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DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

/// E. LESTER JONES, SUPERINTENDENT

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GEODESY

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DESCRIPTIONS OF TRIANGULATION  
STATIONS IN GEORGIA

BY

CLARENCE H. SWICK

Geodetic Computer, U. S. Coast and Geodetic Survey

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Special Publication No. 45



PRICE, 10 CENTS

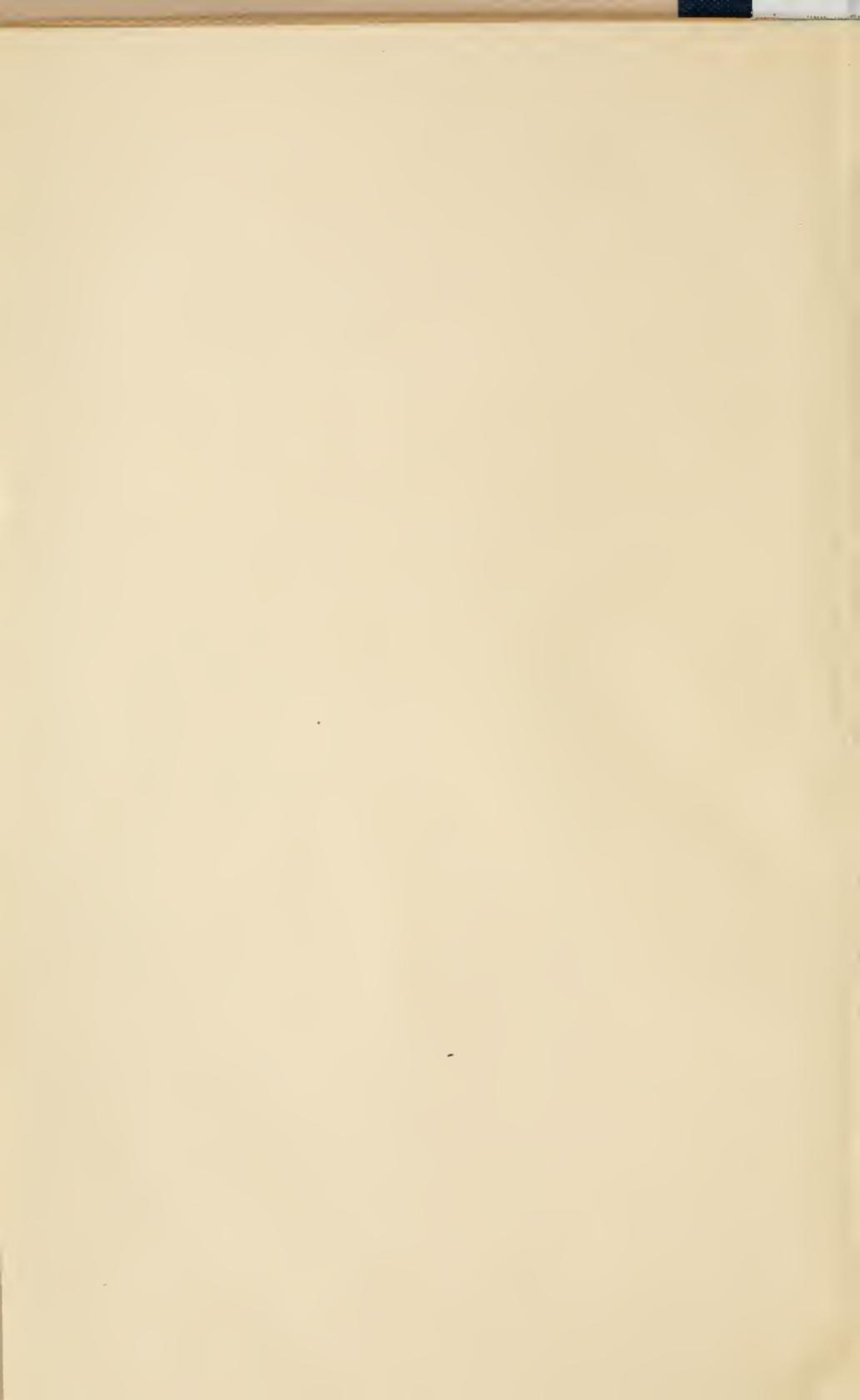
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## DESCRIPTIONS OF TRIANGULATION STATIONS IN GEORGIA.

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By CLARENCE H. SWICK,  
*Geodetic Computer, U. S. Coast and Geodetic Survey.*

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### INTRODUCTION.

This publication contains all the available descriptions of the triangulation stations the geographic positions of which are given in Special Publication No. 43. With the exception of a few supplementary stations along the oblique arc, the descriptions and geographic positions of all triangulation stations in Georgia determined previous to 1917 are included in this publication and in Special Publication No. 43. The stations are arranged in the same order in both books and the index at the end of each volume enables the reader to find readily the data he desires.

A discussion of the triangulation in Georgia will be found on pages 5 to 7 of Special Publication No. 43. As there stated, it consists of the primary triangulation along the oblique arc, the secondary triangulation from the oblique arc to Augusta, and the tertiary triangulation at the lower end of the Savannah River and along the coast. A good general idea of the triangulation may be obtained by consulting the sketches at the end of Special Publication No. 43. These sketches will also be found useful in connection with the descriptions in this volume.

A considerable part of the tertiary triangulation in Georgia was done 50 or more years ago and many of the stations located at that time were marked by wooden stakes. Some of them have been recovered in recent years and re-marked in a more permanent manner, but a large number of them are lost, due to the rotting away of the stakes or in some cases to changes in shore line or other causes. A few of these old stations have been searched for without success, but may still exist, and if triangulation were carried to the immediate vicinity of each station from the nearest available stations and careful measurements made an occasional one might be recovered. The expense of a search of this kind is considerable, often greater than the value of the old station if recovered, and so this method should

seldom be used except in cases where it is necessary to recover such a station in order to make a proper connection between new work and the old.

#### DESCRIPTIONS OF STATIONS.

All azimuths given in these descriptions are reckoned continuously from true south around by west to  $360^\circ$ , south being  $0^\circ$ , west  $90^\circ$ , north  $180^\circ$ , and east  $270^\circ$ . Where magnetic azimuths are given they are indicated as such.

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 name 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 recovered.

Any person who finds that one of the stations herein described has been disturbed, or that the description no longer fits the facts, is requested to send such information to the Superintendent, 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 the illustration facing this page, made of brass and cast in one piece. The disk is 90 mm. in diameter, with a small hole at the center surrounded by a 20 mm. equilateral triangle, and has the following inscribed legend: "U. S. Coast and Geodetic Survey triangulation station. For information write to Superintendent, Washington, D. C. \$250 fine or imprisonment for disturbing this mark." The shank is 25 mm. in diameter and 80 mm. long, with a slit at the lower end into which a wedge is inserted so that when it is driven into a drill hole in the rock it will bulge at the bottom and hold the mark securely in place.

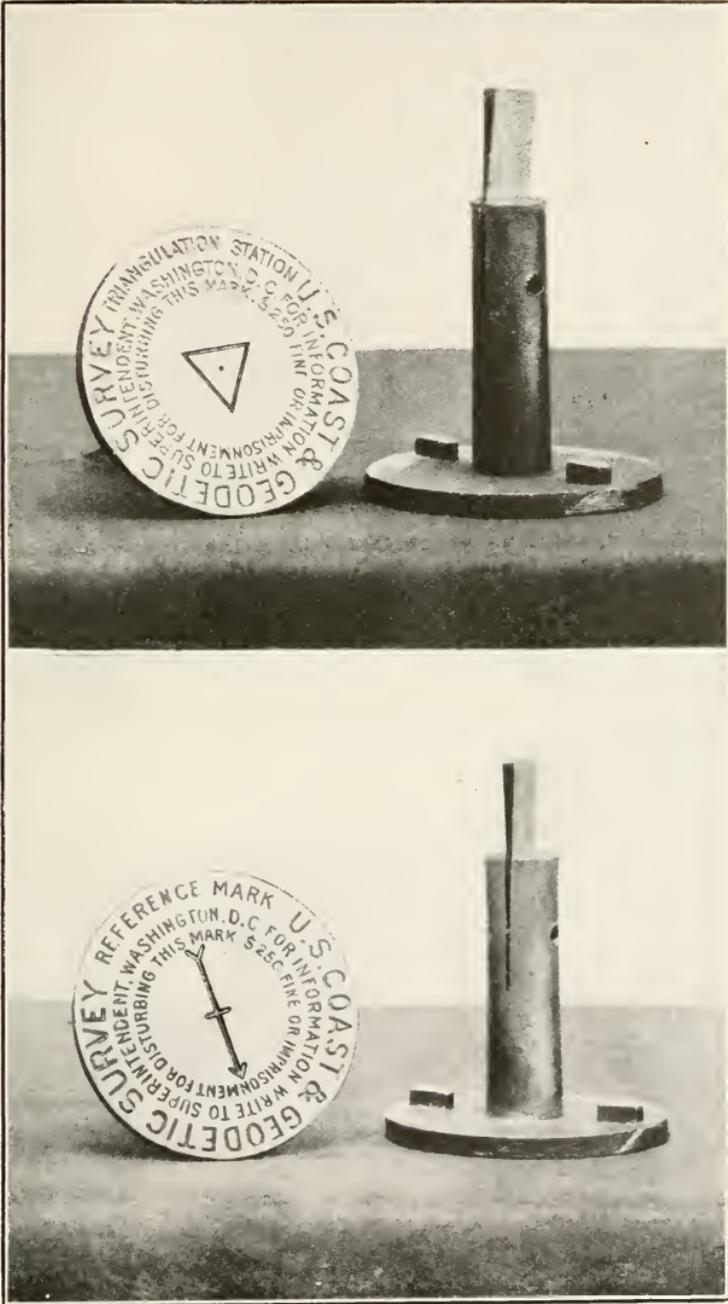
#### STANDARD NOTES ON THE MARKING OF STATIONS.<sup>1</sup>

##### *Surface station marks.*—

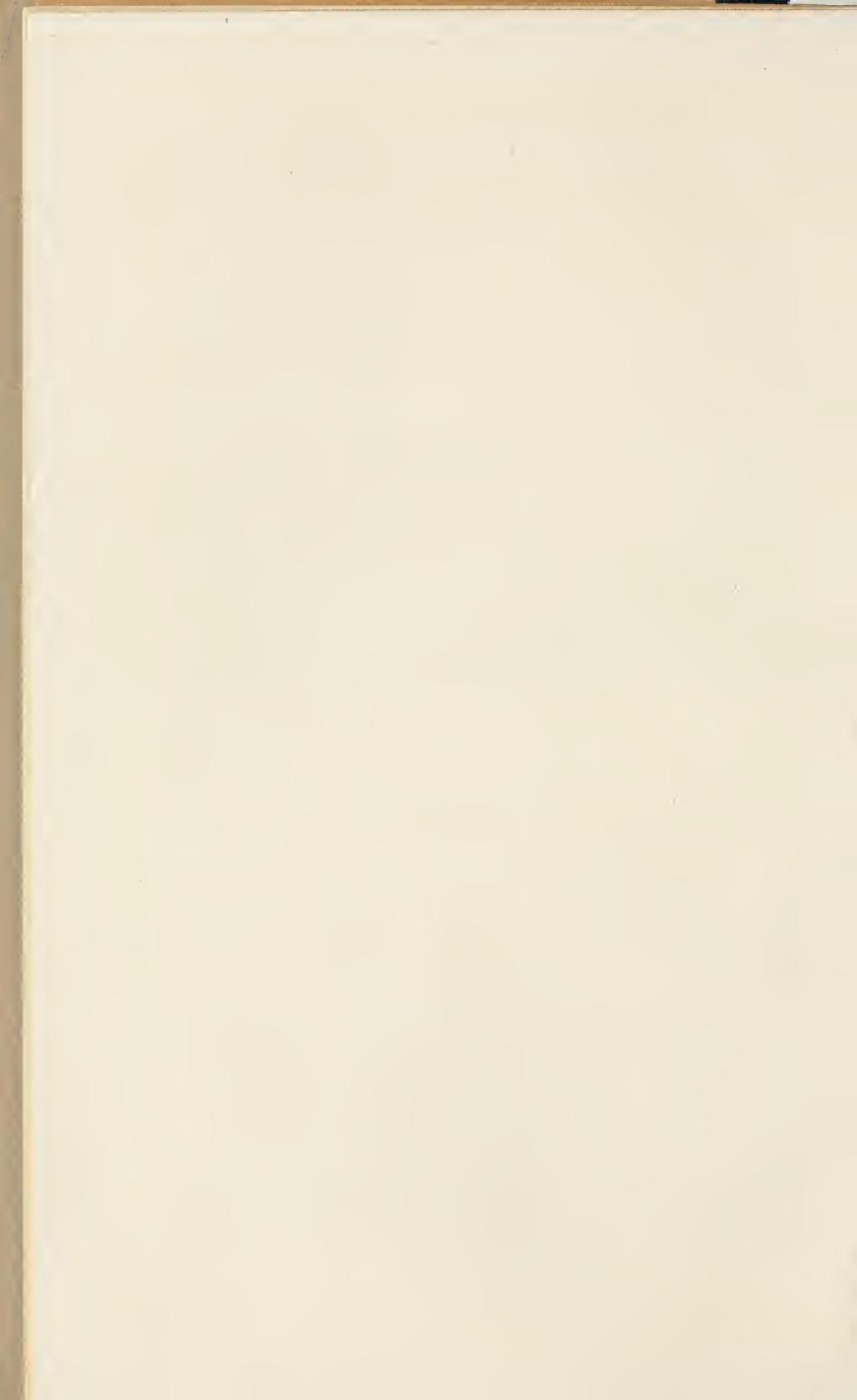
*Note 1.*—A standard disk station mark set in the top of (a) a square block or post of concrete, (b) a concrete cylinder, (c) an irregular mass of concrete.

*Note 2.*—A standard disk station mark wedged in a drill hole in outcropping bedrock, (a) and surrounded by a triangle chiseled in the rock, (b) and sur-

<sup>1</sup> Reprinted from "General instructions for the field work of the U. S. Coast and Geodetic Survey" (pp. 42 and 43).



STANDARD STATION AND REFERENCE MARKS USED IN MARKING TRIANGULATION STATIONS.



rounded by a circle chiseled in the rock, (c) at the intersection of two lines chiseled in the rock.

*Note 3.*—A standard disk station mark set in concrete in a depression in outcropping bedrock.

*Note 4.*—A standard disk station mark wedged in a drill hole in a boulder.

*Note 5.*—A standard disk station mark set in concrete in a depression in a boulder.

*Note 6.*—A standard disk station mark set in concrete at the center of the top of a tile (a) which is embedded in the ground, (b) which is surrounded by a mass of concrete, (c) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (d) which is set in a block of concrete and projects from 12 to 20 inches above the block.

#### *Underground station marks.*—

*Note 7.*—A block of concrete 3 feet below the ground containing at the center of its upper surface (a) a standard disk station mark, (b) a copper bolt projecting slightly above the concrete, (c) an iron nail with the point projecting above the concrete, (d) a glass bottle with the neck projecting a little above the concrete, (e) an earthenware jug with the mouth projecting a little above the concrete.

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

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

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

#### *Reference marks.*—

*Note 11.*—A standard disk reference mark with the arrow pointing toward the station set at the center of the top of, (a) a square block or post of concrete, (b) a concrete cylinder, (c) an irregular mass of concrete.

*Note 12.*—A standard disk reference mark with the arrow pointing toward the station, (a) wedged in a drill hole in outcropping bedrock, (b) set in concrete in a depression in outcropping bedrock, (c) wedged in a drill hole in a boulder, (d) set in concrete in a depression in a boulder.

*Note 13.*—A standard disk reference mark with the arrow pointing toward the station set in concrete at the center of the top of a tile, (a) which is embedded in the ground, (b) which is surrounded by a mass of concrete, (c) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (d) which is set in a block of concrete and projects from 12 to 20 inches above the block.

#### *Witness marks.*—

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

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

## ADDITIONAL NOTES ON THE MARKING OF STATIONS.

*Note 16.*—A large nail embedded in concrete with the point projecting one-half inch at the center of a 4-inch or 6-inch tile which is set in a block of concrete  $2\frac{1}{2}$  feet in diameter and about 3 feet long, the top of which is flush with the surface of the ground. The underground mark is the same as the surface mark except that the block of concrete in which the tile is embedded is smaller. The surface mark is inscribed U. S. C. & G. S. 1902.

*Note 17.*—A copper nail embedded in concrete at the center of a 4-inch or 6-inch tile which in turn is set in a block of concrete and projects about 6 inches above the ground. The letters U. S. are usually impressed in the top of the concrete. The underground mark is a bottle embedded in concrete and sometimes surrounded by a truncated cone of cast iron.

*Note 18.*—A pine post driven several feet into the ground or marsh and surrounded by four smaller stubs, each 3 feet distant, in the form of a square, the diagonals of which intersect at the station.

*Note 19.*—A bottle buried 2 or 3 feet below the surface of the ground and walled in with brick. Over the bottle is a stone which projects an inch or two above the ground.

*Note 20.*—A cross cut in the top of a scantling set at the center of two tiles sunk into the ground one above the other. The scantling projects slightly above the ground and the top of the upper tile is about 1 foot below the ground.

*Note 21.*—The station is marked by a signal pole. Four reference stakes, each 2 feet from the station, form a square, the diagonals of which intersect at the station.

*Note 22.*—The station is marked by two tiles placed one above the other and filled with concrete. A mass of concrete is around the bottom of the lower tile and around the joint where the two tiles fit together.

## OBLIQUE ARC, PRIMARY TRIANGULATION.

*Rabun* (Rabun County, Ga., C. O. Boutelle, 1875).—On the second highest peak in Georgia, known locally as Kelly Bald Mountain. The station is reached through the famous Rabun Gap, whence the name. No further description is available.

*Currahee* (Stephens County, Ga., C. O. Boutelle, 1874; 1902).—About 4 miles southwest of Toccoa, on a small isolated peak, the most southeastern elevation near the Savannah River. The station is marked according to note 16<sup>1</sup> except that the underground mark is a brass tack in a pine plug driven in a drill hole in solid bedrock. Four reference marks, each consisting of a stone marked with an arrow pointing toward the station, are at the following distances from the station: 1.74 meters (5.7 feet) north; 1.46 meters (4.8 feet) east; 1.43 meters (4.7 feet) south; and 1.55 meters (5.1 feet) west. Four additional reference marks, each consisting of a 1-inch drill hole 5 inches deep in the solid rock ledge, are at the following distances and azimuths from the station: 6.89 meters (22.6 feet)  $38^{\circ} 44'$ ; 6.04 meters (19.8 feet)  $186^{\circ} 16'$ ; 6.55 meters (21.5 feet)  $186^{\circ} 16'$ ; and 6.89 meters (22.6 feet)  $357^{\circ} 38'$ .

*Blood* (Union County, Ga., C. O. Boutelle, 1873).—On the top of Blood Mountain, about 120 yards east-southeast of an irregular rock which is the highest point of the peak. Description of the marking is not available.

*Skitt* (White County, Ga., C. O. Boutelle, 1874).—On Skitt Mountain, about 18 miles north-northeast of Gainesville, and about 7 miles east of Mount Walker. No further description is available.

<sup>1</sup> See above.

*Grassy* (Pickens County, Ga., C. O. Boutelle, 1874).—On the top of Grassy Mountain, a heavily wooded peak with a broad top from which can be seen the whole Blue Ridge range for a distance of 100 miles in a northeasterly direction. Description of the marking is not available.

*Sawnee* (Forsyth County, Ga., C. O. Boutelle, 1873).—On the highest point of the central and most prominent one of the three peaks of Sawnee Mountain. The station is marked by a copper tack in a wooden stub. Four other stubs are at the following distances from the station: 6.04 meters (19.8 feet) northeast, 2.07 meters (6.8 feet) southeast, 6.10 meters (20 feet) southwest, and 3.93 meters (12.9 feet) northwest. The diagonal lines connecting these stubs intersect at the station.

*Pine Log* (Cherokee County, Ga., F. P. Webber, 1873).—On the highest point of Pine Log Mountain. The station is marked by a cross cut in the top of a granite post 5 inches square, which projects slightly above the ground. The letters U. S. C. S. are cut in the top of the post. The underground mark is a jug filled with ashes 2½ feet below the ground. Four other granite posts, each marked with a cross and an arrow pointing toward the station, are 6 feet distant north, east, south, and west, respectively.

*Sweat Mountain* (Cobb County, Ga., F. P. Webber, 1873).—On the highest part of the narrow ridge of rough stratified rocks which forms the summit of Sweat Mountain. The station is marked by a copper bolt set in a drill hole near the edge of a rock. Three reference marks, each consisting of a copper bolt set in a drill hole in a rock, are at the following distances and azimuths from the station: 1.90 meters (6.2 feet), 51° 52'; 2.35 meters (7.7 feet), 132° 17'; and 3.75 meters (12.3 feet), 279° 45'. At each reference mark there is an arrow head cut in the rock and pointing toward the station.

*Kenesaw* (Cobb County, Ga., F. P. Webber, 1873).—About 3 miles northwest of Marietta on the highest part of Kenesaw Mountain. The station is marked by a cross and the letters U. S. C. S. in the top of a granite post 5 inches square, which projects about 2 inches above the ground. The underground mark is a cross in a copper bolt set in a drill hole in the bedrock about 2 feet below the ground. Three reference marks, each consisting of a copper bolt set in a drill hole in a rock, are at the following distances from the station: 2.01 meters (6.6 feet) east, 3.47 meters (11.4 feet) west, and 3.41 meters (11.2 feet) northwest.

*Atlanta northeast base* (Gwinnett County, Ga., C. O. Boutelle, 1873; 1907).—About 12 miles northeast of Atlanta and about 500 feet west of the Southern Railway measured from a mile post 1 mile from Norcross. The station is marked by a cross in a copper bolt set in a drill hole in a large granite block, 3.3 feet square at the base, 3 feet square at the top, and 2.5 feet high. This block rests on a brick foundation 5 feet square and 1 foot high having a hole 1 foot square through the center to give access to the underground mark. The underground mark is a copper bolt in the top of a granite post 6 inches square and 2 feet long, 3.5 feet below the top of the surface mark. Four reference marks, each consisting of a copper bolt in the top of a stone post 1 foot square and 3 feet long, form a square the sides of which are parallel and at right angles to the direction of the base line and the diagonals of which intersect at the station. The land included within this square was deeded to the Government by J. H. Maloney. Each reference mark is 18 meters (59.05 feet) from the station and an arrow head cut in the top of each stone post points toward the station.

*Academy* (Gwinnett County, Ga., C. O. Boutelle, 1874).—On the highest point of Academy Hill in the village of Lawrenceville. The station is marked

by a cross in the top of a granite post and underground by a bottle filled with ashes buried 3 feet below the surface. Four other granite posts, each marked with a cross and an arrowhead pointing toward the station, form a square, the diagonals of which intersect at the station. Each of these reference marks is 5 feet from the station except the southwest mark which is 4.5 feet, and they are in approximate azimuths as follows:  $30^\circ$ ,  $120^\circ$ ,  $210^\circ$ , and  $300^\circ$ .

*Stone Mountain* (DeKalb County, Ga., C. O. Boutelle, 1873).—On Stone Mountain, a well-known bare granite peak, standing in an isolated position southeast of the mountains of the main chain. The station is marked by a copper bolt in the solid granite of the mountain at the center of a circle  $3\frac{1}{2}$  feet in radius within which the rock has been cut down to a level surface. In the periphery of this circle are six equidistant drill holes 2 inches deep and  $3\frac{1}{2}$  feet apart.

*Atlanta middle base* (DeKalb County, Ga., C. O. Boutelle, 1873; 1907).—On the southeast slope of a small knoll about 1,100 feet northeast of the station at Doraville and 110 feet northwest of the nearest rail of the Southern Railway track measured from a point in a deep cut opposite the seventh telegraph pole from Doraville. A road crossing is 63 paces northeast of this point. The station is marked by a small drill hole in a copper bolt set at the intersection of two cross lines in the top of a granite post 1 foot square and 3 feet long which projects slightly above the ground. The underground mark is a bottle filled with ashes about  $2\frac{1}{2}$  feet below the surface. The reference marks are four granite posts each 7 inches square and 3 feet long and each marked with a diagonal groove and an arrowhead pointing toward the station. Each is 5 feet from the station, and together they form a square whose sides are parallel to and at right angles to the base line. The diagonal lines of this square intersect at the station.

*Atlanta southwest base* (DeKalb County, Ga., C. O. Boutelle, 1873; 1907).—About 12 miles northeast of Atlanta on the northwestern slope of a small hill just east of the track of the Southern Railway and about 100 yards south of G. Humphrey's house. The station is marked exactly the same as *Atlanta northeast base* (p. 9). The square of ground defined by the reference marks was decided to the Government by Mr. Humphry.

*Carnes* (Polk County, Ga., F. P. Webber, 1873).—On the summit of Carnes Mountain just east of the town of Rock Mart. The station is marked by a copper tack in a wooden stub. There is a reference stub with a copper tack in the top directly south of the station and another directly west. A more permanent marking was probably put in at this station at a later date but no record of it is available.

*Lavender* (Floyd County, Ga., F. P. Webber, 1873; 1875).—On the summit of the highest peak of the Lavender ridge. The station is marked by a cross surrounded by the letters U. S. C. S. in the top of a granite post 5 inches square which projects slightly above the ground. The underground mark is a jug filled with ashes. The reference marks are four granite posts each marked with a cross and an arrowhead pointing toward the station. They are 6 feet from the station north, east, south, and west, respectively.

*Johns* (Walker County, Ga., F. P. Webber, 1874).—On the highest part of Johns Mountain, which is a ridge 7 or 8 miles long extending in a north-northeast and south-southwest direction. The station is about  $1\frac{1}{2}$  miles from the abrupt northern end of the ridge. It is marked exactly the same as *Lavender* (see above).

*Indian* (Cherokee County, Ala., F. P. Webber, 1875; 1885).—On the highest point of Indian Mountain, also called the dividing ridge, about  $1\frac{1}{2}$  miles west of the State line and  $4\frac{1}{2}$  miles from Priors Station, Ga. The station is marked

by a broken granite post 5 inches square, which is covered over with earth and rock. The underground mark is a cross in a copper belt set in a drill hole in bedrock about 2 feet below the surface of the ground. Another granite post with the top broken off is 6 feet due west of the station. Other reference marks are a drill hole three-fourths of an inch deep in the outcropping ledge 6.09 meters (19.97 feet) northeast of the station and a cross cut in the ledge 5.10 meters (16.75 feet) east of the station.

*Gulf Point* (Walker County, Ga., F. P. Webber, 1875).—On the highest part of Lookout Mountain, about 40 miles from Chattanooga, Tenn., at the head of McLamores Cove. The station derives its name from a large cove known locally as the Gulf just south of the station. It is marked the same as *Lavender* (see p. 10), except that the underground mark is a cross on a copper bolt in a drill hole in bedrock about 2 feet underground.

*High Point 2* (U. S. G. S.) (Walker County, Ga., A. H. Buchanan, 1888).—On the highest point of a narrow sharp ridge on the east side of Lookout Mountain, about 15 miles southwest of Chattanooga, Tenn. The station is marked by a hole 1 inch in diameter and  $1\frac{1}{2}$  inches deep drilled in a rock. The reference marks, each of which is a drill hole in a rock with an arrowhead pointing toward the station, are at the following distances and azimuths from the station: 7.82 meters (25.66 feet),  $52^{\circ} 24'$ ; 6.58 meters (21.58 feet),  $176^{\circ} 17'$ ; and 9.70 meters (31.84 feet),  $257^{\circ} 25'$ . The third reference mark is in a large rock separated from the bluff on which the station is located by a crevasse several feet wide.

*Cohutta* (Fannin County, Ga., F. P. Webber, 1874; 1888).—On the summit of the highest peak of Cowpen Mountain, about  $7\frac{1}{4}$  miles south of the Tennessee State line. The station is marked by a drill hole 2 inches deep at the intersection of two cross lines in a large boulder set flush with the surface of the ground. The underground mark is a nail set in plaster of Paris in a drill hole in a large boulder 3 feet below the ground. Three reference marks, each consisting of a drill hole in a rock with an arrow pointing toward the station, are at the following distances and azimuths from the station: 9.30 meters (30.5 feet),  $19^{\circ} 36'$ ; 11.34 meters (37.2 feet),  $167^{\circ} 29'$ ; and 14.57 meters (47.8 feet),  $315^{\circ} 11'$ .

*Mauldin* (Pickens County, S. C., C. O. Boutelle, 1875; 1902).—On Mauldin Mountain, about  $1\frac{1}{2}$  miles southwest of Easley and about 100 feet from a bare ledge of rock on the southwest and west slope of the mountain. The station is in an orchard and is marked by a cross surrounded by the letters U. S. C. S. in the top of a granite post 5 inches square set in a block of concrete  $2\frac{1}{2}$  feet in diameter and about 3 feet long, the top of which is flush with the surface of the ground. The top of the concrete is marked Mauldin, 1902. The underground mark is a large nail embedded in concrete at the center of a 4-inch tile which is set in a block of concrete 15 inches in diameter. Four granite posts, each marked with a cross, are at the following distances from the station: 4.8 feet north, 4.9 feet east, 5.1 feet south, and 5.0 feet west. A 1-inch drill hole 6 inches deep in the rock ledge is 44.95 meters (147.5 feet) from the station in azimuth  $110^{\circ} 10'$  and another drill hole of the same size is in the ledge 47.45 meters (155.7 feet) from the station in azimuth  $87^{\circ} 41'$ .

OBLIQUE ARC TO AUGUSTA, SECONDARY TRIANGULATION.

*Six Mile Mountain* (Pickens County, S. C., W. B. Fairfield, 1902).—On the highest point of Six Mile Mountain, about 6 miles southwest of Pickens court-house and about 1 mile south of the home of W. R. Garrett who owns the hill.

The station is marked according to note 16.<sup>1</sup> Three reference marks, each consisting of a 1-inch drill hole 6 inches deep in the solid rock, are at the following distances and azimuths from the station: 19.62 meters (64.3 feet),  $21^{\circ} 35'$ ; 23.82 meters (78.1 feet),  $58^{\circ} 17'$ ; and 13.38 meters (43.9 feet),  $122^{\circ} 24'$ .

*Little Mountain* (Anderson County, S. C., W. B. Fairfield, 1902).—On the highest point of the heavily wooded hill known as Little Mountain and owned by F. Watson, about 6 miles southwest of the town of Anderson. The station is marked according to note 16.<sup>1</sup> Three reference marks, each consisting of a 1-inch drill hole 4 inches deep in a solid rock, are at the following distances and azimuths from the station: 17.25 meters (56.6 feet),  $51^{\circ} 50'$ ; 16.38 meters (53.8 feet),  $130^{\circ} 05'$ ; and 19.57 meters (64.2 feet),  $271^{\circ} 35'$ .

*Owens* (Hart County, Ga., W. B. Fairfield, 1902).—About  $2\frac{1}{2}$  miles southeast of Bowersville on the road leading to Hartwell, on land belonging to W. Owens and about 250 meters southeast of his house. The station is in an open field at the point of woods 25 meters west of a private road leading to Mr. Owens' house and about 125 meters north of where this road crosses the narrow-gauge railroad between Hartwell and Bowersville. The station is about 100 meters south of a tenant house. It is marked according to note 16.<sup>1</sup> A reference mark, consisting of a large nail embedded in concrete at the center of a 6-inch tile which is set in a block of concrete, is at the south point of woods on the east side of the private road mentioned above, 30.773 meters (100.96 feet) north  $72^{\circ}$  east (magnetic) from the station.

*Beulah* (Abbeville County, S. C., W. B. Fairfield, 1902).—About one-half mile south of Barnes, about 50 meters from the Anderson County line and 30 meters north of Beulah Church, on the west side of the county road and about 60 meters west of the Charleston and Western Carolina Railway. The station is marked according to note 16.<sup>1</sup> A reference mark, consisting of a large nail embedded in concrete at the center of a 4-inch tile which is set in a block of concrete, is near the northeast corner of the church and 36.118 meters (118.50 feet) from the station in azimuth  $4^{\circ} 45'$ . The northeast corner of the church is distant 34.205 meters (112.21 feet) in azimuth  $6^{\circ} 23'$  and the northwest corner 35.164 meters (115.37 feet) in azimuth  $33^{\circ} 19'$ .

*Dewey Rose* (Elbert County, Ga., W. B. Fairfield, 1902; 1907).—In the village of Dewey Rose, at the southeast corner of a garden on land belonging to Mr. Carrithers and about 100 meters southeast of his dwelling house. The station is marked according to note 16.<sup>1</sup> A reference mark, consisting of a large nail embedded in concrete at the center of a 6-inch tile which is set in a block of concrete, is in a fence corner 19.53 meters (64.06 feet) from the station in azimuth  $303^{\circ} 25'$ . The center chimney of Carrithers's house is in azimuth  $157^{\circ} 55'$  from the station and a cotton gin stack is in azimuth  $297^{\circ} 44'$ .

*Rose Hill* (Elbert County, Ga., W. B. Fairfield, 1902; 1907).—About 1 mile south of the railway station of Middleton, on the highest point of the Rose Hill estate, owned by E. B. Heard and about 400 meters south of his dwelling house. The station is about 30 meters south of the old Petersburg road. It is marked according to note 16.<sup>1</sup> A reference mark, consisting of a large nail embedded in concrete at the center of a 6-inch tile, which in turn is set in a block of concrete 15 inches in diameter, is 28.68 meters (94.09 feet) from the station in azimuth  $350^{\circ} 00'$ . The west gable of Heard's house is in azimuth  $230^{\circ} 51'$  and the chimney of a negro tenant cabin is 30.0 meters (98.4 feet) from the station in azimuth  $104^{\circ} 06'$ .

<sup>1</sup> See p. 8.

*Parsons* (Abbeville County, S. C., W. B. Fairfield, 1902).—On the highest point of the rocky summit of Parsons Mountain, known also as Jordans Mountain, about 6 miles south of Abbeville and just north of the county road from Abbeville to Troy. The station is marked by a drill hole with a triangle chiseled around it in a solid rock. Four reference marks, each consisting of a 1-inch drill hole 4 inches deep in the solid rock ledge, are at the following distance and azimuths from the station: 8.07 meters (26.47 feet),  $31^{\circ} 49'$ ; 5.30 meters (17.40 feet),  $113^{\circ} 36'$ ; 12.68 meters (41.60 feet),  $184^{\circ} 55'$ ; and 3.85 meters (12.62 feet),  $304^{\circ} 54'$ .

*Lincoln* (Lincoln County, Ga., W. B. Fairfield, 1902).—On the highest point of Lincoln Mountain, known also as Graves Mountain, a rocky, heavily wooded hill about 350 feet above the general level. The summit of the mountain is a narrow ridge about one-half mile long in a northeast and southwest direction, terminating at either end in a rocky peak. The station is on the highest point of the southwest peak, about 200 meters north of the cliff at the end of the ridge. It is marked by a 1-inch drill hole 6 inches deep with a triangle chiseled around it in the solid rock. Three reference marks, each consisting of a drill hole in a large solid boulder, are at the following distances and azimuths from the station: 8.42 meters (27.62 feet),  $42^{\circ} 33'$ ; 12.68 meters (41.60 feet),  $116^{\circ} 27'$ ; and 19.68 meters (64.57 feet),  $293^{\circ} 03'$ .

*Williams* (Edgefield County, S. C., W. B. Fairfield, 1902).—About 2 miles southwest of Longmires post office, on the farm of L. J. Williams, about 300 meters southwest of his house and 35 meters west of the center of the road to Plum Branch, measured from a point about 30 meters southwest of a fork of roads. The station is in the edge of a pine thicket and is marked according to note 16.<sup>1</sup> A reference mark, consisting of a large nail embedded in concrete at the center of a 4-inch tile, which in turn is set in a block of concrete 15 inches in diameter, is at the fork of roads mentioned above, 46.55 meters (152.72 feet) from the station in azimuth  $293^{\circ} 06'$ . The south gable of Williams's barn is in azimuth  $240^{\circ} 05'$ .

*Clarks Hill* (Edgefield County, S. C., W. B. Fairfield, 1902).—On the highest point of Clarks Hill, in a cultivated field and about 250 yards from a dwelling house. The station is marked according to note 16.<sup>1</sup> A reference mark, consisting of a large nail embedded in concrete at the center of a 4-inch tile, is just inside the yard north of the dwelling house 100.48 meters (329.65 feet) from the station in azimuth  $329^{\circ} 03'$ .

*McKnight* (Columbia County, Ga., W. B. Fairfield, 1902).—About 2 miles south of Evans railway station, on the farm of W. J. McKnight, in a cultivated field directly in front of his dwelling house. The station is on the west side of the county road from Evans and is marked according to note 16.<sup>1</sup> A reference mark, consisting of a large nail embedded in concrete at the center of a 4-inch tile which in turn is set in a block of concrete 15 inches in diameter, is in the yard just east of the garden fence line, 6 meters north of the fence on the north side of the lane leading to the barn and 73.98 meters (242.72 feet) from the station in azimuth  $113^{\circ} 48'$ . The southeast corner of the south chimney of McKnight's house is 53.22 meters (174.6 feet) from the station in azimuth  $127^{\circ} 06'$ .

*Bunch* (Edgefield County, S. C., W. B. Fairfield, 1902).—About 8 miles north of Augusta, Ga., on the highest ground in a peach orchard belonging to E. M. Bunch and about 300 meters west of his house. The station is on the south side of the county road and is marked according to note 16.<sup>1</sup> The reference mark is a large nail embedded in concrete at the center of a 4-inch tile which

<sup>1</sup> See p. 8.

in turn is embedded in a block of concrete 15 inches in diameter inscribed with the letters U. S. C. & G. S. and an arrow pointing toward the station. It is in a small triangular plot about 6 meters on a side formed at the fork of roads and is 154.28 meters (506.17 feet) from the station in azimuth  $207^{\circ} 37'$ . The west chimney of Bunch's house is in azimuth  $255^{\circ} 07'$  from the station.

*Reservoir*<sup>1</sup> (Richmond County, Ga., W. B. Fairfield, 1902).—On the Monte-Sano hills about 4 miles northwest of Augusta, in the reservation in which are located the reservoir, filtering works, and basin of the Augusta City waterworks. The station is in the west part of the grounds, 34 meters from the west line fence, 305 meters from the south line fence, 205 meters from the north line fence, and 6.5 meters north of the prolongation of the line of the south curbing of the reservoir. In 1902 plans had been made to build a new reservoir between the old one and the station, but this would not disturb the station. The station is marked according to note 16.<sup>2</sup> A reference mark, consisting of a large nail embedded in concrete at the center of a 4-inch tile which in turn is set in a block of concrete 15 inches in diameter, is in the fence line on the west side of the reservation 34.12 meters (111.94 feet) from the station in azimuth  $91^{\circ} 57'$ . A large pine tree, marked with a blaze and several nails in the form of a triangle, is 11.49 meters (37.70 feet) from the station in azimuth  $358^{\circ} 56'$ . Other azimuths from the station are as follows: Southwest corner of the reservation fence,  $15^{\circ} 06'$ ; northwest corner of same fence,  $173^{\circ} 51'$ ; filtering house, west cupola,  $299^{\circ} 26'$ .

*Butler* (Aiken County, S. C., W. B. Fairfield, 1902).—In north Augusta, on what is known as the old Butler place owned by Dr. W. E. Mealing, and about 300 meters north of the house which is a large square brick house located on top of a hill. The station is at the north end of a peach orchard, about 4 meters west of the boundary line between the Butler property and that of P. B. Tobin, and about 150 meters west of the Augusta and Aiken Electric Railway. The station is marked according to note 16.<sup>2</sup> A reference mark, consisting of a large nail embedded in concrete at the center of a 4-inch tile which in turn is set in a block of concrete flush with the surface of the ground, is in the property line 3.84 meters (12.60 feet) from the station in azimuth  $270^{\circ} 27'$ . Other azimuths are as follows: Cupola of Butler's house  $15^{\circ} 17'$ ; peak of roof of reservoir, distant about 500 meters,  $47^{\circ} 00'$ ; and east chimney of Tobin's house, distant about 150 meters,  $207^{\circ} 11'$ .

*Augusta post office* (Richmond County, Ga., W. B. Fairfield, 1902).—The iron staff used by the United States Weather Bureau to support its wind vane and anemometer on the tower at the northeast corner of the post-office building in Augusta.

*Beech Island* (Aiken County, S. C., W. B. Fairfield, 1901; 1902).—At Beech Island, about 500 meters north of the north end of the 22-mile tangent from Millpond of the Charleston & Western Carolina Railway, on a slight rise of ground about 15 feet above the tracks on land belonging to W. W. Woolsey. The station is about 30 meters from the track and about 400 meters from a section house on the opposite side of the track. It is marked according to note 16,<sup>2</sup> with the addition of a second underground mark consisting of a bottle buried mouth up 5 feet below the surface of the ground.

#### SAVANNAH RIVER.

*Fort Pulaski* (Chatham County, Ga., C. O. Boutelle, 1851; 1916).—At the northwest corner of the northwest bastion of Fort Pulaski. The station is

<sup>1</sup> This station was reported lost in 1917 after this publication had gone to press.

<sup>2</sup> See p. 8.

marked by a cross filed in the top of a pintle bolt for the gun in that angle of the fort. The pintle bolt is a projection or lug  $1\frac{1}{2}$  inches in diameter and 4 inches high, projecting from and a part of a heavy flat iron plate about 18 inches in diameter which is securely fastened to the masonry. This station is near *Pulaski* (U. S. E.) (See p. 16.)

*McQueen* (Chatham County, Ga., 1873).—No description available.

*Rock Point* (Beaufort County, S. C., C. O. Boutelle, 1851).—Reported lost in 1874.

*Cooper* (Chatham County, Ga., C. O. Boutelle, 1851).—About one-third mile south of St. Augustine Creek on the bank of a small stream, on a plantation belonging to a Miss Cooper. The station is marked by a triangle at the base of a pine stump 20 feet high which was used as an instrument support. Three reference stones are at the following distances from the station: 4 feet north, 4 feet south, and  $3\frac{1}{2}$  feet west.

*Fort Jackson* (Chatham County, Ga., C. O. Boutelle, 1850).—On the parapet of Fort Jackson 3.32 meters (10.9 feet) from the inner face of the breast-high scarp wall at a point just in front of the fourth gun counting from the west flank of the battery. The station is 4.75 meters (15.6 feet) east by south from the third angle of the scarp wall counting from the west flank. The station is marked by a copper bolt in a granite post inclosed in an earthenware cone.

*Proctor* (Beaufort County, S. C., C. O. Boutelle, 1852).—On the north side of the Savannah River opposite the west end of Elba Island, on the roof of the overseer's house of Dr. Screven's (?) plantation. The station is on the ridge of the roof 1.10 meters (3.6 feet) west of the chimney. It was not marked except by a signal pole.

*Proctor (U. S. E.)* (Beaufort County, S. C., O. B. French, 1902; 1913).—On the north side of the Savannah River near the north end of the Barnwell Island training wall, which extends northeast from the end of Barnwell Islands 2 and 3. The station was marked originally by a wooden post. In 1913 it was found that this post had rotted off at the ground, and a new post had been set beside it by the Corps of Engineers at a distance of 0.2 meters. A mass of concrete was placed around the two posts just below the ground. A reference mark, note 11b,<sup>1</sup> is 11.08 meters (36.4 feet) inshore from the station.

*Savannah north base* (Beaufort County, S. C., C. O. Boutelle, 1850).—Reported lost in 1894.

*Savannah south base* (Beaufort County, S. C., C. O. Boutelle, 1850; 1913).—On Dr. Screven's plantation, on the east side of the Union Causeway road, about 400 meters from the ferry slip on Back Creek, on a dam running parallel with the road. The station is marked by a copper bolt in the top of a granite post 4 inches square, the upper end of which is surrounded with concrete. A standard disk station mark is embedded in the concrete just south of the post. It should be carefully noted that the copper bolt and not the disk marks the station. A reference mark, consisting of a standard brass disk reference mark set in the top of a length of 6-inch stovepipe filled with concrete, is 17.46 meters (57.3 feet) from the station in azimuth  $297^{\circ} 19'$ . Other distances and azimuths from the station are as follows: Small tree by bridge, 10.1 meters (33.1 feet),  $339^{\circ} 47'$ ; chimney of dwelling house, about 160 meters (525 feet),  $12^{\circ} 53'$ ; and chimney of Screven's house, about one-third mile,  $259^{\circ} 22'$ .

*Cherres* (Beaufort County, S. C., C. O. Boutelle, 1850).—Reported lost in 1893.

*Daniell* (Beaufort County, S. C., C. O. Boutelle, 1850).—Near the west end

<sup>1</sup> See p. 7.

of a high shell knoll on the plantation of Dr. Daniell. The station is marked by a copper bolt in the top of a granite post inclosed in an earthenware cone.

*Smith* (Beaufort County, S. C., C. O. Boutelle, 1850).—On a sand knoll known locally as Weather House Hill on the plantation of Pringle Smith. The station is on the southeast side of the knoll between an oak tree and a wild orange tree and just south of a well. It is marked by a copper bolt in a granite post inclosed in an earthenware cone.

*King* (Chatham County, Ga., C. O. Boutelle, 1850).—At the northwest end of Hutchinson Island on the plantation belonging to Judge King, on the embankment which bounds the estate on that part of Back Creek known as the Crossings. The station is marked by a copper bolt in a granite post inclosed in an earthenware cone.

*Pulaski* (*U. S. E.*) (Chatham County, Ga., O. B. French, 1902).—This station is 75.18 meters (246.7 feet) from station *Fort Pulaski* (see p. 14). It is marked by a wooden post 10 feet high, the foot of which is embedded in a barrel of concrete.

*Oglethorpe* (*U. S. E.*) (Chatham County, Ga., O. B. French, 1902; 1913).—On the northeast corner of the north bastion of old Fort Oglethorpe (see *Oglethorpe* 2, p. 18). No description of the marking is available.

*Flat* (Chatham County, Ga., W. C. Hodgkins, 1900).—On the sand flats off the mouth of Tybee Creek. The station is marked by a tack in a yellow pine post.

*White* (Beaufort County, S. C., C. Hosmer, 1873).—Reported lost in 1894.

*Northeast* (Beaufort County, S. C., C. Hosmer, 1874).—Reported lost in 1894.

*Fort Jackson 3* (Chatham County, Ga., C. Hosmer, 1874; 1913).—On the parapet at the northwest angle of the fort, 0.86 meter (2.82 feet) from the outer edge of the wall and 0.24 meter (0.79 foot) from the inner edge. The station is marked by a small hole in a lead bolt set in the brickwork of the fort.

*Rock Point 2* (Beaufort County, S. C., C. Hosmer, 1874).—About 6 miles from Savannah on the only high ground on the north side of the Savannah River between the rice fields and the mouth of the river. The station is marked according to note 19.<sup>1</sup>

*St. Augustine 2* (Chatham County, Ga., C. Hosmer, 1874).—On the south side of the Savannah River, about 300 meters east of the entrance to St. Augustine Creek, between the third and fourth telegraph poles from the creek and about 10 meters from the shore of the river. The station is marked according to note 19.<sup>1</sup>

*De Wolf* (Beaufort County, S. C., C. Hosmer, 1873).—On the north side of the Savannah River opposite the east end of Elba Island and just west of the mouth of Mud River. The station is on the marsh 10 meters from shore and is marked according to note 19.<sup>1</sup>

*McQueen 2* (Chatham County, Ga., C. Hosmer, 1874).—On the south side of the Savannah River opposite the east end of Elba Island. The station is on the marsh 10 meters from shore and is marked according to note 19.<sup>1</sup>

*Venus Point beacon* (Beaufort County, S. C., C. Hosmer, 1873).—On the north side of the Savannah River about a mile below the mouth of Mud River. The station is marked according to note 19.<sup>1</sup>

*McClintock* (Chatham County, Ga., C. Hosmer, 1874).—On the south side of the Savannah River nearly opposite the west end of Long Island. The station is on the marsh 20 meters from shore and is marked according to note 19.<sup>1</sup>

*Turtle Point* (Beaufort County, S. C., C. Hosmer, 1874).—On the southwest point of Turtle Island and just east of the range defined by *Cockspar unused*

<sup>1</sup> See p. 8.

*lighthouse* and *Oyster Beds rear range lighthouse*. The station is on the marsh 30 meters from shore and is marked according to note 19.<sup>1</sup>

*Barrel* (Chatham County, Ga., C. Hosmer, 1874).—On the south side of the Savannah River opposite the west end of Cockspur Island. The station is in the marsh 30 meters from the shore and is marked according to note 19.<sup>1</sup>

*Read* (Chatham County, Ga., C. Hosmer, 1873).—On the south side of the Savannah River about 3 miles northwest of the Savannah Exchange spire, on the plantation owned by Dr. Read. The station is marked according to note 19.<sup>1</sup>

*Rutledge* (Beaufort County, S. C., C. Hosmer, 1873).—On the northeast side of the Savannah River just below the Cross Tides, on the plantation owned by Mr. Rutledge. The station is where a brick rice mill once stood and is marked according to note 19.<sup>1</sup>

*Cross Tides* (Chatham County, Ga., C. Hosmer, 1874).—On the north end of Kings Island in the Savannah River about 4 miles northwest of the city of Savannah. The station is marked according to note 19.<sup>1</sup>

*Gordon* (Chatham County, Ga., C. Hosmer, 1874).—On the west side of the south end of Argyle Island 5.33 meters (17.5 feet) south of the southwest corner of a house. The station is on the dam at the west corner of a rice field. It is marked by a stone projecting 2 inches above the ground and underground by a hole in the end of a brick buried 2 feet deep.

*Shack* (Beaufort County, S. C., R. R. Lukens, 1913).—On the north shore of the Savannah River, opposite the west end of Barnwells Island, on a low levee running parallel with the river and about 25 meters southwest of an old dam. There are a few shacks and a small boat wharf or landing a few meters southwest of the station. The station is marked according to note 6a.<sup>2</sup> A reference mark consisting of a 6-inch tile set in the ground is in line with the elevated tank of the fertilizer works in Savannah, 5.80 meters (19.0 feet) from the station. The southeast corner of the nearest shack is 20.18 meters (66.2 feet) west-southwest from the station.

*Coast* (Chatham County, Ga., R. R. Lukens, 1913).—Near the east end of the upper docks of the Coast Line Railroad Co., on the last dock down the river. The station is marked by three nails surrounded by a triangle of nails driven into a plank of the dock. It is 2.86 meters (9.4 feet) from the north side of the dock, 10.30 meters (33.8 feet) from the northeast corner, 10.82 meters (35.5 feet) from the southeast corner, and 4.44 meters (14.6 feet) from the south side.

*Chim* (Beaufort County, S. C., R. R. Lukens, 1913).—On the north shore of the Savannah River about one-half mile west of Screvens Ferry and near an old brick chimney. The station is marked according to note 6a.<sup>2</sup> The south corner of the chimney is 16.82 meters northeast of the station.

*Levee* (Chatham County, Ga., R. R. Lukens, 1913).—On the north side of Hutchinsons Island about three-fourths mile from the east end of the island on a small levee on which there is a growth of small willow trees and 5.05 meters (16.6 feet) southeast of a board and wire fence crossing the levee. The station is marked by a granite paving block set flush with the ground. There is a stump on the edge of the levee 1.62 meters (5.3 feet) west of the station and another stump on the opposite edge of the levee 2.70 meters (8.9 feet) southeast of the station.

*Rourke* (Chatham County, Ga., R. R. Lukens, 1913).—The tower of the Rourke Iron Works in Savannah. The point used as a station is just below the ball.

<sup>1</sup> See p. 8.

<sup>2</sup> See p. 7.

*Tybee Hotel cupola* (Chatham County, Ga., —, 1894; 1900).—The flagpole on the large open cupola or observatory on the top of the Tybee Hotel. The hotel is a little east of the railroad and about 2 miles south of Tybee lighthouse.

*South End Hotel cupola flagpole* (Chatham County, Ga., W. C. Hodgkins, 1900).—The flagpole on the cupola of the hotel at the southern end of the Tybee Island Railroad and near Tybee Creek.

*Finger (U. S. E.)* (Chatham County, Ga., O. B. French, 1902; 1913).—Near the shore at the west end of Elba Island 20 meters north of the north face of a jetty at a point 80 meters from the outer end of the jetty. The station was marked originally by a wooden post. In 1913 it was found that this post had been sawed off and a new post 15 feet high placed close beside it by the Corps of Engineers. A mass of concrete was placed around the bottom of the new post, but the remains of the old post mark the station.

*Wing Dam 4 (U. S. E.)* (Chatham County, Ga., O. B. French, 1902).—Description of this station may be obtained from the United States Army Engineers' office at Savannah, Ga.

*Dike* (Chatham County, Ga., C. Hosmer, 1873).—Reported lost in 1893.

*Grove* (Chatham County, Ga., R. R. Lukens, 1913).—No description available.

*Petit Chow 1* (Chatham County, Ga., R. R. Lukens, 1913; 1916).—On the north side of Wassaw Sound at the southwest end of Petit Chow Island. In 1916 a stake and the remains of a signal were found, and the station was remarked as follows: The surface mark is the neck of a bottle embedded in the top of a concrete post 6 inches square and  $3\frac{1}{2}$  feet long, which projects about 1 foot above the ground. The underground mark is a spike embedded in a mass of concrete 3 inches thick about 3 feet below the ground. The following azimuths were observed: Marsh line on Wassaw Island,  $6^{\circ} 37'$ ; tree line on Wassaw Island,  $9^{\circ} 03'$ ; high tree,  $85^{\circ} 43'$ . There is some doubt as to the recovery of this station in 1916, and it should be used with caution.

*Petit Chow 2* (Chatham County, Ga., R. R. Lukens, 1913; 1916).—About 237 meters east by north from *Petit Chow 1* (see above) at the southern end of a fringe of trees extending in an east-northeast direction along the east coast of Little Tybee Island. The station is marked according to note 1c<sup>1</sup>. The reference mark, note 11a,<sup>2</sup> is 6.75 meters (22.1 feet) from the station in approximate azimuth  $184^{\circ}$ . A palmetto marked with a triangular blaze is 15.20 meters (49.9 feet) from the station in approximate azimuth  $109\frac{1}{2}^{\circ}$ .

*Jones Island front range light* (Chatham County, Ga., R. R. Lukens, 1913).—The front light of the third range for entering the Savannah River. The beacon is a concrete structure.

*Yard* (Chatham County, Ga., R. R. Lukens, 1913).—On Hutchinsons Island in the Seaboard Air Line Railway freight yard near the office of the yardmaster. The station is 15.69 meters (51.5 feet) south of the southeast corner of the section or tool house and is 17.67 meters (58.0 feet) northeast of the northeast corner post of the porch in front of the yardmaster's office. It is marked according to note 1a.<sup>1</sup>

*Jones Island rear range light* (Chatham County, Ga., R. R. Lukens, 1913).—The rear light of the third range for entering the Savannah River. The beacon is a concrete structure.

*Oglethorpe 2* (Chatham County, Ga., R. R. Lukens, 1913).—On the highest point of old Fort Oglethorpe, on the top of a mound on the north bastion. The station is marked according to note 1a.<sup>1</sup>

<sup>1</sup> See p. 6.

<sup>2</sup> See p. 7.

*Pole* (Beaufort County, S. C., R. R. Lukens, 1913).—A small upright piece nailed to the top of an old leaning telegraph pole near Screvens Ferry just north of the east end of Hutchinsons Island.

*Mound* (Chatham County, Ga., R. R. Lukens, 1913).—On the southern part of Barnwell Island No. 1, on the southwest part of an old mound once used for a battery and about 50 meters west of an old house. The station is marked according to note 6a.<sup>1</sup> A tree is 14.15 meters (46.4 feet) from the station on the northeast corner of the mound.

## SAVANNAH RIVER TO SAPELO SOUND.

*Tybee lighthouse* (Chatham County, Ga., C. O. Boutelle, 1851; 1916).—An octagonal brick tower on the northeast end of Tybee Island on the south side of the entrance to the Savannah River. The lighthouse was rebuilt in 1867 without change of position. The center of the tower is the station.

*Savannah Exchange* (Chatham County, Ga., C. O. Boutelle, 1850; 1894).—The center of the tower, over 100 years old, of the Savannah Exchange.

*Mungen* (Beaufort County, S. C., C. O. Boutelle, 1854; 1894).—On Dauskie Island on the house of Mr. Mungen. The station is 20 inches from the east face of the west chimney and just north of the line from the ridge of the house to the center of the chimney. It is marked by four iron brackets nailed around the foot of the signal pole.

*Wilmington* (Chatham County, Ga., A. W. Evans, 1857; 1902).—Near the northeast point of Wilmington Island, on a small bushy sand knoll just south of the old plantation which is the extreme northeast point of the island. The station is about 40 meters east of the first point of woods south of the point of woods that bluffs on Shad Creek where it bends toward the east. The station is marked by a cross in a stone post set in concrete flush with the surface of the ground. The underground mark is a bottle embedded in concrete. Three trees, each marked with a blaze with a copper nail at the center, are at the following distances and azimuths from the station: Palmetto tree, 41.50 meters (136.2 feet)  $76^{\circ} 13'$ ; cedar, 59.17 meters (194.1 feet)  $89^{\circ} 30'$ ; and cedar, 58.01 meters (190.3 feet)  $112^{\circ} 04'$ .

*Petit Chow* (Chatham County, Ga., A. W. Evans, 1857).—Reported lost in 1897.

*Red house cupola* (Chatham County, Ga., A. W. Evans, 1857).—Reported lost in 1889.

*South Wassaw* (Chatham County, Ga., A. W. Evans, 1857).—Reported lost in 1902.

*Skidaway* (Chatham County, Ga., A. W. Evans, 1857).—Reported lost in 1913.

*Raccoon Key* (Chatham County, Ga., A. W. Evans, 1857).—Reported lost in 1902.

*North Ossabaw* (Bryan County, Ga., A. W. Evans, 1857).—Reported lost in 1902.

*Morell* (Bryan County, Ga., A. W. Evans, 1857; 1916).—On the north end of Ossabaw Island about 205 meters west of a roadway leading from the clubhouse to a wharf. The station is at the western end of a row of palmettos and bushes which separates the marsh along the waters edge from the grounds in front of the clubhouse. The station is marked according to note 17.<sup>2</sup> The following distances and azimuths are measured from the station: Southwest corner of clubhouse about 340 meters, S.  $11^{\circ} 15'$  E. (magnetic); palmetto

<sup>1</sup> See p. 7.<sup>2</sup> See p. 8.

marked with a triangular blaze, 5.36 meters (17.6 feet) S. 85° W. (magnetic); oak marked with a triangular blaze, 14.90 meters (48.9 feet) S. 54° E. (magnetic); stump with three nails in the top in the form of a triangle, 5.08 meters (16.7 feet) nearly in line with the oak.

*Green Island* (Chatham County, Ga., A. W. Evans, 1857).—Reported lost in 1902.

*Little Buzzard* (Bryan County, Ga., A. W. Evans, 1857).—Reported lost in 1902.

*Cane Patch* (Bryan County, Ga., A. W. Evans, 1858; 1902).—On a large Indian mound of oyster shells near the north end of Ossabaw Island just south of the middle marsh in the Ogeechee River. The station is at the end of an old causeway which connects the mound with a large hammock. The station is marked according to note 17.<sup>1</sup> Four blazed trees are at the following distances and approximate directions from the station: Cedar, 3.06 meters (10.0 feet) south by east; cedar, 3.03 meters (9.9 feet) south by west; cedar, 6.57 meters (21.6 feet) west by north; sweetbay, 6.20 meters (20.3 feet) north by east.

*Sigma* (Bryan County, Ga., A. W. Evans, 1858; 1902).—Near the eastern end of the western one of two small hammocks on the west side of Red Bird Creek about 1 mile from the Florida Passage. The station is about 12 meters from the marsh toward the south and about 18 meters from the marsh toward the east. It is marked according to note 17.<sup>1</sup> Six blazed trees are at the following distances and azimuths from the station: Pine, 3.24 meters (10.6 feet) 31° 42'; pine, 4.19 meters (13.7 feet) 105° 11'; pine, 10.65 meters (34.9 feet) 233° 46'; cedar, 15.49 meters (50.8 feet) 240° 55'; palmetto, 11.50 meters (37.7 feet) 280° 30'; cedar, 12.30 meters (40.4 feet) 343° 24'.

*Palmetto* (Chatham County, Ga., A. W. Evans, 1857).—On a small palmetto hammock surrounded by marsh about 150 meters west of Crooked Creek. No description of the marking is available.

*Ogeechee* (Bryan County, Ga., A. W. Evans, 1857).—On the hard marsh on the southwest bank of the Ogeechee River just below the great bend. The station is marked by a cross in the top of a stone post.

*Buck Head* (Bryan County, Ga., A. W. Evans, 1858; 1902).—On the western part of Ossabaw Island near the west end of a small hammock on the east bank of Big Tom Creek. The station was re-marked in 1902 but no description of the re-marking is available. It is probably marked according to note 17.<sup>1</sup>

*Stevensons Point* (Bryan County, Ga., A. W. Evans, 1858; 1904).—On the south side of Lincoln Creek within a U-shaped bend of the creek on the center of a narrow ridge extending out from the main highland and about 25 meters from the eastern point of the high land. The station is marked according to note 17.<sup>1</sup> A blazed live-oak tree is 8.82 meters (28.9 feet) from the station in azimuth 39° 28' and a second blazed live oak is 5.78 meters (19.0 feet) from the station in azimuth 340° 32'.

*Newell* (Bryan County, Ga., A. W. Evans, 1858; 1913).—On the east side of Bear River a short distance north of the mouth of Newell Creek, a little northwest of the center of a long shell bank. The station is marked according to note 17.<sup>1</sup> A clump of small cedars is about 35 meters west of the station and another sprawling clump just southeast of the station. A very scraggy cedar is about 5 meters southwest of the station.

*Yellow Bluff* (Liberty County, Ga., A. W. Evans, 1858; 1913).—At the point of woods just north of Ashley Creek where it bends sharply to the eastward,

<sup>1</sup> See p. 8.

on hard ground about 6 meters from the edge of the marsh. The station was marked according to note 17,<sup>1</sup> in 1902, but some changes were made in the marking in 1913. No description of these changes is available. Five live-oak trees marked with blazes and copper nails in 1902 are at the following distances and azimuths from the station: 18.93 meters (62.1 feet)  $17^{\circ} 15'$ ; 24.30 meters (79.7 feet)  $182^{\circ} 39'$ ; 7.94 meters (26.0 feet)  $246^{\circ} 19'$ ; 5.51 meters (18.1 feet)  $300^{\circ} 59'$ ; and 8.28 meters (27.2 feet)  $349^{\circ} 38'$ .

*Walburg* (Liberty County, Ga., A. W. Evans, 1858).—Reported lost in 1902.

*English Cut* (Liberty County, Ga., A. W. Evans, 1858; 1904).—On St. Catherine Island at the west point of woods just east of Johnsons Creek. The station is near the end of an old causeway leading up from the creek and is about 6 meters back from the edge of the high solid flat on which it stands. It is marked according to note 17.<sup>1</sup> Four live oak trees, each marked with a blaze and a copper nail, are at the following distances and azimuths from the station: 5.10 meters (17.0 feet),  $89^{\circ} 54'$ ; 6.38 meters (20.9 feet),  $144^{\circ} 12'$ ; 7.24 meters (23.8 feet),  $247^{\circ} 09'$ ; and 10.08 meters (33.1 feet),  $295^{\circ} 06'$ .

*John Thomas* (McIntosh County, Ga., A. W. Evans, 1858; 1902).—On a point of woods on the south bank of South Newport River about 5 miles from the mouth. The station was recovered in 1902 and re-marked probably according to note 17.<sup>1</sup>

*Barbours Island* (McIntosh County, Ga., A. W. Evans, 1856).—Reported lost in 1902. *Barbours Island 2* is within a few inches of the same position (see p. 23).

*Saint Catherine* (Liberty County Ga., A. W. Evans, 1856).—Reported lost in 1902. *St. Catherine 2* is within a few inches of the same position (see p. 22).

*Cedar Hammock* (McIntosh County, Ga., A. W. Evans, 1856).—Reported lost in 1902. *Cedar Hammock 2* is within a few inches of the same position (see p. 22).

*Sapelo Island north base* (McIntosh County, Ga., A. W. Evans, 1856; 1902).—Near High Point at the north end of Sapelo Island just east of the mouth of Mud River. The station is about 25 meters southeast of the edge of the high bank and is surrounded by small timber and brush. It is marked by a cross in the top of a stone post which is set in concrete. The underground mark is an iron cone. Four water oaks, each marked with a blaze and two copper nails are at the following distances and azimuths from the station: 8.39 meters (27.5 feet),  $41^{\circ} 53'$ ; 7.99 meters (26.2 feet),  $208^{\circ} 57'$ ; 10.52 meters (34.5 feet),  $270^{\circ} 37'$ ; and 10.53 meters (34.5 feet),  $326^{\circ} 19'$ .

*Black Beard* (McIntosh County, Ga., A. W. Evans, 1856).—Reported lost in 1902.

*Dog Island* (McIntosh County, Ga., A. W. Evans, 1856; 1902).—On a small hammock on the north end of Dog Island just south of the mouth of Sapelo River and near the east end of a hard shell bank bordering the beach. The station is marked by a cross in a stone post which is set in concrete. The underground mark is a bottle embedded in concrete. A cedar tree, the only one on the north end of the island, is about 5 meters south by east from the station.

*Sapelo Island south base* (McIntosh County, Ga., A. W. Evans, 1856).—Reported lost in 1901.

*Moss Island* (Liberty County, Ga., A. W. Evans, 1856).—Reported lost in 1902.

*Johns Hummock* (Chatham County, Ga., A. W. Longfellow, 1855; 1902).—On the northern and largest one of three hummocks on Wassaw Island near the shore of Odingsell Creek where it bends to the south. The station is about 20 meters from the southwest end of the hummock and about midway between the

<sup>1</sup> See p. 8.

two sides. A small treeless hummock is on the bank of the creek directly in front of the station. The station is marked according to note 17<sup>1</sup> except that the underground mark lacks the cast-iron cone. Two small live oak trees, each marked with a blaze and a copper nail, are at the following distances from the station: 5.53 meters (18.1 feet) northeast, and 3.32 meters (10.9 feet) southwest.

*Cabbage Island* (Chatham County, Ga., A. W. Longfellow, 1855).—Reported lost in 1902.

*Romerly Marshes south base* (Chatham County, Ga., A. W. Longfellow, 1855).—Reported lost in 1902.

*Romerly Marshes north base* (Chatham County, Ga., A. W. Longfellow, 1855).—Reported lost in 1889.

*Romerly Marsh* (Chatham County, Ga., A. W. Longfellow, 1855).—On a small hummock just north of Romerly Marsh Creek, about one-half mile west of the mouth, near a small stream flowing into the creek. The station is marked by an iron nail driven at the intersection of two cross lines sawed in the top of a red cedar stake driven 3 feet into the ground. The station is 6 meters from a small cabbage palm, the only one in the vicinity.

*Great Wassaw* (Chatham County, Ga., A. W. Longfellow, 1857).—On the north side of Wassaw Island about one-half mile west of the point at the entrance to Wassaw Sound and just east of the mouth of a small creek flowing into the sound. No description of the marking is available, but it is probably the same as at station *Romerly Marsh* above.

*Cedar Hummock 2* (McIntosh County, Ga., O. B. French, 1902; 1913).—On the north shore of Sapelo Sound just east of the mouth of Little Mud River near the west end of a large hammock which is separated by a narrow strip of marsh from a small hammock to the westward. The station is marked by a cross in the top of a stone post, which is set in concrete. The underground mark is a bottle embedded in concrete 2 feet below the surface of the ground.

*St. Catherine 2* (Liberty County, Ga., O. B. French, 1902).—On the west side of the southern end of St. Catherine Island, about one-fourth mile south of the mouth of Brunsens Creek and just north of a small stream. The station is on a small hammock about 15 meters from the first bend in the small stream. It is marked by a cross in the top of a granite post, which is set in concrete and projects about 4 inches above the ground. The underground mark is a large nail embedded in concrete about 2 feet below the surface of the ground.

*Sap* (McIntosh County, Ga., O. B. French, 1902).—On the sand beach about 70 meters north-northwest of *Sapelo Island north base* (see p. 21). The edge of the bluff is about midway between the two stations. The station is marked according to note 17<sup>1</sup> except that the underground mark lacks the cast-iron cone.

*Shell* (McIntosh County, Ga., O. B. French, 1902).—Reported lost in 1913.

*Beard* (McIntosh County, Ga., O. B. French, 1902).—On the northeast end of Blackbeard Island on the highest sand dune just to the east of the main body of low oak timber. The station is about 100 meters from high-water mark to the north and is marked according to note 17.<sup>1</sup> A reference mark, similar to the station mark except that an iron nail was used instead of a copper nail, is about 20 meters northeast of the station.

*Hum* (Liberty County, Ga., O. B. French, 1902).—Reported lost in 1913.

*High* (Liberty County, Ga., O. B. French, 1902; 1913).—On the shore on the east side of St. Catherine's Island, about 2 miles north of Sapelo Sound and about one-half mile south of where the oak timber reaches down to the beach. The station is about 20 feet above high tide, on the highest sand hill in the

<sup>1</sup> See p. 8.

locality. The western slope of the hill is covered with small palmettos and oak brush. The hill is a part of a string of sand dunes extending along the edge of the timber and making an angle of about  $10^\circ$  with the direction of the shore. The station is marked according to note 17.<sup>1</sup> Three large palmetto trees are about 30 meters from the station in the following magnetic directions, respectively: north  $55^\circ$  east, south  $20^\circ$  east, and south  $5^\circ$  west.

*Oak* (Liberty County, Ga., O. B. French, 1902).—Reported lost in 1912.

*Benn* (McIntosh County, Ga., O. B. French, 1902).—On the west side of Front River a short distance south of the mouth. The station is the center of a barrel on the east end of the roof of the store at Hunter and Benn's northern wharf. The wharf is used for loading timber.

*Bluff* (McIntosh County, Ga., O. B. French, 1902).—On the north shore of Sapelo River at the extreme eastern edge of the hard land a short distance west of the mouth of Broro River and about 3 meters from high-water mark. The station is marked according to note 17<sup>1</sup> except that there is no underground mark. Three live-oak trees, each marked with a blaze and a copper nail, are at the following distances and azimuths from the station: 7.90 meters (25.9 feet),  $112^\circ 43'$ ; 5.21 meters (17.1 feet)  $146^\circ 03'$ ; and 4.22 meters (13.8 feet)  $189^\circ 03'$ .

*Hunter* (McIntosh County, Ga., O. B. French, 1902).—On the west side of Front River, about one-half mile from the mouth and just north of the mouth of a large creek. The station is the east gable of the small white building at Hunter and Benn's southern timber-loading wharf.

*Barbours Island 2* (McIntosh County, Ga., O. B. French, 1902).—On the north end of a large Indian mound 10 or 12 feet above the surrounding marsh on the east bank of Barbours Island River and about 30 meters from the south end of the hard land known as Barbours Island. A cleared field is just north of the station. The station is marked by a cross in the top of a granite post set in concrete. The underground mark is a bottle embedded in concrete. A bay tree marked with a blaze and a copper nail is on the top of the ridge 8.20 meters (26.9 feet) west by north from the station and a live-oak tree marked with a blaze and 2 copper nails is at the foot of the ridge 11.35 meters (37.2 feet) east by north from the station.

*Palm* (McIntosh County, Ga., F. F. Weld, 1902).—On the crest of a sand hill on the east side of Blackbeard Island, about 2 miles south of the entrance to Sapelo Sound. The station is at a bend in the shore line opposite an old cedar tree washed up on the shore. It is in range with a palmetto about 100 meters northwest and two lone blazed trees back of the sand hills about 40 meters distant. The station is marked by a concrete post 6 inches square and 2 feet long.

*Os* (Bryan County, Ga., W. E. Parker, 1904).—Reported lost in 1913.

*Cat* (Liberty County, Ga., W. E. Parker, 1904).—Reported lost in 1913.

*Black* (Liberty County, Ga., W. E. Parker, 1904).—Reported lost in 1913.

*North* (Bryan County, Ga., W. E. Parker, 1904).—Near the seacoast on Ossabaw Island about 2 miles from the south end of the island on a sand dune about 12 feet high. The station is marked by an iron spike set in concrete at the center of a 6-inch tile flush with the ground. The letters U. S. are traced in the concrete. Four trees, each marked with a blaze and three nails in the form of a triangle, are at the following distances from the station: Scrub cedar, 4.94 meters (16.2 feet) southwest; red oak, 6.64 meters (21.8 feet) northwest; dead scrub cedar, 3.72 meters (12.2 feet) east-northeast; palmetto standing alone at high-water mark, 36.17 meters (118.7 feet) south-southeast.

<sup>1</sup> See p. 8.

*Medway* (Liberty County, Ga., A. W. Evans, 1858; 1869).—On a shell bank on the south side of the west end of St. Catherines Sound. The station is marked by a signal pole.

*Shell Bank* (Bryan County, Ga., A. W. Evans, 1858).—On a shell bank on the west side of Bear River about 1 mile south of the mouth of Kilkenny Creek. The station is marked by a signal pole.

*Harris* (Liberty County, Ga., A. W. Evans, 1858; 1869).—In the marsh on Dr. Harris's plantation south of Medway River on the bank of Sunbury Creek. The station is marked by a signal pole.

*Hart* (Bryan County, Ga., A. W. Evans, 1858; 1869).—On the north side of Medway River at the point of woods on Mr. Hart's plantation. The station is marked by a signal pole and by four reference stubs each 2 feet from the pole.

*Loan* (Liberty County, Ga., A. W. Evans, 1858).—Reported lost in 1869.

*Pine* (Bryan County, Ga., A. W. Evans, 1858; 1869).—On the northeast side of the Medway River at the end of a hammock called Table of Pines. The station is marked by a signal pole and by four reference stubs each 2 feet from the pole. The station was searched for without success in 1902 and is probably lost.

*Drop* (Chatham County, Ga., W. C. Hodgkins, 1913).—Reported lost in 1916.

*Land* (Bryan County, Ga., W. C. Hodgkins, 1913; 1916).—On the northeast end of Ossabaw Island on the inshore end of the first row of sand dunes. The station is marked by a concrete post 6 inches square projecting about 6 inches above the ground.

*Hospital north chimney* (McIntosh County, Ga., O. B. French, 1902; 1913).—The center of the most northern chimney on the large building used as a hospital for the quarantine station at the northern end of Blackbeard Island.

*Ton* (McIntosh County, Ga., O. B. French, 1902).—On the east bank of the Julienton River about one-third mile from the mouth. The station is the center of the round white chimney in the center of the roof of the most southern house at Hilton & Dodges timber-loading wharf.

*North* (Liberty County, Ga., F. F. Weld, 1902).—On the east side of St. Catherines Island about 4 miles north of the entrance to Sapelo Sound on the crest of a lone, conspicuous sand hill, the first one of a range of hills running north from a low place on the beach. The station is marked by a concrete post 6 inches square and 2 feet long.

*Creighton* (McIntosh County, Ga., O. B. French, 1902).—On the south side of Sapelo River and near the north end of Creighton Island. No description of the station is available. The station is not marked on the ground and is probably a part of some building, as a chimney, for example.

*Three* (McIntosh County, Ga., O. B. French, 1902).—The station is the tallest one of three piles on the east side of the channel of Mud River nearly opposite the mouth of a small creek to the west.

*One* (McIntosh County, Ga., O. B. French, 1902).—The station is a large pile on the north side of Mud River. The pile is used as a range for the cross channel from the north end of New Teakettle River.

*Magnetic azimuth mark* (McIntosh County, Ga., O. B. French, 1902).—The station is 9.25 meters (30.3 feet) from station *Cook* (see p. 26). No further description is available.

*Pryor* (Chatham County, Ga., A. W. Evans, 1857).—On the west side of Skidaway Island, about one-fourth mile south of Burnside River at the southern edge of a hammock near Pryor's plantation. The station is marked by

a hole in a palmetto stump  $4\frac{1}{2}$  feet high which was used to hold the foot of the signal pole.

*Possum Island* (Chatham County, Ga., A. W. Evans, 1857).—On the east bank of Vernon River just north of the mouth of Burnside River on the edge of a small hammock. The station is marked by a cedar tree with a triangular blaze.

*Brinson* (McIntosh County, Ga., C. M. Cade, 1913).—On the seacoast about  $2\frac{1}{2}$  miles south of the northeast point of Blackbeard Island on the highest sand ridge about 100 meters from high-water mark. The station is marked by a standard disk station mark in the top of a block of concrete 10 inches square and  $3\frac{1}{2}$  feet long projecting 8 inches above the surface of the sand and secured to the top of an iron pipe  $1\frac{1}{2}$  inches in diameter and 7 feet long driven into the sand. A reference mark, consisting of a wedge-shape block of concrete secured to the top of an iron pipe  $1\frac{1}{2}$  inches in diameter and 5 feet long driven into the sand, is on the highest part of the ridge 24.59 meters (80.7 feet) north  $14^\circ$  east (magnetic) from the station.

*High 2* (Liberty County, Ga., C. M. Cade, 1913).—In practically the same location as station *High* (see p. 22). The station is marked by a standard disk station mark set in the top of a block of concrete 10 inches square and  $4\frac{1}{2}$  feet long secured to the top of a 5-foot length of 2-inch iron pipe driven into the sand. The concrete projects about 1 foot above the surface of the sand. A reference mark, consisting of a block of concrete secured to the top of a 6-foot length of 1-inch iron pipe driven into the sand, is 15.14 meters (49.7 feet) from the station in azimuth  $37^\circ 43'$ . Station *High* is 1.145 meters (3.76 feet) from the station in azimuth  $45^\circ 03'$ . The legs of the signal are embedded in concrete and are at the following distances from the station: Northeast leg, 2.7 meters (8.9 feet); northwest leg, 3.1 meters (10.2 feet); and south leg, 2.4 meters (7.9 feet).

*Quarantine stack* (McIntosh County, Ga., O. B. French, 1902; 1913).—The largest iron stack on the most eastern building at the quarantine station on the south side of Sapelo Sound.

*Wind* (McIntosh County, Ga., W. C. Hodgkins, 1912; 1913).—A hydrographic station on the highest sand dune near the northeast point of Blackbeard Island. The station is marked by a signal pole.

*Bank* (McIntosh County, Ga., W. C. Hodgkins, 1912; 1913).—This is a hydrographic station near the northeast point of Blackbeard Island. It is marked by a 25-foot tripod.

*Cat 2* (Liberty County, Ga., C. M. Cade, 1913).—On the north end of St. Catherine Island. The station is marked by a 2 by 4 inch stud.

*Os 2* (Bryan County, Ga., C. M. Cade, 1913).—On a small sand dune on the southern end of Ossabaw Island. The station is marked by a pole signal. An eccentric point, occupied in making the observations and marked by a 6-foot length of iron pipe  $1\frac{1}{4}$  inches in diameter, is 5.560 meters (18.24 feet) from the station in azimuth  $125^\circ 26'$ .

*Cat 3* (Liberty County, Ga., C. M. Cade, 1913).—On the sand flat off the northeast point of St. Catherine Island 80 meters from high-water mark. There is no mark at this station except a signal pole.

*Rauer* (Liberty County, Ga., C. M. Cade, 1913).—At the center of a sand ridge near the northeast point of St. Catherine Island about 300 meters from high-water mark to the north, about 250 meters from high-water mark to the eastward, and about 30 meters north of a clump of pines growing on the highest part of the ridge. The station is marked according to note 1a.<sup>1</sup> Three pine trees, each marked with a blaze and two spikes, are at the following distances and azimuths from the station: 13.04 meters (42.8 feet)  $115^\circ 42'$ ; 10.84

<sup>1</sup> See p. 6.

meters (35.6 feet)  $161^{\circ} 39'$ ; and 6.54 meters (21.5 feet)  $355^{\circ} 01'$ . The three legs of the signal, each set in concrete, are at the following distances and azimuths from the station: West leg, 3.10 meters (10.2 feet)  $77^{\circ} 38'$ ; north leg, 1.90 meters (6.2 feet)  $182^{\circ} 15'$ ; and south leg, 1.68 meters (5.5 feet)  $317^{\circ} 29'$ .

*North 2* (Bryan County, Ga., C. M. Cade, 1913).—Reported lost in 1916.

*Black 2* (Liberty County, Ga., C. M. Cade, 1913).—On the east side of St. Catherines Island, on Black Hammock, the highest of the sand dunes just north of the smaller and more northerly one of two creeks: The station is marked by a triangle of nails in a crosstie 8 by 10 inches and 8 feet long buried 4 feet deep in the sand and surrounded with concrete. The reference mark consists of a standard disk reference mark set in concrete in the top of a 3-inch tile which in turn is secured with concrete to the top of an iron pipe  $2\frac{1}{2}$  inches in diameter and 6 feet long driven into the sand. It is in the top of a dune 23.00 meters (75.5 feet) from the station in azimuth  $17^{\circ} 39'$ .

*Coon* (Chatham County, Ga., T. J. Maher, 1916).—At the extreme point of the southern end of the tree line on Raccoon Key. The station is marked by a nail embedded in a mass of concrete which projects slightly above the ground. The nail is surrounded by a triangle cut in the concrete.

*Wassaw* (Chatham County, Ga., T. J. Maher, 1916).—On the south end of Wassaw Island north-northwest of the flat area forming the south point of the island and about 350 meters south of the mouth of Wassaw Creek. The station is on a sand dune and is marked according to notes  $1a^1$  and  $7d^2$  except that the disk is a hydrographic station mark. A reference mark consisting of a concrete post inscribed with the words U. S. Coast Survey and an arrow pointing toward the station, is 39.06 meters (128.1 feet) south of the station. Three trees near the station are marked with blazes, one with a square blaze, one with a triangular blaze with the apex down, and the third one with a double triangular blaze with the apices down.

#### SAPELO SOUND TO ST. SIMON SOUND.

*Julienton* (McIntosh County, Ga., A. W. Evans, 1856).—Reported lost in 1901.

*Marsh* (McIntosh County, Ga., F. P. Webber, 1858; 1902).—On a hammock on the east side of Marsh Creek and about 1 mile west of a point of woods on Sapelo Island. The station is about 3 meters from the high-water line of the creek and about 10 or 15 meters from the southern end of the hammock. There is another and smaller hammock just south of the station. The station is marked according to note 17.<sup>3</sup> Four Stakes, each marked with a copper nail and each 3 feet from the station, form a square the diagonals of which intersect at the station. In searching for the station in 1902 a large hole was dug northeast of the station.

*Cook* (McIntosh County, Ga., F. P. Webber, 1858; 1902).—On a shell bank at the extreme southern end of Creighton Island and about 7 meters from the marsh line both to the south and to the east. The station is marked according to note 17.<sup>8</sup> From stakes, each marked with a copper nail in a vertical line, are at the following distances and azimuths from the station: Cedar, 11.83 meters (38.8 feet),  $56^{\circ} 07'$ ; cedar, 10.38 meters (34.1 feet),  $108^{\circ} 32'$ ; live oak, 12.55 meters (41.2 feet),  $129^{\circ} 24'$ . A magnetic azimuth mark is 9.25 meters from the station.

<sup>1</sup> See p. 6.

<sup>2</sup> See p. 7.

<sup>3</sup> See p. 8.

*Fox* (McIntosh County, Ga., F. P. Webber, 1859; 1901).—On a hammock, covered with oyster shells, about equally distant from Connegan River, Dead River, and Fox Creek. The station is on the northern one of two small points on the east side of the hammock and is marked according to note 17.<sup>1</sup>

*Spalding* (McIntosh County, Ga., F. P. Webber, 1859; 1906).—On the south end of Sapelo Island, near the center of a small hammock between Sapelo lighthouse and the mouth of Duplin River. The station is marked according to note 17.<sup>1</sup> Four cedar trees each marked with a blaze and three copper nails in a vertical line are at the following distances and azimuths from the station: 6.91 meters (22.7 feet),  $1^{\circ} 57'$ ; 17.62 meters (57.8 feet),  $99^{\circ} 12'$ ; 9.40 meters (30.8 feet),  $176^{\circ} 32'$ ; and 7.12 meters (23.4 feet),  $289^{\circ} 42'$ .

*My Hall* (McIntosh County, Ga., F. P. Webber, 1859).—Reported destroyed in 1896.

*Thalia* (McIntosh County, Ga., F. P. Webber, 1859).—Near the southern end of the sand hills along the beach on the southeastern part of Wolf Island. The station is marked by a copper tack in the top of a stake driven through the center of a truncated cone of cast iron which is buried 3 feet below the surface of the ground.

*Butler* (Glynn County, Ga., F. P. Webber, 1859; 1872).—In the northwest edge of a cultivated field at the north end of St. Simon Island. The station was marked by a copper tack in a live-oak stump. In 1872 the center of the stump was found rotted away.

*Troup* (Glynn County, Ga., F. P. Webber, 1859; 1901).—In the marsh on the west side of South Altamaha River near its entrance into Buttermilk Sound. The station is marked according to note 18.<sup>1</sup> No surface marks could be found in 1901 and the station is probably lost.

*Bank* (Glynn County, Ga., F. P. Webber, 1859; 1901).—Near the center of an embankment connecting the hard land of St. Simon Island with a small creek flowing west into Buttermilk Sound. The station is marked according to note 18.<sup>1</sup> No surface mark could be found in 1901 and the station is probably lost.

*Brown* (Glynn County, Ga., F. P. Webber, 1859; 1872).—In the marsh on the west side of Grants Creek. The station is marked according to note 18.<sup>1</sup>

*West Point* (Glynn County, Ga., F. P. Webber, 1859).—On St. Simon Island, just each of Frederica River on a point of hard land known as West Point and about 200 meters west of a house. The station is marked according to note 18<sup>1</sup> except that the center stake is driven through a truncated cone of cast iron 2 feet below the surface of the ground.

*Duck* (Glynn County, Ga., F. P. Webber, 1860; 1899).—On a point of hard land extending to the eastward and near the head of a small stream flowing into Troups Creek. The station is marked by a truncated cone of cast iron directly on the edge of the bank of the stream. (See *Duck 2* p. 30.)

*Hamilton* (Glynn County, Ga., A. W. Longfellow, 1856; 1872).—On a small wooded hammock on the north side of the mouth of a small stream flowing into Frederica River. The station is about 35 meters north of the shore of the creek and about 30 meters from the shore at the mouth of the creek. The station was marked originally by a wooden stake. In 1872 the remains of a rotten stub were found and a new cedar stake with an iron nail in the top was set in approximately the same position. This station should be used with caution.

*Curlew* (Glynn County, Ga., F. P. Webber, 1860).—A little south of east from Brunswick and about 1 mile north of the Brunswick River on a point of hard

<sup>1</sup> See p. 8.

land. The station is marked according to note 18<sup>1</sup> except that the center stake is driven through a truncated cone of cast iron 2 feet below the surface of the ground. The station was searched for in 1894 but without success.

*Brunswick Point* (Glynn County, Ga., A. W. Longfellow, 1856).—On Brunswick Point near the center of a shell bank 110 meters long and 7 meters wide extending parallel with the shore. The station is 320 meters from the mouth of the first creek to the westward and is 20 meters from high-water mark. It is marked by a nail in the top of a 4 by 4 inch post driven into the shell bank. The station was searched for in 1894 but without success.

*Cedar Hummock* (Glynn County, Ga., A. W. Longfellow, 1856; 1860).—On a small shell bank about 120 meters northwest of the mouth of a small creek connecting Jointer Creek with Brunswick River. The station is at the head of a small indentation in the shore line and is about 6 meters from high-water mark. It is marked by a nail in the top of a 2 by 4 inch stake driven into the shell bank. The station was searched for without success in 1894 and is probably lost.

*Jekyl Creek* (Glynn County, Ga., A. W. Longfellow, 1856).—On a small shell bank 125 meters southwest of the entrance to Jekyl Creek and 18 meters from high-water mark. The station is marked by an iron nail in the top of a wooden stake driven into the shell bank. The station was searched for in 1894 but without success. It is probably lost.

*Jekyl North* (Glynn County, Ga., A. W. Longfellow, 1856).—On the northwest end of Jekyl Island about 190 meters northeast of the mouth of Clam Creek. The station is marked by an iron nail in the top of a cedar stake. It was searched for without success in 1894 and is probably lost.

*Plantation Creek* (Glynn County, Ga., A. W. Longfellow, 1856).—On a small shell bank on the point on the south side of the mouth of Plantation Creek. The station is marked by a brass nail in the top of a 3 by 3 inch pine stub. It was searched for without success in 1894 and is probably lost.

*St. Simon Island west base* (Glynn county, Ga., A. W. Longfellow, 1856).—On a sand beach at the southwest end of St. Simon Island about 320 meters southeast of the mouth of Kings Creek and about 5 meters from high-water mark. The station is marked by a cross and the letters U. S. C. S. in the top of a marble post. It was searched for without success in 1894 and is probably lost.

*St. Simon Island east base* (Glynn County, Ga., A. W. Longfellow, 1855).—On the shore of St. Simon Sound, at the south end of St. Simon Island, about midway between T. B. King's house and the lighthouse. The station is marked by a nail in a pine plug driven in an auger hole in a live-oak stump.

*Aikens* (McIntosh County, Ga., O. B. French, 1901).—On the south side of North River, 10 meters back from high-water mark and 20 meters from the end of the planks on the water's edge near the center of the remains of an old mill chimney. The station is marked according to note 17,<sup>1</sup> except that the underground mark lacks the cast-iron cone. Three trees each marked with a blaze and three copper nails in a vertical line are at the following distances and azimuths from the station: Chinaberry, 17.14 meters (56.2 feet), 7° 53'; cedar, 13.66 meters (44.8 feet), 58° 33'; persimmon, 12.76 meters (41.9 feet), 273° 03'. A sink hole is about 15 meters southeast of the station.

*Grass* (McIntosh County, Ga., O. B. French, 1901; 1906).—In the marsh on the north bank of the Altamaha River a little more than a mile east of Three Mile Cut and directly opposite a small island, the first one east of the cut. The station is about 20 meters east of two very small creeks, which are dry

<sup>1</sup> See p. 8.

except at high water and along which the small bushes grow thicker than elsewhere. The station is on a high part of the marsh 5 meters from the high-water bank and 10 meters from the steep part of the river bank. It is marked according to note 17,<sup>1</sup> except that the underground mark lacks the cast-iron cone. Four reference posts, each about 10 or 12 feet long and projecting 3 or 4 feet above the ground, are at the following distances from the station: 1.54 meters (5.05 feet) north, 1.49 meters (4.90 feet) east, 1.65 meters (5.40 feet) south, and 1.49 meters (4.90 feet) west. The diagonal lines connecting these posts intersect at the station. The west point of the island mentioned above is in azimuth  $43^{\circ} 50'$  from the station and the east point in azimuth  $337^{\circ} 35'$ .

*Rokenbaugh's mill chimney* (McIntosh County, Ga., O. B. French, 1901; 1906).—An iron stack built on the foundation of an old chimney at the north end of the sawmill, called locally the Lower Bluff mill, at the eastern end of the town of Darien. The stack is not guyed rigidly and has a swing of several inches.

*Butler's rice mill chimney* (McIntosh County, Ga., F. P. Webber, 1858; 1906).—An old brick chimney of massive construction about 1 mile south of Darien. It is about 70 feet high and a prominent landmark. It had been repaired and was in good condition in 1906.

*Dennis Folly* (Glynn County, Ga., A. W. Longfellow, 1856).—On the north bank of Brunswick River, at the east side of the entrance to Brunswick Harbor, on the northwest end of a small hammock, and 20 meters from high-water mark. The station is marked by a nail at the intersection of two grooves sawed in the top of a pine stub driven into the ground. It was searched for without success in 1894.

*Jointer* (Glynn County, Ga., A. W. Longfellow, 1856).—On the south side of Turtle River, about 400 meters northwest of the mouth of Jointer Creek, and just back of a conspicuous white-shell bank. The station is about 15 meters from high-water mark and is marked by a nail in the top of a round cedar stub driven into the marsh.

*Brandy Point* (Glynn County, Ga., A. W. Longfellow, 1856).—On a small shell bank on the west side of the entrance to Brunswick Harbor, about 400 meters north of Brandy Point, and about 8 meters from high water. The station is marked by an iron nail in the top of a 4 by 6 inch post driven into the ground.

*Buzzards Roost* (Glynn County, Ga., A. W. Longfellow, 1856).—On Buzzards Island, about 220 meters east of Turtle River, about 380 meters south of the channel leading to Brunswick, and about 90 meters southeast of the hammock known as Buzzards Roost. The station is marked by a nail in the top of a round cedar stake 5 inches in diameter driven into the marsh.

*Colonels Island* (Glynn County, Ga., A. W. Longfellow, 1856).—On the west bank of Turtle River near the southeast end of Blythe Island, about 90 meters north of the mouth of South Brunswick River and 10 meters from high-water mark. The station is marked by an iron nail in the top of a cedar stake.

*Mud 2* (Glynn County, Ga., F. W. Perkins, 1898).—Reported lost in 1905.

*Spot* (Glynn County, Ga., F. W. Perkins, 1898; 1913).—On a shell bank sparsely covered with scrub cedar between the mouth of Back River and Plantation Creek. The station is in range north and south between two small cedars which are 6.4 meters north and 5.8 meters south of the station respectively. The station is marked according to note 6a.<sup>2</sup>

<sup>1</sup> See p. 8.

<sup>2</sup> See p. 7.

*Dune* (Glynn County, Ga., F. W. Perkins, 1899).—At the northern end of Jekyll Island among low sand dunes covered with pine, palmetto, and water oak, 360 meters northeast from Clam Creek, 175 meters west from the shore of a small artificial pond, 11 meters northwest from the north side of River Side road, and 15 meters southeast from the 2-foot bluff at the water's edge. The station is marked according to note 20.<sup>1</sup>

*Col* (Glynn County, Ga., F. W. Perkins, 1898; 1917).—In the soft marsh on Colonels Island, three-fourths mile northwest of the entrance to Jenter Creek, 95 meters southwest from the bank of Turtle River, and 70 meters east of a blind creek about 10 meters wide. The station is marked according to note 20.<sup>1</sup> A mound of shells is piled about the station mark.

*Duck 2* (Glynn County, Ga., F. W. Perkins, 1899).—On a point of hard land extending to the eastward near the head of a small stream flowing into Tromps Creek. The station is 15.16 meters (49.75 feet) west  $4^{\circ} 10'$  north from station *Duck* (see p. 27). It is marked by two tiles sunk into the ground one above the other and surrounded with concrete. A pine tree marked with a blaze is at the edge of the woods 19.2 meters (63 feet) from the station in prolongation of the line from *Duck* to the station.

*Ham* (Glynn County, Ga., F. W. Perkins, 1898; 1913).—Near the west end of a shell bank called Cedar Hammock on the south side of Brunswick River nearly opposite the quarantine station and about 300 meters east-southeast of a small but navigable creek. The station is marked according to note 20.<sup>1</sup> A cedar marked with a triangle of nails is on the hammock 9.69 meters (31.8 feet) from the station in azimuth  $77^{\circ} 05'$ .

*Buz* (Glynn County, Ga., F. W. Perkins, 1899; 1917).—In the soft marsh on Buzzards Island, 203 meters east from the bank of Turtle River and 101.5 meters south  $13^{\circ} 16'$  east from station *Buzzards Roost* (see p. 29). The station is marked according to note 20.<sup>1</sup> A patch of marsh bare of long grass is between the station and the palmetto trees called Buzzards Roost. The south end of the Buzzards Roost trees is in azimuth  $111^{\circ} 32'$  from the station and a lone palmetto at the north end is in azimuth  $139^{\circ} 13'$ .

*Brunswick Bar west base* (Glynn County, Ga., F. W. Perkins, 1898; 1913).—On hard land 864 meters west-northwest from St. Simon lighthouse and 75 meters north of high-water mark. The station is marked by a three-fourths inch iron rod driven in flush with the ground. The location of the station was visited in 1917 but the station was not found. It can probably be recovered by a thorough search.

*Brunswick Bar east base* (Glynn County, Ga., F. W. Perkins, 1898).—Reported lost in 1917.

*Jekyll* (Glynn County, Ga., F. W. Perkins, 1899).—On a small sand dune covered with scrub palmetto on the east side of the northern end of Jekyll Island about 1,100 meters south of the northeast point of the island and at the inner edge of the sand beach. The station is marked by a nail in a pine stub 3 inches square and 3 feet long projecting 4 inches above the ground. The underground mark is the mouth of a bottle buried 4 feet deep. Two pine trees, each marked with a blaze, are at the following distances from the station: 68.9 meters (226 feet) south  $72^{\circ}$  west, and 39.9 meters (131 feet) north  $47^{\circ}$  west. A tall umbrella-topped pine with boards nailed to the trunk is north  $56^{\circ}$  west from the station.

*Bly* (Glynn County, Ga., F. W. Perkins, 1899; 1917).—In the soft marsh on Blythe Island on the southwest side of Turtle River opposite the mouth of Gibsons Creek, 50 meters from the mouth of a small creek to the westward,

<sup>1</sup> See p. 8.

30 meters from the edge of the grass line to the northward, and 20 meters from high-water mark. The station is marked according to note 20.<sup>1</sup>

*Dennis* (Glynn County, Ga., F. W. Perkins, 1898).—Reported lost in 1911.

*Quarantine* (Glynn County, Ga., I. Winston, 1905; 1911).—On the north side of Brunswick River about 600 meters from the United States quarantine station. The station is on a narrow ridge of shells, 14 meters from the east end, just above the high-water mark extending along the outer edge of the marsh line below the quarantine station. The station is marked by a nail in an irregular piece of timber which is driven down 12 feet into the mud. Two tiles placed one above the other are around the top of the timber. The upper tile projects 8 inches above the ground and is surrounded with shells.

*Tank* (McIntosh County, Ga., W. H. Burger, 1906).—On the top of a tall rectangular water tank just west of the Hilton and Dodge lumber mill, called the Lower Bluff mill and formerly known as Rokenbaugh's mill, at Darien. The station is about 25 meters southwest of *Rokenbaugh's mill chimney* (see p. 29). The tank is about 5 meters long, 3 meters wide, and 2 meters deep, and the top is about 20 meters above ground. It is supported by a heavy frame work of timber and has heavy timber braces across the top. The station is marked by a copper nail bent over in driving surrounded by three other copper nails in the form of a triangle in the seventh cross timber from the east end of the top of the tank or the sixth timber from the west end.

*Altamaha* (Glynn County, Ga., W. H. Burger, 1906).—On Broughton Island on the south side of Altamaha River, about three-eighths mile east of the west end of a large grassy marshy island in Altamaha River about 1 mile east of Wood Cut. The station is on marshy land on the point at the eastern end of a large bight, about 100 meters east of a group of small bushes and 7 meters south of the embankment of the river. It is marked by a spike embedded in concrete at the center of a tile which projects 3 inches above the ground. A reference mark, similar to the station mark, except that the spike is near the west edge of the top of the tile, is 8 meters from the river bank and 4.989 meters (16.37 feet) from the station in azimuth  $95^{\circ} 02'$ . Another reference mark, similar to the station mark, except that the spike is near the east edge of the top of the tile, is 8 meters from the river bank and 6.043 meters (19.83 feet) from the station in azimuth  $275^{\circ} 02'$ . The reference marks and the station are in line with each other. The tangent to the west end of the island mentioned above is in azimuth  $140^{\circ} 32'$  from the station and the tangent to the east end is in azimuth  $262^{\circ} 42'$ .

*Reach* (McIntosh County, Ga., W. H. Burger, 1906).—About 200 meters north of the south point of the peninsula just south of Darien formed by that part of the Darien River known as North and South Reach and the part of the river running southward from *Rokenbaugh's mill chimney* (see p. 29). The station is about 10 meters west of the edge of the reeds at high tide, about 10 meters north of a small creek draining the marsh, and about 3 meters southeast of an old one-room shack. The station is marked by a signal pole. A reference mark, consisting of a nail embedded in concrete at the center of the top of a tile which is surrounded with concrete and projects 4 inches above the ground, is about 10 meters from the edge of the reeds and 5.907 meters (19.38 feet) from the station in azimuth  $192^{\circ} 45'$ . Another reference mark similar to the one just described is about 5 meters north of the small creek mentioned above and 4.682 meters (15.36 feet) from the station in azimuth  $101^{\circ} 36'$ .

*Sapelo Lighthouse (new)* McIntosh County, Ga., W. H. Burger, 1906).—A steel tower erected in 1905 on the south end of Sapelo Island and about one-fourth mile north of *Sapelo Lighthouse (old tower)*.

<sup>1</sup> See p. 8.

*Pea* (McIntosh County, Ga., F. P. Webber, 1859).—At the northern end of Sapelo Island, about one-fourth mile east-southeast of High Point, about 50 meters south of the beach, and about 100 meters east of a point of woods. The station is marked according to note 21.<sup>1</sup>

*Bayonet* (McIntosh County, Ga., F. P. Webber, 1859; 1868).—On a hammock in the marsh on the northwest side of Blackbeard Island. The station is marked according to note 21.<sup>1</sup>

*Fisherman* (McIntosh County, Ga., F. P. Webber, 1859).—At a point of woods on the west side of Blackbeard Island near the belt of marsh separating this island from Sapelo Island. The station is marked according to note 21.<sup>1</sup>

*Oyster* (McIntosh County, Ga., F. P. Webber, 1858).—On an oyster-shell mound in an old field on the east side of Sapelo Island. The station is marked according to note 21.<sup>1</sup>

*Palm* (McIntosh County, Ga., F. P. Webber, 1859).—In an open field near the end of a hammock on the east side of Sapelo Island about 110 meters west of a small creek. The station is marked according to note 21.<sup>1</sup>

*Moss* (McIntosh County, Ga., F. P. Webber, 1858; 1868).—On a hammock at a point of woods on the west side of the southern half of Blackbeard Island. The station is near the marsh and is marked according to note 21.<sup>1</sup>

*Otter* (McIntosh County, Ga., F. P. Webber, 1859).—At a point of woods on the east side of Sapelo Island on the bank of the stream separating this island from Blackbeard Island. The station is marked according to note 21.<sup>1</sup>

*Scrub* (McIntosh County, Ga., F. P. Webber, 1858; 1868).—Near the southern end of Blackbeard Island at a point of woods about three-fourths mile from the sand hills along the seashore and about 200 meters from the stream to the westward separating this island from Sapelo Island. The station is marked according to note 21.<sup>1</sup>

*Sand Hill* (McIntosh County, Ga., F. P. Webber, 1859; 1868).—On Blackbeard Island, on a large sand hill on the narrow part of the island about 1 mile from the southern end. The station is about midway between the sea beach and Caberita Inlet and is marked according to note 21.<sup>1</sup>

*Sedge* (McIntosh County, Ga., F. P. Webber, 1859).—On a point of woods on the east side of Sapelo Island. The station is marked according to note 21.<sup>1</sup>

*Caberita* (McIntosh County, Ga., F. P. Webber, 1859).—Reported lost in 1868.

*Chaparral* (McIntosh County, Ga., F. P. Webber, 1859).—At a point of woods on Sapelo Island about one-fourth mile west of the mouth of Caberita Inlet. The station is marked according to note 21.<sup>1</sup>

*Lowe* (McIntosh County Ga., F. P. Webber, 1859; 1868).—A flag in the top of a large pine tree on Sapelo Island about three-fourths mile south of the mouth of Caberita Inlet. The tree is marked with a triangular blaze and is just back of the sand hills along the beach.

*Gripe* (McIntosh County, Ga., F. P. Webber, 1859).—A pine tree marked with a triangular blaze near the northern end of Sapelo Island.

*Egg Island* (Glynn County, Ga., F. P. Webber, 1859).—On a hammock near the north point of Egg Island. The station is marked according to note 21.<sup>1</sup>

*Holly* (Glynn County, Ga., F. P. Webber, 1859; 1869).—On a hammock at a point of woods on Little St. Simon Island about 1 mile south of Altamaha Sound. The station is marked by a signal pole.

*Fly* (Glynn County, Ga., F. P. Webber, 1859).—On Mr. Cooper's plantation on the east side of St. Simon Island, on a hammock at the edge of a grass field. The station is marked according to note 21.<sup>1</sup>

<sup>1</sup> See p. 8.

*Snake* (Glynn County, Ga., F. P. Webber, 1859).—On the east bank of Hamp-ton River about 2 miles from the mouth. The station is marked according to note 21.<sup>1</sup>

*Terrapin* (Glynn County, Ga., F. P. Webber, 1859; 1869).—At a point of woods on St. Simon Island about 1 mile west of the mouth of Village Creek. The station is marked according to note 21.<sup>1</sup>

*Jack* (Glynn County, Ga., F. P. Webber, 1859).—Reported lost in 1869.

*Wylly* (Glynn County, Ga., F. P. Webber, 1859; 1869).—At the point of a field on the east side of St. Simon Island about 1 mile south of Miss Wylly's settle-ment. The station is marked according to note 21.<sup>1</sup>

*Thomas* (Glynn County, Ga., F. P. Webber, 1859; 1869).—On a point of ham-mock on the east side of St. Simon Island about one-half mile north of the big bend in Black Bank River. The station is marked according to note 21.<sup>1</sup>

*Single tree* (Glynn County, Ga., F. P. Webber, 1859).—At the southwest point of woods on the Isle of Palms. The station is marked according to note 21.<sup>1</sup> It was searched for without success in 1894 and is probably lost.

*Goold* (Glynn County, Ga., F. P. Webber, 1859).—Reported lost in 1869.

*Princess* (Glynn County, Ga., F. P. Webber, 1859; 1872).—On a large sand hill on the sea beach of St. Simon Island about one-half mile south of the mouth of Postells Creek. The station is marked by a hole in a live-oak stub on which the signal pole rests.

*St. Simon Main* (Glynn County, Ga., A. W. Longfellow; 1856; 1859).—On the sea beach near the southern end of St. Simon Island about 740 meters south-west of the mouth of a small creek and 40 meters from high water. The sta-tion is marked by a signal pole.

*St. Simon* (Glynn County, Ga., A. W. Longfellow, 1856; 1859).—At the southern end of St. Simon Island. The station is marked according to note 21.<sup>1</sup>

*Jekyl Main* (Glynn County, Ga., A. W. Longfellow, 1856).—On the sea beach on the east side of the northern end of Jekyl Island, on a bank of hard white sand covered with grass 15 meters from high water. The station is marked by a cross cut in the top of a 3 by 4 inch joist driven 3 feet into the ground. It was searched for without success in 1894 and is probably lost.

*Dubignon* (Glynn County, Ga., A. W. Longfellow, 1856).—On the east part of the northern end of Jekyl Island, on a sand bank about 5 feet high sur-ounded with pine trees and about 8 meters from high-water mark. The sta-tion is marked by an iron nail in the top of a 3 by 4 inch stake driven into the ground.

*Pond* (Glynn County, Ga., F. P. Webber, 1859; 1869).—On a wooded sand hill on the north-side of Little St. Simon Island about a mile west of the northeast point of the island. The station is marked by a signal pole.

*Altamaha* (Glynn County, Ga., F. P. Webber, 1859).—On a sand hill on the sea beach near the northeast point of Little St. Simon Island. The station is marked by a signal pole.

*Sea* (Glynn County, Ga., F. P. Webber, 1859).—On a point of the sea beach on Little St. Simon Island, about 2 miles south of the northeast point of the island. The station is marked by a signal pole.

*Winter* (Glynn County, Ga., F. P. Webber, 1859).—Reported lost in 1869.

*Jim* (Glynn County, Ga., F. P. Webber, 1859).—On a large sand hill on the sea beach on the east side near the southern end of Little St. Simon Island, about one-fourth mile north of the mouth of Mosquito Creek. The station is marked according to note 21.<sup>1</sup>

<sup>1</sup> See p. 8.

*Mcoss* (Glynn County, Ga., F. P. Webber, 1859; 1869).—On a large sand hill on the south bank of Hampton River near its mouth. The station is marked according to note 21.<sup>1</sup>

*Kyl* (Glynn County, Ga., C. M. Cade, 1913).—Near the northwest point of Jekyll Island on the north side of a small salt-water creek and just below extreme high-water mark. The station is marked by a nail in the top of a block of concrete 8 inches square and  $2\frac{1}{2}$  feet long formed around the upper end of a stake 3 inches square and 5 feet long driven into the sand.

*N. B. R.* (*U. S. E.*) (Glynn County, Ga., C. M. Cade, 1913).—On the southern end of St. Simon Island, about one-half mile west-northwest from St. Simon light. The station is a pole on the top of a back range mark for the dredging of Brunswick Bar.

*Sand Fly* (*U. S. E.*) (Glynn County, Ga., C. M. Cade, 1913).—On the east side of the northern end of Jekyll Island, about one-half mile south of the north point of the island and about 300 meters from high-water mark. The station is marked by a nail in the top of a 2-by-4-inch stake.

*New Jekyll* (*U. S. E.*) (Glynn County, Ga., C. M. Cade, 1913).—On the east side of Jekyll Island, about 2 miles south of the north point of the island, on the highest sand dune in the vicinity and about 10 meters from high-water mark. The station is marked by an iron pipe  $1\frac{1}{2}$  inches in diameter set in concrete. The foot of each of the three legs of the signal is set in concrete.

*New A* (*U. S. E.*) (Glynn County, Ga., C. M. Cade, 1913).—About 300 meters north of the large hotel on the southern end of St. Simon Island and just north of a log cabin belonging to a Mr. Bigger, of Montreal, Canada, on a sand dune about 20 feet high and 50 meters from high-water mark. The station is marked by an iron pipe  $2\frac{1}{2}$  inches in diameter filled with concrete.

*Postell* (Glynn County, Ga., C. M. Cade, 1913).—About 300 meters south of the south point of Postells Creek and about  $1\frac{1}{4}$  miles north of the large hotel on the southern end of St. Simon Island, on the highest sand dune in the vicinity which is partially covered with a growth of cedar. The station is marked according to note 1a<sup>2</sup> except that the concrete post is formed about the upper end of a piece of timber driven into the sand. A reference mark consisting of a concrete post similar to the one at the station is on the top of the dune 11.880 meters (38.98 feet) from the station in azimuth  $33^{\circ} 50'$ . The three legs of the signal over the station are set in concrete.

*Cane Creek tank* (McIntosh County, Ga., O. B. French, 1901).—A large rectangular tank at the old mill known as Cane Creek mill on the west side of North River, opposite Doboy Island.

*Doboy Island stack* (McIntosh County, Ga., O. B. French, 1901).—The iron stack on the east side of the old mill on Doboy Island.

*Union Island chimney* (McIntosh County, Ga., O. B. French, 1901).—A large brick chimney on Union Island (given as Pumpkin Hammock on Coast and Geodetic Survey Chart No. 157).

*Channel range, north rear, south rear, north front, and south front* (McIntosh County, Ga., O. B. French, 1901).—These four stations are four signals built on the northeast part of Wolf Island by the United States Engineers to define the sides of a proposed channel across the bar at the entrance to Doboy Sound. The signals were somewhat out of plumb when the observations were made, so they are not very accurately determined.

*Sim* (Glynn County, Ga., A. Joachims, 1916).—In the edge of the woods on the north end of Little St. Simon Island, about one-fourth mile inside the low sand point, about 300 meters from the shore of Altamaha Sound, about 200

<sup>1</sup> See p. 8.

<sup>2</sup> See p. 6.

meters from an artesian well, about 70 meters north of two fresh-water ponds, about 30 meters south of an old wagon road, and about 2 meters from high-water mark. The station is marked according to note 1c.<sup>1</sup> A reference mark, note 11c,<sup>1</sup> is 25.08 meters (82.28 feet) from the station in azimuth 186° 12'.

*Palm* (Glynn County, Ga., A. Joachims, 1916).—On the northeast end of the Isle of Palms, on the south bank of Hampton River near its mouth, and about 500 meters from high-water mark at the extreme end of the point. The station is on a low cleared place surrounded on three sides by palmettos and is marked according to note 1c.<sup>1</sup> A reference mark, note 11c,<sup>2</sup> is 6.041 meters (19.82 feet) from the station.

*Rack* (Liberty County, Ga., A. Joachims, 1916).—On the extreme southern end of St. Catherine Island, about 300 meters north of the beach, and about 300 meters south of the first bend in the small slough on the west side of the point of the island.<sup>3</sup> The station is on the first high land in a grove of oak trees. A great deal of clearing was done about the station in order to get timber for a hydrographic signal 100 feet high. The station is marked according to note 1c.<sup>1</sup>

*Neck* (McIntosh County, Ga., A. Joachims, 1916).—Near the southern end of Blackbeard Island about 1½ miles north of the mouth of the inlet separating this island from Sapelo Island and about one-eighth mile north of a new hospital. The station is in a grove of trees on high land about midway between the inlet mentioned above and the sea-coast. A great deal of clearing was done about the station in order to get timber for a hydrographic signal 100 feet high. The station is marked according to note 1c.<sup>1</sup> A reference mark, note 11c,<sup>2</sup> is near the station, but the location with reference to the station was not determined.

*Pine* (Liberty County, Ga., A. Joachims, 1916).—Just inside the woods at the extreme northern end of St. Catherine Island about 300 meters west of the border of pines along the sea-beach. The station is marked by a triangle of nails set in the top of an 8 by 8 inch concrete monument. Station *Rauer* (see p. 25) is 153.4 meters from the station in azimuth 317° 10'. A 100-foot hydrographic signal was erected at this station.

*Middle* (Liberty County, Ga., A. Joachims, 1916).—Near the center of St. Catherine Island, about three-fourths mile north of a small oyster cannery which is on a small creek flowing into an inlet known locally as Back Creek. The station is on hard ground in a grove of oak trees about 300 or 400 meters from the edge of the marsh and about one-fourth mile east of a road. The station is marked according to note 1b.<sup>1</sup> A reference mark, note 11b,<sup>2</sup> is 21.90 meters (71.85 feet) from the station in azimuth 115° 25'. A 100-foot hydrographic signal was erected at this station.

*Shore* (Glynn County, Ga., F. W. Perkins, 1899).—On the southeast side of St. Simons Island, about two-thirds of a mile east by north from St. Simon Lighthouse, about 10 meters west of the inner edge of the sand beach, 6 meters east of an old railroad covered with sand, and 30 meters east of the edge of a growth of bushes. The station is marked by a nail in the top of a pine stub 3 inches square and 4 feet long, driven into the sand. The upper end of the stub is surrounded with a chimney tile.

*Darien proposed longitude station* (McIntosh County, Ga., W. H. Burger, 1906; 1907).—In a small octagonal plot of ground owned by the city of Darien and used as a park, situated between the Episcopal and Methodist churches, one block east of the city fire house. The station is in the southeast quarter of the park in a direct line between the spire of the Methodist Church

<sup>1</sup> See p. 6.

<sup>2</sup> See p. 7.

and the cross of the Episcopal Church (see p. 46, of Special Publication No. 43), 6.61 meters (21.7 feet) from the corner of the park nearest the Episcopal Church, 15.20 meters (49.9 feet) east of the eastern one of two north and south walks in the park, and 24.50 meters (80.4 feet) south of an east and west walk. The station is marked by a copper nail embedded in concrete at the center of a 4-inch tile which is also surrounded with concrete and projects 4 inches above the ground. *Darien longitude station* (see below) is 2.58 meters (8.46 feet) north and 0.18 meter (0.59 foot) west of the station.

*Calliope* (McIntosh County, Ga., F. P. Webber, 1859).—On a shell bank on the southeast end of Commodore Island. The station is marked by a signal pole.

*Citadel* (McIntosh County, Ga., F. P. Webber, 1859).—A pole on the roof of a two-story house about one-half mile west of the settlement on Sapelo Island and about  $2\frac{1}{2}$  miles north by west from Sapelo lighthouse.

*Creighton Island* (McIntosh County, Ga., F. P. Webber, 1856).—Reported lost in 1902.

*Sutherland* (McIntosh County, Ga., F. P. Webber, 1856).—Reported lost in 1902.

*Coon* (Glynn County, Ga., F. P. Webber, 1859; 1869).—On the west side of Rainbow Island on the east bank of a small stream about one-fourth mile from its junction with Hampton River. The station is marked according to note 21.<sup>1</sup>

*Wolf Island clubhouse* (McIntosh County, Ga., O. B. French, 1901; 1906).—A small pole at the center of the roof of the clubhouse at the southeast point of Wolf Island.

*Hclms mill chimney* (Glynn County, Ga., A. W. Longfellow, 1856).—Reported lost in 1894.

*Darien Longitude station* (McIntosh County, Ga., J. S. Hill, 1907).—This station is 2.58 meters (8.46 feet) north and 0.18 meter (0.59 foot) west of *Darien proposed longitude station* (see p. 35). It is marked by a concrete pier.

#### ST. SIMON SOUND TO ST. MARYS RIVER.

*Raft* (Glynn County, Ga., F. P. Webber, 1860; 1868).—On a shell bank on the southeast side of Brunswick River about 400 meters northeast of the mouth of Jekyl Creek. The station is marked according to note 18,<sup>1</sup> except that the center stake is driven through a truncated cone of cast iron 2 feet below the ground.

*Mud* (Glynn County, Ga., F. P. Webber, 1860; 1894).—On the south side of the northern part of the horseshoe bend in Jointer Creek about 2 miles south of its junction with the Brunswick River. The station is in the marsh and is marked according to note 18.<sup>1</sup>

*Oak* (Camden County, Ga., F. P. Webber, 1860; 1868).—On a point of hard land near the edge of a marsh near the head of a small stream flowing into Little Satilla River from the south. The station is marked according to note 18,<sup>1</sup> except that the center stake is driven through a truncated cone of cast iron 2 feet below the ground. It was searched for without success in 1905, but the underground mark may still be in place.

*Cemetery* (Glynn County, Ga., F. P. Webber, 1860).—Reported lost in 1905.

*Dover* (Camden County, Ga., F. P. Webber, 1860).—Reported lost in 1905.

*Deformed* (Camden County, Ga., F. P. Webber, 1860).—Reported lost in 1905.

*Mound* (Camden County, Ga., F. P. Webber, 1860).—Reported lost in 1905.

<sup>1</sup> See p. 8.

*Bat* (Camden County, Ga., F. P. Webber, 1860; 1905).—On the west side of Cumberland Island about one-fourth mile south of Brickhill River and near a point of woods from which a shell point projects to within about 50 meters of the station. The station was marked originally according to note 18,<sup>1</sup> except that the east reference stake is 3.4 feet from the station and the south one is 3.15 feet. In 1905 a 4-inch tile was fitted over the upper end of the cedar post marking the station and was filled and surrounded with concrete and shells. The tile projects about 1 foot above the ground and the top of the post. Another tile was forced down into the mud around the north reference mark. A reference mark (1905), consisting of a cedar post 6 inches in diameter and 12 feet long, projecting 5 feet above the ground, is 7.60 meters (24.93 feet) from the station in azimuth  $3^{\circ} 38'$ .

*Delaroché* (Camden County, Ga., F. P. Webber, 1860; 1905).—About one-fourth mile north of Crooked River just outside a point of woods and near a drain ditch which is just inside the woods. The station was marked originally by a copper tack in a large pine stub driven through a truncated cone of cast iron 2 feet below the ground. In 1905 a 6-inch tile was placed around the upper end of the stub and was filled and surrounded with concrete. Two reference marks, each consisting of a 4-inch tile filled with concrete, are at the following distances from the station: 0.99 meter (3.25 feet) north and 0.92 meter (3.02 feet) east. An old stub with a copper tack in the top is 0.915 meter (3.00 feet) south of the station and a cedar tree marked with a triangle of nails is 1.84 meters (6.04 feet) from the station. Station *Crooked* (see p. 39) is 17.58 meters (57.68 feet) from the station in azimuth  $141^{\circ} 53'$ .

*Stafford* (Camden County, Ga., F. P. Webber, 1860; 1905).—On the marsh on the west side of Cumberland Island, 121 meters south of an old fence composed of logs driven in the marsh, about 75 meters from hard ground, and about 58 meters from a telegraph pole marked with a triangle of nails, the third pole south of the fence. The station was marked originally according to note 18.<sup>1</sup> In 1905 a tile was fitted over the upper end of the post marking the station and was filled and surrounded with concrete and shells. The tile projects 8 inches above the marsh. Another tile was pushed down around the east reference stub. A reference mark, consisting of a cedar post 8 inches in diameter and 8 feet long projecting 4 feet above the marsh, is 6.55 meters (21.49 feet) from the station on the opposite side from the telegraph pole mentioned above.

*Forsoaken* (Camden County, Ga., F. P. Webber, 1860).—On the southwest side of Kings Bay about 100 meters from the shore and about one-fourth mile south of an old deserted house. The station is marked according to note 18<sup>1</sup> except that the center stake is driven through a truncated cone of cast iron 2 feet below the ground. The station was searched for in 1905 without success but the underground mark may still be in place.

*Nightingale* (Camden County, Ga., F. P. Webber, 1860).—Reported lost in 1905.

*Camden* (Camden County, Ga., F. P. Webber, 1860; 1905).—On the mainland about  $2\frac{1}{2}$  miles north of Point Peter and 13 meters west of the west bank of St. Peters Creek at the boat landing of F. L. Dubose which is at a decided bend in the creek. There is a short piece of corduroy road with shells on it leading up from the landing. The station was marked originally according to note 18<sup>1</sup> except that the center post was driven through a truncated cone of cast iron 2 feet below the ground. In 1905 a piece of tile a foot long was fitted over the upper end of the center post and concrete and shells were placed on top of the cone and in and around the tile. A reference mark, consisting of a tile filled

<sup>1</sup> See p. 8.

with shells projecting 6 inches above the ground, is 6.1 meters (20 feet) from the station in azimuth  $107^{\circ} 52'$ . Dubose's house is about 500 meters from the station in azimuth  $69^{\circ} 05'$ . The three instrument stubs were left in position.

*Sector* (Camden County, Ga., F. P. Webber, 1860).—Reported lost in 1905.

*Point Peter* (Camden County, Ga., A. W. Evans, 1855; 1905).—On slightly elevated ground in a large open field, formerly cultivated, and separated on the southeast from Cumberland Sound and St. Marys River by extensive marshes. On the east side of the field is a creek which flows into St. Marys River. The field is surrounded by a narrow row of trees and bushes from the west around by south to the east, and avenues were cut through these trees in line to stations *Beach*, *Beacon*, and *Martins Island*. The station is marked by the intersection of two lines cut in the top of a granite monument surrounded by a mass of concrete extending from 2 inches below the surface of the ground to a depth of 14 inches. A circular trench 6 feet in radius and 18 inches in depth was dug around the station and the earth therefrom piled around the center stone, forming a slight elevation.

*Tiger Island north base* (Nassau County, Fla., A. W. Evans, 1855).—On a sand bank on Tiger Island opposite the bar and near the mouth of a large creek. The station is marked by a cross in a stone. In 1905 the station was reported as being probably lost, due to the erosion of the north end of the island in the vicinity of the station.

*Cumberland* (Camden County, Ga., A. W. Evans, 1855).—On a large, long sand hill near the southeast point of Cumberland Island and fronting the sea. The station is marked by a cross in the top of a stone post set in the sand.

*Tiger Island south base* (Nassau County, Fla., A. W. Evans, 1855).—On the marsh of Tiger Island, west of the north end of Amelia Island, and near a break in the hammocks which line the east side of Tiger Island. The station is marked by a cross in the top of a stone post. In 1905 the marsh in this location was being covered with sand and the mark was not found.

*Hammock* (Camden County, Ga., I. Winston, 1905).—On the east shore of Cumberland Sound near the southern end of Cumberland Island on a hammock covered with cedars and other trees about three-fourths mile north-northwest of the mouth of Beach Creek. The station is on the top and about 50 meters from the north end of a narrow ridge across the end of the hammock. It is marked by a pine scantling in the center of two tiles placed one above the other with concrete around the bottom of the lower tile and where the tiles are joined. There is a pile of shells around the top of the upper tile which projects about 6 inches above the ground.

*Spar* (Camden County, Ga., F. P. Webber, 1860).—On the southeast end of Dover Island on the north shore of the mouth of Satilla River. The station is marked by a signal pole.

*Board* (Glynn County, Ga., F. P. Webber, 1860).—Reported lost in 1868.

*Shoal* (Camden County, Ga., I. Winston, 1905; 1913).—On a shell bank covered with grass on the northeast shore of Horse Island about 150 meters from the end of a high ridge of shells along the shore north of Cumberland Wharf. The station was marked originally according to note 22.<sup>1</sup> The upper tile was found broken off in 1913. Two reference marks, each consisting of a tile embedded in the shell bank, are at the following distances and azimuths from the station: 2.56 meters (8.4 feet),  $127^{\circ} 37'$ ; and 2.68 meters (8.8 feet),  $309^{\circ} 37'$ . The point of woods on Little Cumberland Island is in azimuth  $227^{\circ} 17'$  from the station and the house on Cumberland Wharf is in azimuth  $3^{\circ} 44'$ .

<sup>1</sup> See p. 8.

*Floyd* (Camden County, Ga., I. Winston, 1905).—On a large circular shell mound 30 meters in diameter and 3 meters high covered with cedar trees and bushes and one-half mile south of the point where Floyds Creek touches the hard ground of the mainland. The station is marked according to note 22.<sup>1</sup> The following distances and azimuths are from the station: Dead cedar tree, 8.6 meters (28.2 feet), 28° 56'; tall cedar tree, 6.73 meters (22.1 feet), 155° 06'; cedar stump, 7.75 meters (25.4 feet), 259° 26'; and cedar stump, 5.15 meters (16.9 feet), 306° 56'.

*Crooked* (Camden County, Ga., I. Winston, 1905).—This station is 17.58 meters (57.68 feet) from station *Delaroché* (see p. 37) in azimuth 141° 53'. It is marked according to note 22<sup>2</sup>, except that there is a ring of concrete on the ground around the top of the upper tile. A cedar tree marked with a triangle of nails is 4.76 meters (15.6 feet) from the station in azimuth 107° 33'.

*Satilla* (Camden County, Ga., I. Winston, 1905).—Reported lost in 1913.

*Pivot* (Glynn County, Ga., I. Winston, 1905; 1913).—On the edge of the sand hills overlooking St. Andrews Sound at the southern end of Jekyl Island. The station is the center of a 4-inch iron pivot at the center of a large square iron plate secured to the western one of two concrete gun platforms which were built during the Spanish war. The western halves of the platforms are somewhat broken and the two iron carriages are lying on their sides to the westward of the pivots. *Pivot reference* (see below) is 36.121 meters (118.51 feet) from the station in azimuth 97° 41'.

*Horse* (Camden County, Ga., F. P. Webber, 1860; 1868).—On a shell bank on Horse Island on the south shore of Satilla River nearly opposite the mouth of Dover Creek. The station is marked by a signal pole.

*Crab* (Camden County, Ga., F. P. Webber, 1860).—Reported lost in 1869.

*Club* (Camden County, Ga., F. P. Webber, 1860).—Near the north end of Cumberland Island on the east bank of Cumberland River on a bluff about one-half mile west of Mr. Club's house. The station is marked by a live-oak stub which was used to support the signal pole.

*Conch* (Camden County, Ga., F. P. Webber, 1860).—Reported lost in 1868.

*Hog* (Camden County, Ga., F. P. Webber, 1860).—On a large sand hill on the beach near the northern end of Cumberland Island about 2 miles south of the mouth of the creek separating this island from Little Cumberland Island. The station is marked by a live-oak stub which was used to support the signal pole.

*Trout, Rest, Pelican, Porpoise, Shark, Mullett, and Palmetto* (Camden County, Ga., F. P. Webber, 1860).—No descriptions are available for these points. They were probably marked with wooden stakes.

*Dufour* (Camden County, Ga., A. W. Evans, 1856).—Reported lost in 1871.

*Tilla* (Camden County, Ga., C. M. Cade, 1913).—On the northwest bank of the Satilla River about three-fourths mile northeast of the mouth of Dover Creek, on a sand and shell bank covered with grass 10 meters back from low water. The station is marked according to note 1a<sup>2</sup> except that the concrete is secured to the upper end of a 2 by 4 inch pine scantling 10 feet long driven into the ground.

*Pivot reference* (Glynn County, Ga., C. M. Cade, 1913).—This station is 36.121 meters (118.51 feet) from station *Pivot* (see above) in azimuth 97° 41'. It is marked according to note 11a<sup>3</sup> with the arrow pointing toward *Pivot*. The three legs of the signal, each set in concrete, are at the following distances and azimuths from the station: 2.53 meters (8.3 feet) 24° 45'; 1.82 meters (6.0 feet) 163° 39'; and 2.75 meters (9.0 feet) 304° 03'.

<sup>1</sup> See p. 8.

<sup>2</sup> See p. 6.

<sup>3</sup> See p. 7.

*Bunkley* (Camden County, Ga., C. M. Cade, 1913).—Near the northern end of Cumberland Island, about  $1\frac{1}{2}$  miles east of R. L. Bunkley's Hotel, 500 meters north of an old tramway track and bathhouses on the beach, 120 meters from high-water mark, and 50 meters from the wreck of an old wooden ship. The station is on a flat-topped dune and is marked according to note  $1a^1$ . A reference mark, consisting of a 1-inch iron pipe set in concrete, is 25.13 meters (82.4 feet) from the station in azimuth  $174^\circ 20'$ .

*Beach* (Camden County, Ga., I. Winston, 1905).—On the broad sand beach at the extreme southern end of Cumberland Island, about half way between the woods and high-water mark, directly in front of a sand hill with a round top, half of which has been cut away and on which palmettos are growing. The station is marked according to note  $22^2$ . Logs were piled around the station in the form of a rough square to hold the sand in place.

*Dungeness house cupola* (Camden County, Ga., I. Winston, 1905).—The center of the top of the cupola on the residence of Mrs. Lucy C. Carnegie. It is on the site of the old Nightingale residence and is a prominent object from Cumberland Sound.

*Dungeness water tower* (Camden County, Ga., I. Winston, 1905).—The center of the tank, 99 feet above the ground, supported by a steel tower near the residence of Mrs. Lucy C. Carnegie (see station *Dungeness house cupola* above).

*Carnegie* (Camden County, Ga., J. S. Bilby, 1915).—On the sea beach of Cumberland Island and about 1 mile east by north from the Stafford place, 200 meters north of the shell road leading from the Stafford place to the beach and 293 meters from high-water mark. The station is on a large sand hill about 25 feet high outside of the timber and is marked according to notes  $1a^1$  and  $7a^3$ . A reference mark, note  $11a^3$  is on a sand hill covered with live-oak bushes and palmetto, 50.91 meters (167.0 feet) north  $66^\circ$  east (magnetic) from the station.

*Lee* (Camden County, Ga., J. S. Bilby, 1915).—On the sea beach of Cumberland Island about 1,500 meters south of the Cumberland Hotel bathhouses and 325 meters from high-water mark. The station is on the highest sand hill in the vicinity, about 25 feet high, at the south end of a broad sand ridge. It is marked according to notes  $1a^1$  and  $7a^3$ . A reference mark, note  $11a^3$  is on a sand hill covered with palmetto 21.153 meters (69.40 feet) north  $90^\circ$  east (magnetic) from the station.

*Groves* (Glynn County, Ga., J. S. Bilby, 1915).—On the sea beach of Jekyll Island about 2 miles by road southeast of the Jekyll Island Club and 1,250 meters south of the club bathhouse, on the southern end of the second sand ridge back from the beach, 65 meters from high-water mark. The station is on a sand hill about 18 feet high, the southern part of which is covered with grass and the northern part with live-oak bushes and palmetto. It is marked according to notes  $1a^1$  and  $7a^3$ . A reference mark, note  $11a^3$  is on the south edge of the palmetto 15.344 meters (50.34 feet) north  $5^\circ$  east (magnetic) from the station.

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<sup>1</sup> See p. 6.

<sup>2</sup> See p. 8.

<sup>3</sup> See p. 7.

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