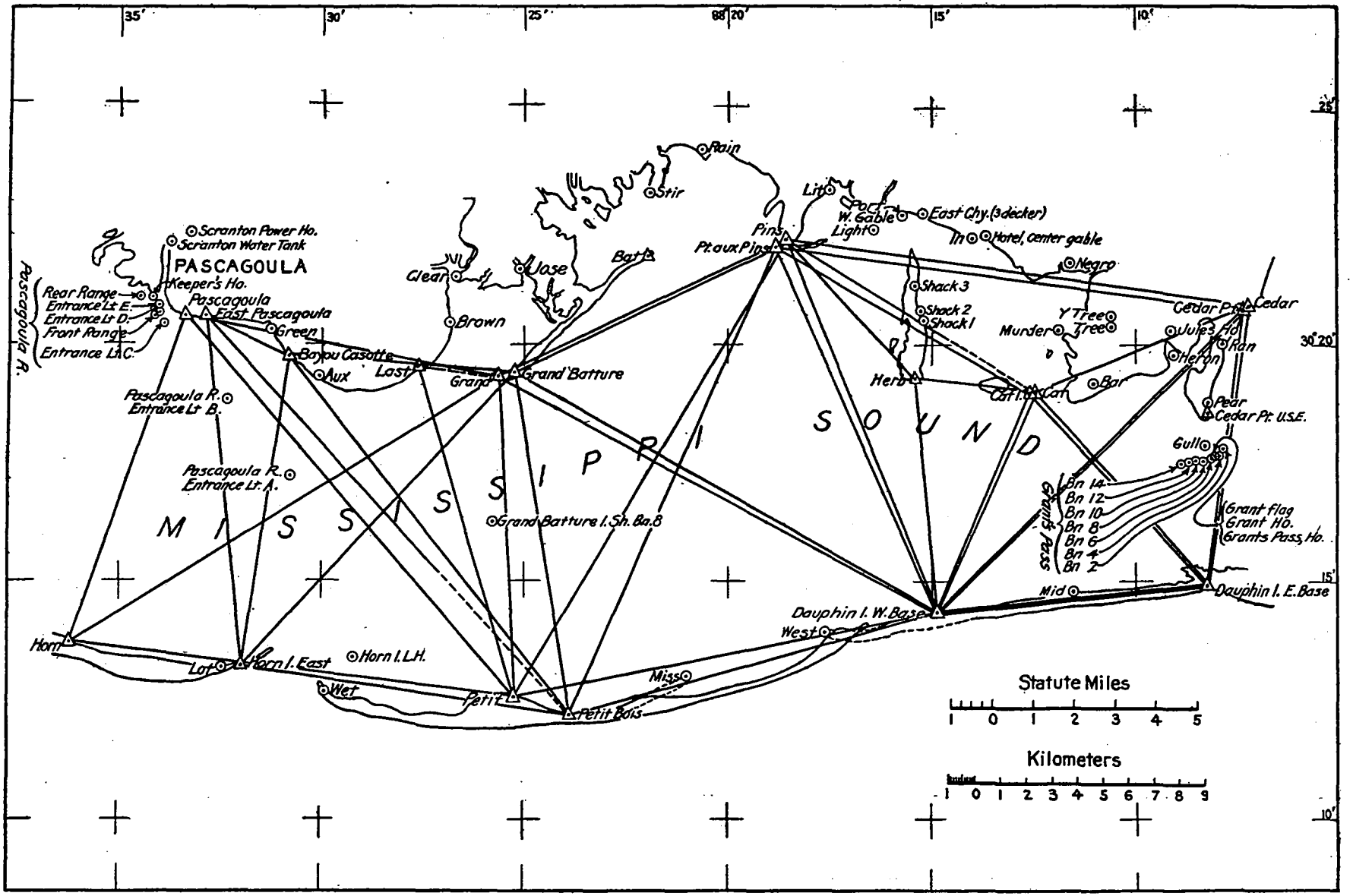

TRIANGULATION, LOWER MOBILE BAY.



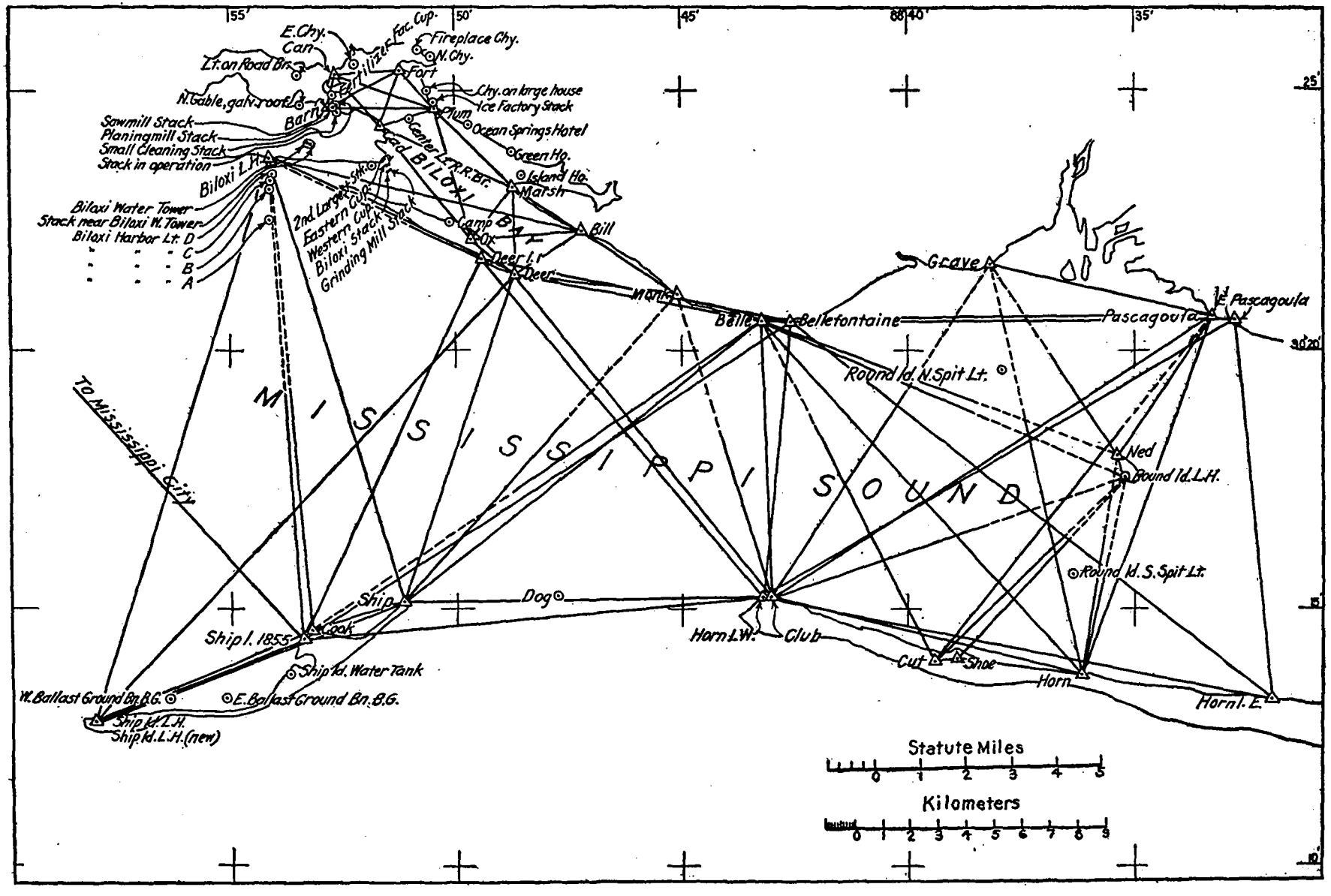

TRIANGULATION, UPPER MOBILE BAY.



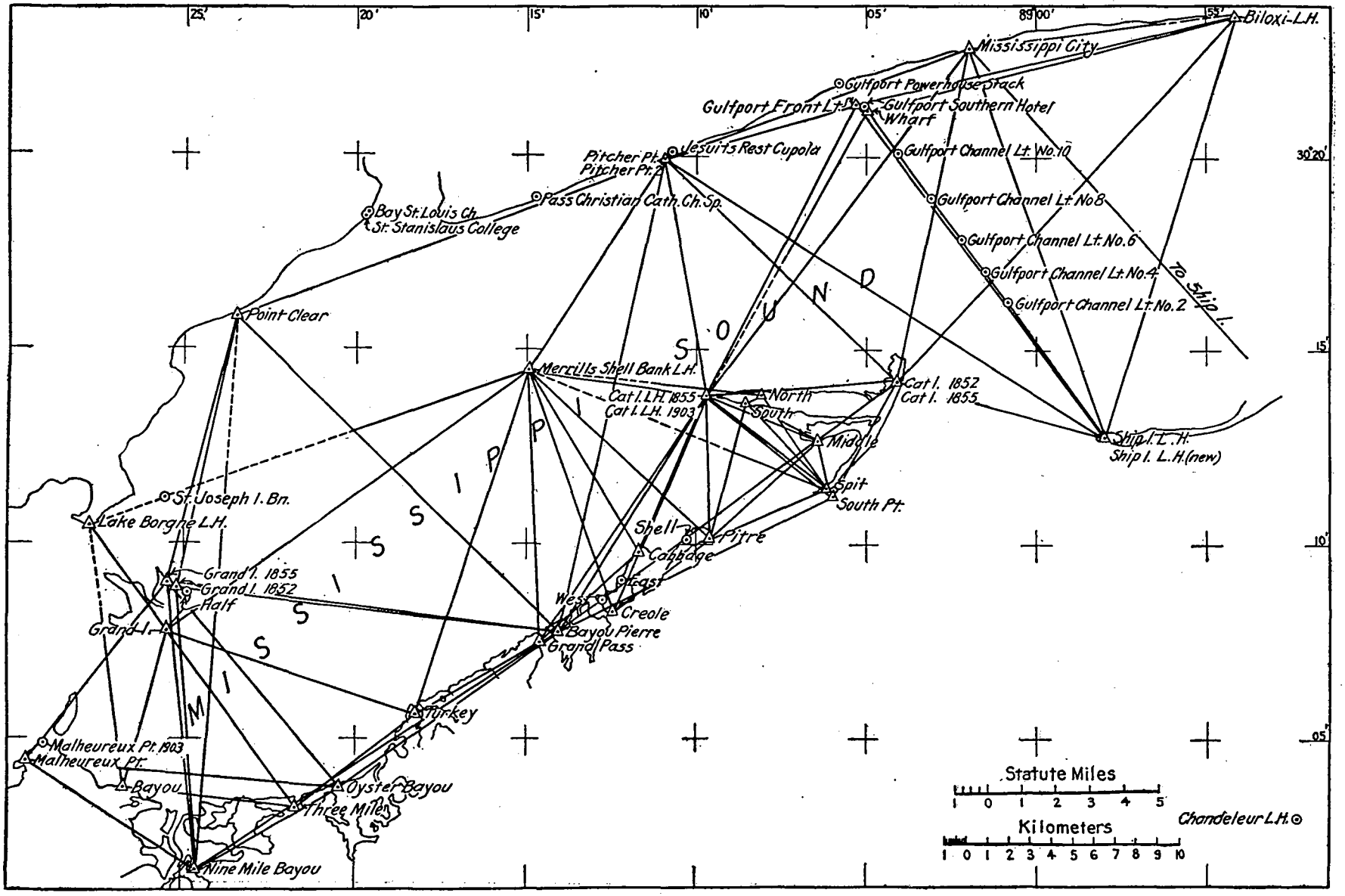

TRIANGULATION, PERDIDO BAY AND WESTWARD TO MOBILE BAY.



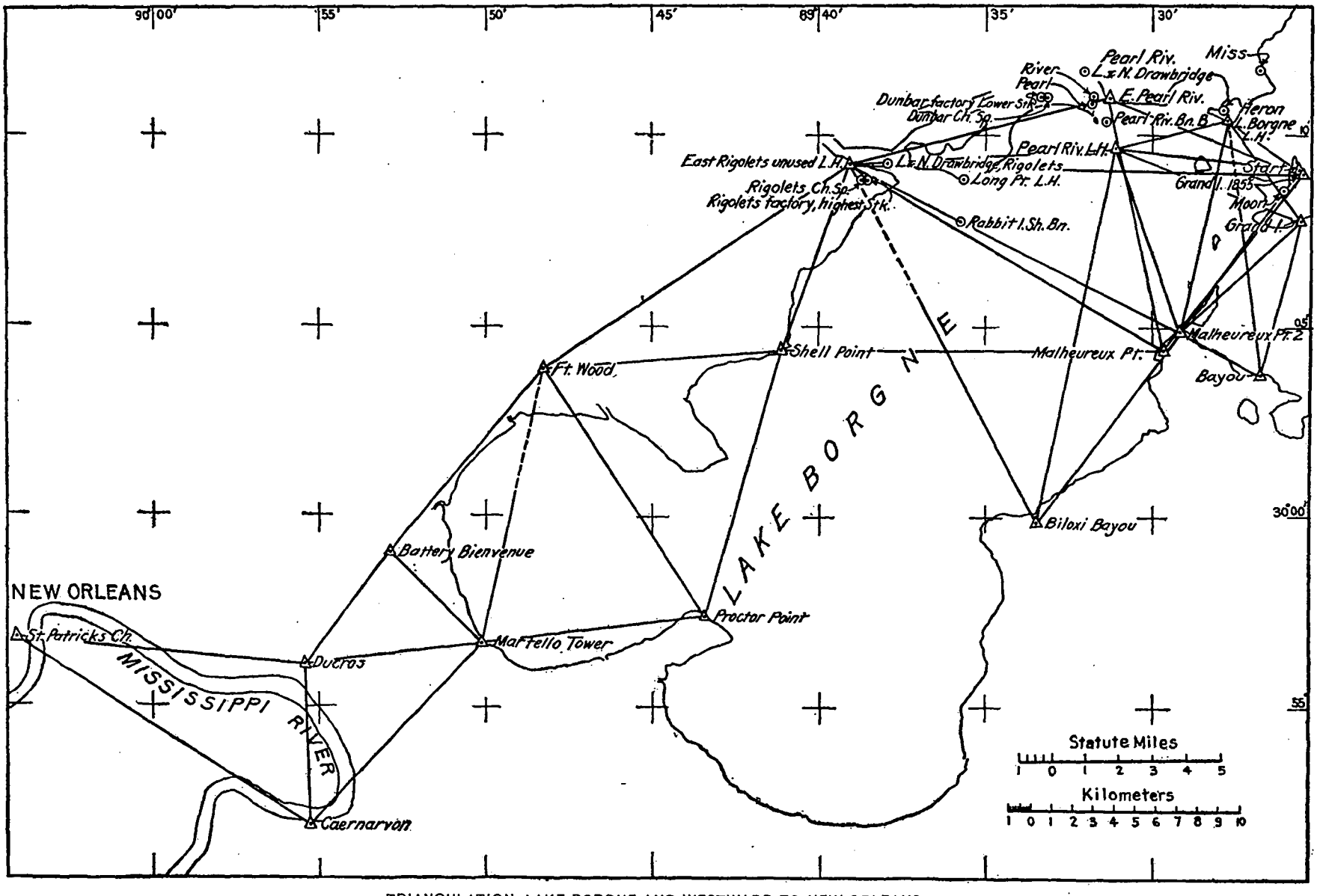

TRIANGULATION, MISSISSIPPI SOUND, MOBILE BAY TO PASCAGOULA.




TRIANGULATION, MISSISSIPPI SOUND, PASCAGOULA TO BILOXI.




TRIANGULATION, MISSISSIPPI SOUND, BILOXI TO LAKE BORGNE.




TRIANGULATION, LAKE BORGNE AND WESTWARD TO NEW ORLEANS.

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| Do | 23 | 51 | | 7 |
| Dog | 35 | 61 | | 11 |
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| Double | 27 | 54 | | 9 |
| Drury | 24 | 52 | | 7 |
| Ducros | 18 | 48 | | 13 |
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| Dupont | 27 | 53 | | 9 |
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| East Rigolets unused lighthouse | 18 | 48 | | 13 |
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| Ethridge | 16 | 45 | 66 | 5 |
| Fatama | 17 | 45 | 66 | 5 |
| Fell | 29 | 55 | | 9 |
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| Fish house southeast gable | 29 | | | 9 |
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| Florida Cut-off | 28 | 55 | | 9 |
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| Goat 2 | 28 | 55 | | 9 |
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| Grand | 29 | 56 | | 10 |
| Grand Batture | 17 | 47 | | 10 |
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| Grants Pass beacon No. 8 | 32 | | | 7, 10 |
| Grants Pass beacon No. 10 | 32 | | | 7, 10 |
| Grants Pass beacon No. 12 | 32 | | | 7, 10 |
| Grants Pass beacon No. 14 | 32 | | | 7, 10 |
| Grants Pass house, west gable | 32 | | | 7, 10 |
| Grass | 22 | 50 | | 7 |
| Grassy | 27 | 54 | 66 | 9 |
| Grassy Island | 40 | | | |
| Grave | 34 | 60 | | 11 |
| Great Point Clear | 22 | 50 | | 7, 8 |
| Green | 34 | 60 | | 10 |
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| Grinding-mill stack, skyscraper | 35 | | | 11 |
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| Gulfport Channel Light No. 4 | 36 | | | 12 |
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| Gunter | 16 | 42 | 66 | 4 |
| Half | 37 | 61 | | 12 |
| Hant | 24 | 51 | | 7 |
| Hard | 28 | 54 | | 9 |
| Harvey | 39 | | | |
| Hawley | 39 | | | |
| Head | 29 | 56 | | 9 |
| Hendersons Point | 40 | | | |
| Herb | 32 | 59 | | 10 |
| Heron, 1856 | 40 | | | |
| Heron, 1909 | 37 | 61 | | 13 |
| Heron, 1910 | 32 | 59 | | 7, 10 |
| Hester | 29 | 56 | | 9 |
| Hickock Mountain | 20 | 49 | | 4 |
| High Peak, Talladega Range | 20 | | | 4 |
| Hirse | 28 | 54 | | 9 |
| Horn | 16 | 43 | 66 | 4 |
| Horn, 1910 | 30 | 56 | | 10, 11 |
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| In | 33 | 59 | | 10 |
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| Inerarity west 2 | 28 | 55 | | 9 |
| Inlet | 28 | 55 | | 9 |
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| Jose | 33 | 60 | | 10 |
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| Juniper | 28 | 54 | | 9 |
| Kahatchee | 16 | 43 | 66 | 4 |
| Kee | 28 | 54 | | 9 |
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| Lot | 34 | 60 | | 10 |
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| Lower Peach Tree longitude | 21 | 49 | | 5 |
| Lower Point Clear | 40 | | | |
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| Manuel | 27 | 53 | | 9 |
| Marcus | 29 | 56 | | 9 |
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| Pitre | 31 | 58 | | 12 |
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| Negro College | 20 | 49 | | 4 |
| Presbyterian Church | 20 | 49 | | 4 |
| Tarkill | 29 | 55 | | 9 |
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| Terrapin Mountain | 19 | | 66 | 4 |
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| Titi | 28 | 55 | | 9 |
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| Turkey | 31 | 58 | | 12 |
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