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U. S. COAST AND GEODETIC SURVEY

E. LESTER JONES, Director

PRECISE TRIANGULATION, TRAVERSE, AND LEVELING IN NORTH CAROLINA

BY

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and

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Mathematicians

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By WALTER D. SUTCLIFFE and HENRY G. AVERS, *Mathematicians, U. S. Coast and Geodetic Survey.*

PART I.

GENERAL STATEMENT.

The purpose of this publication is to present to the engineer or surveyor the results of all precise triangulation, precise traverse, and precise leveling which constitute the horizontal and vertical control for North Carolina. The triangulation along the coast being of secondary accuracy is not included in this report. The results of the coast work will probably be issued as a separate report in the near future.

This report has been divided, for the convenience of those who may use it, into two parts. In Part I are given all the data which an engineer or surveyor will ordinarily need for the control of local surveys. Part II is devoted to a brief description of the methods employed in making the triangulation and traverse observations and to a discussion of the office computation including the final rigid least squares adjustment.

The location of the triangulation, traverse, and leveling can be most readily seen by referring to the index sketches at the back of this publication. On page 10 will be found instructions on how to find the data for any particular station or bench mark or for all the stations or bench marks in a particular region.

PRECISE TRIANGULATION.

The eastern oblique arc of precise triangulation extends from Maine to Louisiana. The results of this work were first published in 1902 in Special Publication No. 7, but the geographic positions were not given on the North American datum (see p. 3). This triangulation has since been recomputed on the North American datum, and the results for the North Carolina portion of the arc are included in this report. The work lies in the western part of the State, and while only seven stations of the main scheme are in North Carolina, other points of possible use in adjoining States have been included as well as a large number of intersection stations.

In 1918 an arc of precise triangulation was extended southeastward from stations of the oblique arc in the vicinity of Madison to Sanford, N. C., where a connection was made with the precise traverse.

PRECISE TRAVERSE.

The precise traverse lines in North Carolina were run in 1918. One follows the Seaboard Air Line Railway through Hamlet, Sanford, Raleigh, Henderson, and Weldon and is a part of the line which extends from Savannah, Ga., to Norfolk, Va. In addition to the part in North Carolina the Virginia portion of this line, which follows the Seaboard Air Line Railway through Boykins, Franklin, and Suffolk and the Virginian Railway from Suffolk to Norfolk, has been included in this report. The other traverse follows the Atlantic Coast Line Railroad from Wilmington to Sanford, N. C.

PRECISE LEVELING.

The North Carolina portion of the precise level net of the United States comprises the following level lines, totaling 882 miles in length and fixing the elevations of 554 permanent bench marks:

Line I. Morehead City, N. C., to Brunswick, Ga. (part).
Line II. Savannah, Ga., to Norfolk, Va. (part).
Line III. Wilmington to Sanford, N. C.
Line IV. Greensboro to Sanford, N. C.

Line I was run by the U. S. Geological Survey and the three other lines by the U. S. Coast and Geodetic Survey. The work on line I was begun at Morehead City, N. C., and carried westward along the Norfolk Southern Railroad and the Southern Railway to Knoxville and Cleveland, Tenn., and to Brunswick, Ga. The field work was done in 1896–1898.

Line II is the North Carolina and Virginia portions of the Savannah, Ga.-Norfolk, Va., line of precise levels. The route of the work is the same as that of the traverse between those places, and in North Carolina follows the Seaboard Air Line Railway through Hamlet, Sanford, Raleigh, Henderson, and Weldon. The field work was done in 1918.

Line III follows the Atlantic Coast Line Railroad from Wilmington through Fayetteville to Sanford, N. C., the route being the same as that of the traverse between those places. The field work was done in 1918.

Line IV follows the Atlantic & Yadkin Railway from Sanford to Greensboro. The field work, which was done in 1918, was carried forward from both ends of the line, the parties meeting at Bear Creek.

CLASSIFICATION OF CONTROL.

Triangulation, traverse, and leveling are divided, according to accuracy, in four classes—precise, primary, secondary, and tertiary. The limits of these classes have been prescribed and defined by agreement of representatives of the various Federal map-making bureaus, and they are described in detail in U. S. Coast and Geodetic Survey Circular No. 30.

In precise triangulation the length discrepancy—that is, the discrepancy between the measured length of a base and its length as computed through the triangulation from the preceding base—must not exceed one part in 25,000. To secure this accuracy, the standard has been adopted for the field work that the average closing error of the triangles must not greatly exceed 1 second and the maximum

closing error should not be more than 3 seconds. The closing error of a triangle is the discrepancy between the sum of the measured angles in the triangle and 180° plus the spherical excess of the triangle.

Precise traverse should be of the same relative degree of accuracy as that required for precise triangulation. The error in closure in position should not exceed one part in 25,000 of the distance run. Observed astronomic azimuths used for controlling the geodetic azimuths of the traverse should have an accuracy represented by a probable error of about $\pm 0''.5$.

The limits prescribed for precise leveling are those adopted by the International Geodetic Association at its Seventeenth General Conference held at Hamburg, Germany, September, 1912. The probable accidental error should not exceed ± 1 millimeter per kilometer, and the probable systematic error should not exceed ± 0.2 millimeter per kilometer. The methods and formulas to be used in computing these errors are given on page 88 of Special Publication No. 18.

ARRANGEMENT OF DATA.

The final results of a system of triangulation or traverse take the form of geographic positions which give the latitude and longitude of each point of the triangulation or traverse, the azimuths of each line, the logarithm of the length in meters of each line, and the length of each line in meters and feet.

The tabulation of the various data given in Part I is arranged in the following order: (1) The geographic positions of the triangulation and traverse points are found on pages 13 to 35. The principal points and the supplementary points are listed separately. (2) The description of all marked points, with the character of the marks, are given on pages 38 to 128, arranged in the same order as the geographic positions. At the end of each description is given the elevation above mean sea level of the station mark in both meters and feet, if it has been determined. There are also given the descriptions and elevations of all additional bench marks which are not triangulation or traverse stations. (3) The lengths of the lines and the elevations of the stations and bench marks are given in both meters and feet, but for the convenience of those who may wish to convert other quantities from one system to the other, conversion tables are given on pages 130 to 137.

THE NORTH AMERICAN DATUM.

Concerning the actual use of the table of geographic positions, it is necessary to explain the "North American datum," which serves as the basis for all the geodetic values in this report. Early in the year 1913 the Superintendent of the U. S. Coast and Geodetic Survey was notified by the director of the Commission Geodésica Mexicana and by the chief astronomer of the Dominion of Canada Astronomical Observatory that the so-called United States standard datum had been adopted as the datum for the triangulation of those organizations. They also reported that the Clarke spheroid of 1866, now used in the United States, would be used by them. Owing to the international character of the datum adopted by the three

countries, the Superintendent of the U. S. Coast and Geodetic Survey changed its designation from the "United States standard datum" to the "North American datum."

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

All of the positions and azimuths have been computed upon the Clarke spheroid of 1866, as expressed in meters, which has been in use in the U. S. Coast and Geodetic Survey for many years. After a spheroid has been adopted and all the angles and lengths in a triangulation have been fully fixed it is still necessary, before the computation of latitudes, longitudes, and azimuths can be made, to adopt a standard latitude and longitude for a specified station and a standard azimuth of a line from that station. For convenience the adopted standard position (latitude and longitude) of a given station, together with the adopted standard azimuth of a line from that station, is called the geodetic datum.

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

The transcontinental triangulation, the office computation of which was completed in 1899, joined all the detached portions mentioned and made them one continuous triangulation. As soon as this took place the logical necessity existed of discarding the old geodetic data used in these various pieces and substituting one for the whole country, or at least for as much of the country as is covered by continuous triangulation. To do this was a very tedious piece of work and involved much preliminary study to determine the best datum to be adopted. On March 13, 1901, the superintendent adopted what was known from that time until 1913 as the United States standard datum, but is now known as the North American datum, and it was decided to reduce the positions to that datum as rapidly as possible. The datum adopted was that formerly in use in New England, and therefore its adoption did not affect the positions which had been used for geographic purposes in New England and along the Atlantic coast to North Carolina, nor those in the States of New York, Pennsylvania, New Jersey, and Delaware. The adopted datum does not agree, however, with that used in the Transcontinental Triangulation and in the Eastern Oblique Arc of the United States, publications which deal primarily with the purely scientific problem of the determination of the figure of the earth and which were prepared for publication before the adoption of the new datum. As the adoption of such a standard datum was a matter of

considerable importance, it is in order here to explain the desirability of this step more fully.

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

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

The North American datum was adopted with reference to positions furnished for geographic purposes but has no reference to the problem of the determination of the figure of the earth. It was adopted with reference to the engineer's problem of furnishing standard positions and does not affect the scientists' problem of the determination of the figure of the earth.

The principles which guided in the selection of the datum to be adopted were: First, that the adopted datum should not differ widely from the ideal datum for which the sum of the station errors in latitude, longitude, and azimuth should each be zero; second, it was desirable that the adopted datum should produce minimum changes in the publications of the U. S. Coast and Geodetic Survey, including its charts; and, third, it was desirable, other things being equal, to adopt that datum which allowed the maximum number of positions

already in the office files to remain unchanged, and therefore necessitated a minimum amount of new computation. These considerations led to the adoption, as the standard, of that datum which had been in use for many years in the northeastern group of States and along the Atlantic coast as far south as North Carolina.

An examination of the station errors of the astronomical stations so far reduced, scattered widely over the United States from Maine to Louisiana and to California, indicated that this datum approaches closely the ideal for which the algebraic sum of the station errors of each class would be zero.

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

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

Points are then said to be upon the North American datum when they are connected with the station Meades Ranch by a continuous triangulation, or traverse, through which the latitudes, longitudes, and azimuths have been computed on the Clarke spheroid of 1866, as expressed in meters, starting from the above data.

BENCH MARKS.

Nearly all the leveling by the Coast and Geodetic Survey in North Carolina follows the routes of the traverse. On these lines the traverse stations or their reference marks were used as bench marks, and the stations are in all cases referred to by name regardless of whether or not a bench-mark designation was assigned to them. In towns and cities extra bench marks were established and given bench-mark designations.

In the progress of the leveling the elevations of a number of supplementary points, such as marks on masonry, spikes in poles, and the top of the rail or the top of the spike at the base of the rail in front of the railroad stations, were determined. All of these points, where a sufficient description is available, are included in this publication, but the results are given apart from the results of the permanent bench marks.

ORTHOMETRIC CORRECTION.

The orthometric correction was applied to the results of all the leveling. This correction eliminates from the observed results the effect of the convergence of level surfaces as the poles of the earth are approached, and the resulting elevations represent the vertical distances of the points above mean sea level. (See Special Publication No. 18, p. 49.)

MEAN SEA LEVEL.

The elevations of all bench marks in the precise level net of the United States are referred to mean sea level. (See Special Publication No. 41, Use of Mean Sea Level as the Datum for Elevations.) Mean sea level is the average height of the surface of the sea, all

stages of the water considered. It is the surface that the water of the ocean would form were it not disturbed by the attraction of the sun and moon and the force of the wind.

Mean sea level is usually determined from hourly height readings, and it may be established within a very small fraction of a foot by continuous tidal observations extending over at least a year. It is assumed that mean sea level is at the same elevation on the open coasts of the Atlantic Ocean, the Gulf of Mexico, and the Pacific Ocean.

ELEVATIONS.

All the elevations are given in meters and feet above mean sea level. The elevations of the permanent bench marks are given to millimeters. This does not imply that the millimeters are known. For bench marks not more than 2 kilometers apart the difference in elevation is uncertain in the millimeters; for those which are from 2 to 200 kilometers apart the centimeters are also uncertain; and for greater distances there may be in some cases an uncertainty in the decimeters. Similarly, the uncertainty in the absolute elevations varies with the distance from the nearest tidal connection.

The elevations of the temporary bench marks and the top of the rail in front of the railroad stations, although determined with the same accuracy as the elevations of the permanent bench marks, are given to only two decimal places because of the character of the marks and the uncertainty of recovering the exact point whose elevation was determined.

The elevations of the triangulation stations which were determined by reciprocal measures of vertical angles are given to one decimal place, and the elevations determined by nonreciprocal measures of vertical angles are given to the nearest meter. A few elevations given to the nearest meter were determined by reciprocal measures, but these have not been rigidly adjusted.

USES OF HORIZONTAL CONTROL DATA.

The plan or map for any extensive engineering project, whether or not map construction is the primary object, should have all of its parts properly correlated and should be on the same datum as adjacent surveys. Federal and State mapping organizations have long been aware of the necessity for having all surveys based upon a common datum, but the local engineers and surveyors in this country have too often in the past been content, and in many cases compelled, to use a local datum for their surveys. The future economic disadvantage of such a system is now becoming recognized, with the result that city and county surveys are being more generally placed upon a permanent basis by connecting them to stations on the North American datum.

One other factor must be taken into consideration by the engineer of to-day. As the States develop industrially they will undoubtedly follow the lead of one of the Eastern States, Massachusetts, which with splendid foresight has extended its triangulation control over the entire State for the purpose of defining property boundaries in terms of latitude and longitude. The advantage of such a system is well stated in the following extracts from the Report on the Maryland Oyster Survey:

The difficulties of accurately locating and permanently defining the boundaries of a farmer's plantation on land, even with the aid of monuments, public roads, streams of water, and other points of reference, are often great, judging from the disputes frequently arising in connection with boundaries. * * *

There is only one point on the earth's surface at the intersection of any one parallel of latitude and any one meridian of longitude, and therefore there can be no dispute as to the meaning of such a geographic definition of the location of a point, even though all the original triangulation station marks used in its determination, together with the chart on which its position was originally plotted, have been totally destroyed.

In the case of the destruction of an original triangulation station mark, or any other point defined by a geographic position, a competent geodetic engineer can reestablish its exact location by means of a new system of triangulation connecting with other distant triangulation marks which have not been destroyed.

In a section of the country covered by adequate geodetic control the data are available to the engineer for any of the following operations, in addition to its possible future use as a basis for cadastral surveys:

(1) **Extensive mapping.**—The topographer needs as initial data for beginning a topographic survey the distance and direction between two points and the geographic position of one of them, in latitude and longitude, on the North American datum. His local triangulation or traverse, based on this control, will prevent the accumulation of excessive errors as he carries on his mapping operations. In the event that the available precise triangulation in that region has lines of too great length to join to conveniently, he can measure a base and azimuth at some place visible from a precise or a primary triangulation or traverse station and connect his base to the station by triangulation or traverse, thus obtaining proper geographic positions for his local surveys.

Instructions for secondary (formerly called tertiary) triangulation, suitable for the control of local surveys, may be found in U. S. Coast and Geodetic Survey Special Publication No. 26. Instructions for precise and secondary traverse are given in Special Publication No. 58. Either of these publications can be had at a nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C.

(2) **Boundary lines.**—If it is desired to locate or to delimit accurately and permanently the boundaries of political subdivisions, such as States, counties, or cities, the methods indicated in the preceding paragraph may be followed. Whenever possible, a line of the adjusted triangulation or traverse should be used as a basis for local surveys rather than a point, since a line gives the three essentials of position, length, and direction.

(3) **Local intensive surveys.**—The necessity for such surveys arises most frequently in connection with extensive improvements over a considerable area or as a basis for city planning, where the needs of a city are being anticipated for a number of years. Here the requirements are somewhat different from those in the two preceding operations, for it is often necessary to extend precise or primary control in considerable detail over the entire area affected, secondary triangulation or traverse then being used to furnish additional points for the survey. Such a control survey should invariably be started from a line of adjusted triangulation or traverse on the North American datum.

While it may be noted in the preceding paragraphs that the azimuth and length of one line and the geographic position of one end of that line constitute the essential data for the complete utilization of old work as a basis for new work, there is always grave danger in depending upon this minimum of data. There may be failure to identify the true station mark, or the mark, though genuine, may have been tampered with or otherwise disturbed in position. This will, of course, introduce an error into the new work based on these stations. It is the present practice in this survey, unless unusual conditions render it unnecessary, to establish the integrity of the recovered points by using at least three old stations as a basis for new work, the third station serving as a check for the two stations on which the new work may actually depend.

In local surveys where the area is of limited extent it is usually desirable to use a system of plane coordinates, the origin being connected to some point of the precise or primary triangulation or traverse scheme. Tables for computing plane coordinates from geographic positions are found in U. S. Coast and Geodetic Survey Special Publication No. 71. The U. S. Coast and Geodetic Survey will be glad to give advice on any problem arising out of the use of its control points or on any proposed extension of triangulation or traverse from them. Special Publication No. 91, entitled "Use of geodetic control for city surveys," will also be found to be of great assistance to engineers and surveyors who are using geodetic control for local surveys.

EXPLANATION OF TABLES.

ARRANGEMENT OF TABULATED DATA.

In the tables of positions the latitude and longitude of each point are given on the North American datum (see p. 3); also the length and azimuth of each line observed over, whether in one way or both ways, to other points of the triangulation or traverse. NO LENGTHS OR AZIMUTH ARE REPEATED, AND FOR A GIVEN LINE THE LENGTH AND AZIMUTH WILL BE FOUND OPPOSITE THE POSITION OF ONE OR THE OTHER OF THE TWO STATIONS INVOLVED.

The distances between stations are given in both meters and feet. To facilitate further the use of the tables, a column is given of the logarithms of the lengths in meters. It must be remembered that it is the logarithm of the length in meters which is derived first in the computation, the lengths in meters given in this table being derived from the corresponding logarithm and the lengths in feet in turn being derived from the lengths in meters by the aid of the conversion tables on pages 130–137. Where further work of considerable extent is contemplated, an accumulation of error in the last two operations can be avoided by using the logarithm.

EXPLANATION OF LENGTHS.

The lengths as given in the tables are all reduced to sea level. If the actual length of the line simply reduced to the horizontal is desired—that is, *its length in its actual elevation on the surface of* the earth—it may be obtained by adding to the sea level length as

given in meters a correction = (length of the line as given in meters) times

$$\left[\frac{\text{mean elevation of the two ends of the line in meters}}{6\ 370\ 000}\right]$$

The error introduced by the use of the above approximate formula will be within the probable error of the triangulation or traverse for any of the data given in this publication.

AZIMUTH AND BACK AZIMUTH.

All azimuths are reckoned continuously from true south around by west to 360°, south being 0°, west 90°, north 180°, and east 270°. Because of the convergence of the meridians the azimuth and back azimuth of a line do not differ by exactly 180°, the amount of the divergence varying with the latitude and the difference of longitude of the two points. To illustrate from the tables, page 13, the azimuth from Moore to Buffalo is 158° 33′ 30.″90, while the back azimuth, or the azimuth from Buffalo to Moore is 338° 26′ 33.″67.

The azimuths of the triangulation lines offer a very convenient and accurate means of testing the error of the magnetic needle on a surveyor's transit, and even the azimuth over such short distances as those between a station mark and its reference mark may be used for this purpose with fair accuracy, provided the distance is greater than 100 feet.

ACCURACY OF DATA INDICATED IN TABLES.

The rule followed in recent publications of this office has been to give latitudes and longitudes to thousandths of a second for all points the positions of which have been fixed by fully adjusted triangulation or traverse. Points, the positions of which are given to hundredths of a second only, are marked by footnotes as being without check.

In the columns giving azimuths, distances, and logarithms of distances the accuracy is indicated to a certain extent by the number of decimal places given, it being understood that in each case two doubtful places are given. In some cases there is very little doubt of the correctness of the second figure from the right, while in a few cases some doubt may be cast on the third figure from the right.

HOW TO FIND THE DATA DESIRED.

Following the text at the back of this publication are 16 maps. The first is an index map showing all the areas in the United States covered by triangulation or traverse rigidly computed on the North American datum and showing also the net of published and unpublished precise leveling in the United States. Following this are two maps of North Carolina, showing the areas covered by the triangulation, traverse, and leveling in this publication. The others are detailed maps showing the triangulation and traverse stations plotted by latitudes and longitudes. The traverse sketches are somewhat distorted in order to show the stations on the proper side of the railroad track. The names of the stations in any locality can readily

be obtained from the maps. Then by using the index of geographic positions at the end of the publication (see p. 177) the tables containing the desired data may be consulted. In the appropriately headed columns of the index, opposite the name of each triangulation and traverse station, are given the pages on which may be found its geographic position, description (including elevation above mean sea level, if determined), and the number of the detailed map on which the station is plotted.

The bench marks and the triangulation and traverse stations used as bench marks are indexed by the name of the town and county which appear in the descriptions. (See p. 183.)

RELATED PUBLICATIONS.

Engineers and others using the data given in this report for the control of maps and surveys will find it of help to have Special Publications Nos. 5, 8, and 71 of the U. S. Coast and Geodetic Survey.

Special Publication No. 5 is entitled "Tables for a Polyconic Projection of Maps Based on Clarke's Reference Spheroid of 1866." This publication contains the necessary explanation of the method employed in constructing a polyconic projection, and also gives the values in meters of the degrees, minutes, and seconds of latitude and longitude for all latitudes.

Special Publication No. 8 is entitled "Formulæ and Tables for the Computation of Geodetic Positions." As the title of this publication implies, the data contained in it will enable one to compute the spherical coordinates for triangulation where the distances and angles are known.

Special Publication No. 71 is entitled "Relation Between Plane Rectangular Coordinates and Geographic Positions." This book contains tables which will facilitate the use by engineers of plane coordinates for local surveys.

Any person interested in the methods employed in the field work of the Coast and Geodetic Survey or in the office computations of the results are referred to the following publications of this bureau:

Special Publication No. 18, The Fourth General Adjustment of the Precise Level Net in the United States and the Resulting Standard Elevations, contains general instructions for precise leveling, comments on the procedure in the field, and an explanation of the office computation of the results.

Special Publication No. 19, Primary Triangulation on the One Hundred and Fourth Meridian, and on the Thirty-ninth Parallel in Colorado, Utah and Nevada, contains general instructions for primary (now precise) triangulation.

Special Publication No. 26, General Instructions for the Field Work of the U. S. Coast and Geodetic Survey.

Special Publication No. 28, Application of the Theory of Least Squares to the Adjustment of Triangulation.

Special Publication No. 58, General Instructions for Precise and Secondary Traverse.

Special Publication No. 79, Precise Traverse and Triangulation in Indiana, and Special Publication No. 86, Precise Traverse, Racine, Wis., to Vandalia, Ill., contain an account of the methods employed in the field work on traverse and the office computation of the results.

Special Publication No. 91, Use of Geodetic Control for City Surveys.

Special Publication No. 93, Reconnaissance and Signal Building.

The principal lists of geographic positions published on the North American datum throughout the United States, together with

descriptions of stations, are contained in the following publications of the U. S. Coast and Geodetic Survey and of other organizations:

Appendix 8 of the Report for 1888, positions in Connecticut.
Appendix 8 of the Report for 1893, positions in Pennsylvania, Delaware, and Maryland.
Appendix 6 of the Report for 1901, positions and descriptions in Kansas and Nebraska.
Appendix 9 of the Report for 1904, positions and descriptions in California.
Appendix 3 of the Report for 1907, positions and descriptions in California.
Appendix 5 of the Report for 1910, positions and descriptions in California.
Appendix 4 of the Report for 1911, positions and descriptions in Nebraska, Minnesota, North Dakota, and South Dakota.
Appendix 6 of the Report for 1911, positions and descriptions in Florida.
Special Publication No. 11, positions and descriptions in Texas, New Mexico, Arizona, and California.
Special Publication No. 13, positions and descriptions in California, Oregon, and Washington.
Special Publication No. 16, positions and descriptions in Florida.
Special Publication No. 17, positions and descriptions in Texas.
Special Publication No. 19, positions and descriptions in Colorado, Utah, Nevada, Wyoming, Montana, South Dakota, and North Dakota.
Special Publication No. 24, positions and descriptions in Alabama and Mississippi.
Special Publication No. 30, positions and descriptions in West Virginia, Ohio, Kentucky, Indiana, Illinois, and Missouri.
Special Publication No. 31, positions and descriptions in Oregon, Washington, and California.
Special Publication No. 43, positions in Georgia.
Special Publication No. 45, descriptions in Georgia.
Special Publication No. 46, positions and descriptions in Maine.
Special Publication No. 54, positions and descriptions in Texas.
Special Publication No. 62, positions and descriptions in Rhode Island.
Special Publication No. 70, positions and descriptions in Kansas.
Special Publication No. 74, positions and descriptions in Idaho, Oregon, and Washington.
Special Publication No. 76, positions and descriptions in Massachusetts.
Special Publication No. 78, positions and descriptions in Texas.
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Special Publication No. 84, positions and descriptions in California and Oregon.
Special Publication No. 86, positions and descriptions in Illinois and Wisconsin.
Special Publication No. 88, positions and descriptions in Oklahoma and Texas.
Special Publication No. 101, positions and descriptions in North Carolina.
Report on triangulation of Greater New York.
Report on a plan of sewerage for the City of Cincinnati.
Appendix EEE, pages 2905–3031, Annual Report of the Chief of Engineers, U. S. Army, 1902, positions of points on and near the Great Lakes.
Professional Paper No. 24, Corps of Engineers, U. S. Army, descriptions of points on and near the Great Lakes.
Publications of the Massachusetts Commission on Waterways and Public Lands.
Various bulletins of the United States Geological Survey.

A number of publications have been issued by the U. S. Coast and Geodetic Survey covering the results of precise leveling in the United States. Appendix 8, Report for 1899, Appendix 3, Report for 1903, Precise Leveling in the United States 1903–1907, and Special Publication No. 18 are reports on the four adjustments of the precise level net and contain the elevations of bench marks derived from those respective adjustments and their descriptions. The first three of these publications should be used for descriptions of bench marks only, as the elevations given in them have been superseded and the corrected elevations appear in Special Publication No. 18.

Special Publication No. 18 is a report on the fourth general adjustment of the precise level net and contains the standard elevations of

all bench marks in the precise level net which had been established at the time the adjustment was made in 1912. Descriptions of bench marks in certain areas are also included, but one must have all four publications mentioned above for the complete list of the descriptions of the bench marks whose elevations are given in this publication. An index to the four publications is given in Special Publication No. 18.

The results of precise leveling done since 1912, which have been published, appear as special publications and cover either a line of levels or the complete results for the leveling in some State. These publications are:

Special Publication No. 22, Precise Leveling from Brigham, Utah, to San Francisco, Calif.
Special Publication No. 39, Precise Leveling from Reno to Las Vegas, Nev., and from Tonopah Junction, Nev., to Laws, Calif.
Special Publication No. 77, Precise Leveling in Texas.
Special Publication No. 95, Precise Leveling in Georgia.

All publications of the U. S. Coast and Geodetic Survey and other Federal organizations may be obtained at a nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C.

GEOGRAPHIC POSITIONS.

PRECISE TRIANGULATION, EASTERN OBLIQUE ARC.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points.	° ′ ″	° ′ ″	° ′ ″				
Buffalo (Va.), 1876	36 47 46.150 80 28 39.048						
Moore, 1876	36 23 53.488 80 16 59.222	158 33 30.90	338 26 33.67	Buffalo	4.6763564	47463.13	155718.6
Poore, 1877	36 02 47.516 81 09 24.228	216 00 53.18 243 19 32.45	36 25 04.97 63 50 30.94	Buffalo Moore	5.0132570 4.9430287	103099.60 87705.88	338252.6 287748.4
Young, 1876	35 44 14.356 80 38 51.122	126 52 51.43 187 21 32.31 204 00 41.04	306 34 56.77 7 27 34.41 24 13 33.43	Poore Buffalo Moore	4.7586445 5.0736393 4.9049425	57364.67 118478.44 80341.98	188203.9 388708.0 263588.6
Benn, 1877	35 33 54.889 81 39 37.510	220 18 09.18 257 56 52.30	40 35 50.04 78 32 17.64	Poore Young	4.8461670 4.9717084	70172.51 93693.28	230224.3 307392.0
Roan High Bluff, 1894.	36 05 35.231 82 08 44.141	273 01 47.22 323 02 31.26	93 36 43.23 143 19 33.70	Poore Benn	4.9505236 4.8642691	89232.61 73159.22	292757.3 240023.2
Rogers (Va.), 1894	36 39 36.031 81 32 41.885	260 40 41.12 332 46 30.78 40 46 09.08	81 18 59.23 153 00 19.27 220 24 46.65	Buffalo Poore Roan High Bluff.	4.9847271 4.8835172 4.9182174	96544.40 76474.60 82835.67	316746.1 250900.4 271770.0
King, 1876	35 12 27.718 81 18 45.517	141 33 38.08 188 35 02.49 225 34 49.70	321 21 33.06 8 40 29.47 45 57 59.22	Benn Poore Young	4.7051366 4.9737439 4.9255307	50715.02 94133.44 84242.39	166387.5 308836.1 276385.2
Wofford (S. C.), 1876	34 57 32.129 81 56 06.643	200 18 37.89 243 53 45.69	20 28 08.94 64 15 13.83	Benn King	4.8559012 4.8002103	71763.10 63126.29	235442.8 207106.8
Hogback (S. C.), 1876	35 10 12.054 82 17 26.266	232 22 48.66 267 01 51.79 305 44 11.43	52 44 41.88 87 35 40.72 125 56 26.57	Benn King Wofford	4.8581240 4.9502319 4.6020196	72131.33 89172.70 39996.28	236650.9 292560.8 131221.1
Big Knob (Va.), 1893.	36 39 52.635 82 30 21.435	270 03 15.78 332 52 32.39	90 37 41.50 153 05 21.86	Rogers Roan High Bluff.	4.9340893 4.8523812	85919.02 71183.80	281886.0 233542.2

PRECISE TRIANGULATION, EASTERN OBLIQUE ARC—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Big Butt (N. C. & Tenn.), 1893.	36 03 40.800 82 37 38.873	189 13 00.63 235 19 04.84 265 12 45.99	9 17 19.99 55 57 35.33 85 29 47.54	Big Knob Rogers Roan High Bluff.	4.8313900 5.0707621 4.6389763	67825.03 117696.10 43548.81	222522.6 386141.3 142876.4
Mount Mitchell, 1876.	35 45 53.487 82 15 54.521	135 16 21.67 196 27 54.98 252 19 46.80 291 50 43.21 305 17 35.19 341 21 45.99 2 00 53.46	315 03 36.59 16 32 07.52 72 58 46.98 112 11 52.52 125 50 45.78 161 33 13.47 182 00 00.24	Big Butt Roan High Bluff. Poore Benn King Wofford Hogback	4.6663901 4.5796309 5.0204712 4.7713251 5.0263882 4.9745517 4.8197813	46386.3 37986.6 104826.5 59064.3 106264.5 94308.7 66036.1	152186 124628 343918 193780 348636 309411 216653
Supplementary points.							
Anderson, 1878	35 33 57.171 81 05 26.755	26 57 47.98 90 05 15.48 173 38 24.27 244 30 56.15	206 50 05.43 269 45 22.70 353 36 05.34 64 46 26.17	King Benn Poore Young	4.6489395 4.7130162 4.7296649 4.6475601	44559.42 51643.56 53661.75 44418.11	146192.0 169433.9 176055.3 145728.4
Simonton College, center of cupola, 1879.	35 46 57.80 80 53 39.01	36 33 07.6 141 04 52.7 282 39 13.0	216 26 14.9 320 55 38.3 102 47 51.9	Anderson Poore Young	4.4760593 4.5759086 4.3592070	29926.73 37662.45 22866.88	98184.6 123564.2 75022.4
Statesville longitude, 1879.	35 46 56.41 80 53 39.90	270 30 41	27 30 42	Simonton College.	1.68543	48.466	159.01
Lincolnton Court house yellow cupola, 1877.	35 28 16.726 81 15 25.616	9 48 33.5 106 01 04.1 188 04 00.9	189 46 37.9 285 47 00.6 8 07 32.0	King Benn Poore	4.472446 4.580235 4.809318	29678.8 38039.5 64464.1	97371 124801 211496
Hanging Bluff, 1877.	36 23 45.219 80 15 22.864	156 02 59.0 194 57 15.4 221 45 18.6	335 55 04.3 15 05 53.8 42 10 04.5	Buffalo Cahas Smith	4.686861 4.918426 4.965129	48625.2 82875.5 92284.6	159531 271901 302770
Grandfather Mountain, 1877.	36 06 41.434 81 48 40.223	276 46 48.2 291 13 42.3 347 17 25.5	97 09 55.6 111 54 40.1 167 22 43.3	Poore Young Benn	4.773703 5.052803 4.793239	59388.6 112928.4 62121.1	194844 370499 203809
Crowder Mountain, 1877.	35 13 56.066 81 16 35.249	136 45 26.3 186 48 35.2 225 20 35.4	316 32 05.6 6 52 46.3 45 42 29.6	Benn Poore Young	4.705948 4.959011 4.903006	50809.9 90993.6 79984.5	166699 298535 262416
Spencer Mountain, 1877.	35 17 49.930 81 06 55.154	61 07 03.6 121 09 15.8 177 25 48.3	241 00 13.6 300 50 18.2 357 24 21.4	King Benn Poore	4.312188 4.761521 4.920242	20520.5 57745.9 83222.7	67324 189455 273040
Silver Creek Knob, 1877.	35 35 01.056 81 47 48.740	279 19 19.2 10 19 52.7 44 29 56.5	99 24 05.0 190 15 05.3 224 12 47.4	Benn Wofford Hogback	4.098162 4.847815 4.807384	12536.1 70439.3 64177.7	41129 231100 210556
Blackstock Knob, 1877.	35 44 15.685 82 19 06.344	302 29 38.4 337 55 42.8 357 41 50.2	123 04 40.3 158 09 01.0 177 42 48.2	King Wofford Hogback	5.035769 4.969222 4.799560	108584.8 93158.4 63031.8	356249 305637 206797
Fishers Peak, 1877.[1]	36 33 34.48 80 49 24.14	350 06 29 27 50 28	170 12 42 207 38 38	Young Poore	4.966606 4.808362	92598.9 64322.4	303802 211031
Bull Head Mountain, 1877.[1]	36 26 47.85 81 04 01.27	334 14 03 10 19 17	154 28 52 190 16 06	Young Poore	4.941016 4.654377	87300.4 45120.8	286418 148034
Bakers Knob, 1877.[1]	35 39 38.07 81 24 05.11	65 48 49 207 13 45	245 39 46 27 22 21	Benn Poore	4.410607 4.682966	25739.9 48191.0	84448 158107
Dallas Courthouse cupola, 1877.[1]	35 18 57.46 81 10 35.61	45 54 52 122 19 52	225 50 10 302 03 02	King Benn	4.236828 4.715286	17251.5 51914.2	56599 170322
Devils Courthouse Mountain.	35 19 40 82 52 29						

[1] No check on this position

PRECISE TRIANGULATION, EASTERN OBLIQUE ARC—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points—Contd.	° ′ ″	° ′ ″	° ′ ″				
Warrior Mount	36 29 13 80 51 45						
Hibriten Mountain.	35 54 25 81 29 22						
Carleton Knob	35 29 23 81 49 47						
East Drowning Creek Mountain.	35 41 51 81 30 24						
West Drowning Creek Mountain.	35 42 33 81 31 32						
Hickory Knob	35 37 00 81 44 16						
Propst Mountain	35 36 55 81 45 06						
Little Pisgah Mountain.	35 30 01 82 19 56						
Mount Pisgah	35 25 32 82 45 23						
Sugarloaf Mountain.	35 24 24 82 16 07						
High Pinnacle (Blue Ridge).	35 42 16 82 16 32						
Pinnacle Mountain (Bald Mountain).	35 28 05 82 14 33						
Big Craggy Mountain.	35 42 22 82 21 59						
Hawksbill Mountain.	35 54 48 81 53 11						
Table Rock Mountain.	35 53 28 81 52 59						
Big Yellow Mountain.	36 05 57 82 04 40						
Grassy Ridge	36 05 45 82 04 37						
Bright Yellow Mountain.	35 59 16 82 03 34						
Mount Hallback	35 44 53 82 15 07						
Mount Gibbs	35 44 56 82 16 34						
Cold Mountain 1	35 09 58 82 59 09						
Cold Mountain 2	35 24 37 82 51 24						
Mount Hardy (Tennessee Bald Mountain).	35 18 11 82 55 40						
Richland Balsam Mountain.	35 21 26 82 59 53						

PRECISE TRIANGULATION, EASTERN OBLIQUE ARC—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points—Contd.	° ′ ″	° ′ ″	° ′ ″				
Humpback Mountain (Blue Ridge).	35 55 50 81 57 04						
Flat Top Mountain (Blue Ridge).	36 09 44 81 40 37						
Elk Knob (Smoky Range).	36 20 40 81 42 31						
Bowlens Pyramid (Black Mountains) (one of northernmost summits).	35 50 35 82 14 04						
Long Ridge, middle summit.	35 49 03 82 14 56						
Tryon Mountain, northeast summit.	35 16 53 82 12 51						
Great Hogback Mountain.	35 07 55 82 59 00						
Chimney Top Mountain.	35 06 10 83 03 46						
Whitesides Mountain.	35 04 53 83 08 17						
Little Bald Mountain, Nantahela.	35 07 15 83 30 35						
Pickens Nose	35 01 18 83 27 27						
Standing Indian Mountain, north summit of Nantahela.	35 02 07 83 32 17						
Sauratown Mountain.	36 22 33 80 22 17						
Tryon Mountain	35 15 58 82 14 39						
Fodderstack Mountain (Terrapin Mountain).	35 03 06 83 05 28						
Saddleback Mountain.	35 02 10 83 11 31						
Black Brother Mountain.	35 47 22 82 15 23						
Balsam Cone	35 46 38 82 15 44						
Bear Wallow Mountain.	35 27 38 82 21 25						
Sitting Bull Mountain (Ridge Pole) middle summit of Nantahela. (Ga.)	34 59 53 83 31 22						

PRECISE TRIANGULATION, EASTERN OBLIQUE ARC TO SANFORD, N. C.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points.	° ′ ″	° ′ ″	° ′ ″				
Bull, 1918	36 41 34.799	9 03 59.47	189 01 54.74	Moore	4.5201712	33126.17	108681.4
	80 13 29.747	116 58 49.08	296 49 45.09	Buffalo	4.4030605	25296.50	82993.6
Stuart, 1918	36 40 51.888	9 44 56.82	189 42 47.97	Moore	4.5031013	31849.40	104492.6
	80 13 22.799	119 24 01.71	299 14 53.64	Buffalo	4.4162006	26073.57	85543.0
		172 34 13.86	352 34 09.71	Bull	3.1251344	1333.93	4376.4
Cedder Mountain, 1918.	36 25 38.760	84 04 28.07	263 52 15.88	Moore	4.4899960	30902.67	101386.5
	79 56 25.748	138 08 22.59	317 58 16.84	Stuart	4.5779687	37841.53	124151.8
		139 15 14.36	319 05 04.39	Bull	4.5904732	38946.93	127778.4
Kernersville, 1918	36 07 31.491	148 22 42.36	328 15 19.72	Moore	4.5510655	35568.50	116694.3
	80 04 30.864	199 49 27.92	19 54 14.95	Cedder Mt	4.5518473	35632.58	116904.6
Ogburn, 1918	36 14 41.896	46 02 54.37	225 57 29.75	Kernersville	4.2809942	19098.28	62658.3
	79 55 21.030	117 48 27.57	297 35 38.62	Moore	4.5631718	36573.94	119993.0
		175 26 50.55	355 26 12.20	Cedder Mt	4.3077253	20310.72	66636.1
Guilford, 1918	36 04 58.861	105 28 53.11	285 22 11.47	Kernersville	4.2476336	17686.16	58025.3
	79 53 09.259	169 37 30.71	349 36 12.95	Ogburn	4.2617291	18269.60	59939.5
High Point, 1918	35 57 30.031	161 23 48.16	341 21 21.33	Kernersville	4.2914166	19562.15	64180.2
	80 00 21.304	217 59 28.23	38 03 42.31	Guilford	4.2445569	17561.31	57615.7
Greensboro, 1918	36 04 28.663	56 27 01.97	236 19 26.16	High Point	4.3675036	23307.92	76469.4
	79 47 26.139	96 12 55.99	276 09 33.93	Guilford	3.9362899	8635.55	28331.8
Climax, 1918	35 54 28.547	101 18 42.02	281 07 41.90	High Point	4.4585917	28746.95	94314.0
	79 41 36.427	154 41 10.07	334 37 44.56	Greensboro	4.3110275	20465.74	67144.7
Asheboro, 1918	35 44 13.742	149 41 47.27	329 36 11.91	High Point	4.4539213	28439.46	93305.1
	79 50 48.662	187 42 25.53	7 44 24.30	Greensboro	4.5773483	37787.51	123974.5
		216 08 36.37	36 13 59.58	Climax	4.3706568	23477.77	77026.6
Liberty, 1918	35 48 42.145	68 43 54.79	248 35 41.90	Asheboro	4.3567017	22735.35	74590.9
	79 36 45.532	145 39 57.49	325 37 07.08	Climax	4.1116873	12932.64	42429.8
Ramsure, 1918	35 39 47.207	118 22 17.93	298 16 24.15	Asheboro	4.2384050	17314.30	56805.3
	79 40 42.405	199 49 56.50	19 52 14.85	Liberty	4.2437395	17528.29	57507.4
Siler, 1918	35 42 04.706	76 44 31.79	256 37 36.47	Ramsure	4.2648045	18399.44	60365.5
	79 28 50.376	96 57 03.14	276 44 13.50	Asheboro	4.5233861	33372.30	109489.0
		135 46 37.45	315 41 59.79	Liberty	4.2330906	17103.72	56114.5
Paul Beck, 1918	35 34 08.468	123 42 40.29	303 36 37.53	Ramsure	4.2749600	18834.76	61793.7
	79 30 19.492	188 40 43.10	8 41 35.02	Siler	4.1716554	14847.57	48712.4
Ore Hill, 1918	35 39 44.684	34 18 55.01	214 16 11.50	Paul Beck	4.0983696	12542.08	41148.5
	79 25 38.711	90 16 08.89	270 07 22.02	Ramsure	4.3566016	22730.12	74573.7
		131 51 20.26	311 49 28.46	Siler	3.8108580	6469.31	21224.7
Carthage, 1918	35 20 40.062	142 47 46.99	322 37 26.59	Ramsure	4.6477448	44437.01	145790.4
	79 22 54.159	155 46 20.65	335 42 02.32	Paul Beck	4.4366028	27327.68	89657.6
		173 18 29.77	353 16 54.21	Ore Hill	4.5504553	35518.56	116530.5
Jonesboro, 1918	35 27 33.076	59 06 52.16	238 58 44.94	Carthage	4.3935216	24746.94	81190.6
	79 08 53.116	110 42 21.11	290 29 53.85	Paul Beck	4.5394495	34629.76	113614.5
		131 45 37.38	311 35 52.56	Ore Hill	4.5302993	33907.77	111245.7
Lemon, 1918	35 22 01.808	80 32 32.06	260 26 47.24	Carthage	4.1834041	15254.72	50048.2
	79 12 58.263	211 11 22.55	31 13 44.60	Jonesboro	4.0768775	11936.51	39161.7
Foch, 1918	35 10 15.025	181 40 34.02	1 40 46.90	Carthage	4.2848866	19270.22	63222.4
	79 23 16.480	215 36 20.02	35 42 16.99	Lemon	4.4282364	26806.27	87946.9
Swan, 1918	35 23 02.941	78 01 06.81	257 57 43.69	Lemon	3.9568575	9054.35	29705.8
	79 07 07.411	162 14 49.61	342 13 48.34	Jonesboro	3.9415977	8741.74	28680.2
Sanford, 1918	35 27 06.071	250 18 23.54	70 19 17.05	Jonesboro	3.3928080	2470.63	8105.7
	79 10 25.365	22 22 32.58	202 21 03.99	Lemon	4.0060115	10139.38	33265.6
Allenby, 1918	35 31 16.339	350 20 47.04	170 21 13.98	Jonesboro	3.8438166	6979.38	22898.2
	79 09 39.531	8 31 22.74	188 30 56.13	Sanford	3.8920359	7798.95	25587.1

PRECISE TRIANGULATION, EASTERN OBLIQUE ARC TO SANFORD, N. C.—Contd.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points	° ′ ″	° ′ ″	° ′ ″				
Pilot Mountain, 1918.	36 20 24.037 80 28 28.539	249 21 07.9 281 50 27.4 303 26 08.9	69 27 56.6 102 10 03.8 123 40 18.7	Moore Ogburn Kernersville	4.263793 4.705039 4.634283	18356.6 50703.6 43080.7	60225 166350 141341
High Point, higher tank, 1918.	35 57 32.492 80 00 12.509	71 00 39.6 160 42 55.7 217 34 24.9	251 00 34.4 340 40 23.7 37 38 33.8	High Point Kernersville Guilford	2.367500 4.291413 4.239708	233.1 19562.0 17366.3	765 64180 56976
Flat Shoal Mountain, 1918.[1]	36 22 29.98 80 22 17.41	251 59 27 316 02 09	72 02 36 136 12 40	Moore Kernersville	3.921044 4.584542	8337.6 38418.6	27354 126045
Stokesdale, 1918[1]	36 14 58.36 79 59 34.62	274 33 38 28 16 45	94 36 08 208 13 50	Ogburn Kernersville	3.802898 4.194137	6351.8 15636.4	20839 51300
Winston-Salem, water tank, 1918.[1]	36 06 00.61 80 16 31.52	261 06 26 302 51 26	81 13 30 123 00 57	Kernersville High Point	4.261030 4.461544	18240.2 28943.0	59843 94957
Greensboro, red tank, 1918.[1]	36 03 13.11 79 46 51.72	109 03 54 159 42 07	289 00 11 339 41 46	Guilford Greensboro	3.999748 3.394955	9994.2 2482.9	32789 8146
Greensboro, Vicks Chemical Co., tank, 1918.[1]	36 03 58.54 79 49 27.83	108 34 02 253 02 03	288 31 52 73 03 15	Guilford Greensboro	3.766734 3.502908	5844.3 3183.5	19174 10445
Greensboro, white tank, 1918.[1]	36 03 41.76 79 50 07.95	53 19 52 117 39 41	233 13 51 297 37 54	High Point Guilford	4.282449 3.709405	19162.4 5121.6	62869 16803
Greensboro, city tank, 1918.[1]	36 04 31.90 79 47 29.73	56 07 22 95 36 49	235 59 49 275 33 29	High Point Guilford	4.367144 3.931247	23288.6 8535.9	76406 28005
Bull (U. S. G. S.) 1918.[1]	36 41 34.62 80 13 29.71	171 29 26	351 29 26	Bull	0.73878	5.48	18.0

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.

Principal points							
Osgood, 1918	35 33 09.035 79 07 12.202	46 54 41.8	226 53 16.2	Allenby	3.7061264	5083.07	16676.7
Davis, 1918	35 33 47.008 79 07 12.886	359 09 24.5	179 09 24.9	Osgood	3.0683436	1170.43	3840.0
Gibbons, 1918	35 34 24.543 79 06 48.951	27 31 23.0	207 31 09.1	Davis	3.1154062	1304.39	4279.5
Esprey, 1918	35 35 08.360 79 06 15.558	31 54 36.2	211 54 16.8	Gibbons	3.2015989	1590.74	5219.0
Farley, 1918	35 35 31.478 79 06 07.614	15 40 51.0	195 40 46.4	Esprey	2.8692400	740.01	2427.8
Dro, 1918	35 37 02.617 79 04 59.451	31 25 23.9	211 24 44.2	Farley	3.5173760	3291.36	10798.4
Moncure, 1918	35 37 15.007 79 04 07.596	73 41 39.9	253 41 09.7	Dro	3.1334383	1359.68	4460.9
Dri, 1918	35 37 11.256 79 03 54.808	109 45 37.2	289 45 29.8	Moncure	2.5339645	341.95	1121.9
Dre, 1918	35 36 58.675 79 03 37.914	132 21 54.9	312 21 45.1	Dri	2.7599819	575.42	1887.9
Dra, 1918	35 36 40.368 79 02 40.436	111 18 41.5	291 18 08.0	Dre	3.1910921	1552.72	5094.2
Doz, 1918	35 37 18.801 79 01 46.771	48 45 10.7	228 44 39.4	Dra	3.2544034	1796.40	5893.7

[1] No check on this position.

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Doy, 1918	35 37 51.374 79 01 29.919	22 54 04.2	202 53 54.4	Doz	3.0373292	1089.76	3575.3
Dox, 1918	35 38 01.635 79 01 17.229	45 16 31.6	225 16 24.2	Doy	2.6526360	449.40	1474.4
Dow, 1918	35 39 02.068 78 59 25.583	56 27 42.2	236 26 37.1	Dox	3.5276637	3370.26	11057.3
Dov, 1918	35 41 29.345 78 54 49.418	56 51 25.2	236 48 44.2	Dow	3.9189262	8297.10	27221.4
Dot, 1918	35 42 02.117 78 53 21.920	65 20 45.5	245 19 54.4	Dov	3.3839319	2420.65	7941.7
Dos, 1918	35 42 11.221 78 53 08.703	49 49 22.5	229 49 14.8	Dot	2.6383671	434.88	1426.8
Dor, 1918	35 42 45.347 78 52 33.919	39 44 32.6	219 44 12.3	Dos	3.1360108	1367.76	4487.4
Dop, 1918	35 43 14.923 78 52 13.288	29 38 13.8	209 38 01.8	Dor	3.0206536	1048.71	3440.6
Don, 1918	35 43 17.252 78 51 36.793	85 31 43.6	265 31 22.3	Dop	2.9638174	920.06	3018.6
Baldwin, 1918	35 43 23.310 78 51 18.751	67 37 22.1	247 37 11.6	Don	2.6905334	490.38	1608.9
Apex, 1918	35 44 00.838 78 50 55.897	26 24 39.4	206 24 26.1	Baldwin	3.1110495	1291.37	4236.8
Dom, 1918	35 45 16.033 78 50 10.394	26 15 46.7	206 15 20.1	Apex	3.4123251	2584.19	8478.3
Dol, 1918	35 45 34.019 78 49 46.295	47 31 31.0	227 31 16.9	Dom	2.9142799	820.88	2693.2
Dok, 1918	35 45 54.085 78 48 39.943	69 38 59.2	249 38 20.4	Dol	3.2498989	1777.87	5832.9
Doi, 1918	35 46 00.891 78 48 28.668	53 28 30.5	233 28 23.9	Dok	2.5470847	352.44	1156.3
Doh, 1918	35 46 59.993 78 47 57.457	23 17 16.3	203 16 58.1	Doi	3.2973317	1983.04	6506.0
Dog, 1918	35 47 12.644 78 47 37.685	51 51 41.2	231 51 29.6	Doh	2.8002741	631.36	2071.4
Dof, 1918	35 47 14.609 78 47 13.669	84 16 08.5	264 15 54.5	Dog	2.7825768	606.15	1988.7
Cary, 1918	35 46 57.591 78 46 53.003	135 18 12.8	315 18 00.7	Dof	2.8679896	737.89	2420.9
Raleigh, 1918	35 46 37.232 78 38 21.139	92 50 09.3	272 45 10.0	Cary	4.1096129	12871.02	42227.7
Hilltop, 1918	35 51 59.462 78 35 16.031	25 05 21.0	205 03 32.7	Raleigh	4.0399886	10964.49	35972.7
Dob, 1918	35 56 23.853 78 31 41.604	33 26 13.7	213 24 08.0	Hilltop	3.9895798	9762.92	32030.5
Diz, 1918	35 56 31.893 78 31 36.356	27 57 53.2	207 57 50.1	Dob	2.4479880	280.54	920.4
Dix, 1918	35 56 57.965 78 31 17.500	30 27 43.9	210 27 32.8	Diz	2.9695303	932.25	3058.6
Div, 1918	35 57 25.983 78 31 01.583	24 47 39.1	204 47 29.8	Dix	2.9782852	951.23	3120.8
Dit, 1918	35 58 16.056 78 30 55.619	5 31 53.2	185 31 49.7	Div	3.1904803	1550.53	5087.0

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Dis, 1918	35 58 28.220 78 30 41.916	42 28 54.7	222 28 46.7	Dit	2.7061675	508.36	1667.8
Forrest, 1918	35 58 52.662 78 30 33.293	16 00 09.2	196 00 04.1	Dis	2.8941530	783.71	2571.2
Dir, 1918	35 59 05.582 78 30 22.612	33 53 59.0	213 53 52.7	Forrest	2.6810278	479.76	1574.0
Dip, 1918	35 59 24.665 78 29 48.075	55 47 36.3	235 47 16.0	Dir	3.0195925	1046.15	3432.2
Dim, 1918	35 59 43.378 78 29 30.631	37 08 51.1	217 08 40.8	Dip	2.8594846	723.58	2373.9
Wake, 1918	36 00 32.812 78 28 30.557	44 38 40.4	224 38 05.1	Dim	3.3306763	2141.29	7025.2
Youngsville, 1918	36 00 45.612 78 28 26.011	16 05 47.9	196 05 45.2	Wake	2.6134195	410.60	1347.1
Dil, 1918	36 02 09.668 78 28 46.842	348 36 56.4	168 37 08.7	Youngsville	3.4220489	2642.71	8670.3
Dik, 1918	36 02 18.320 78 28 51.010	338 37 42.0	158 37 44.5	Dil	2.4568852	286.34	939.4
Dig, 1918	36 02 28.734 78 28 58.968	328 10 20.2	148 10 24.9	Dik	2.5772354	377.78	1239.4
Tank, 1918	36 02 41.916 78 29 05.532	337 58 52.9	157 58 56.8	Dig	2.6417235	438.25	1437.8
Dif, 1918	36 03 18.338 78 29 14.510	348 40 46.4	168 40 51.7	Tank	3.0587457	1144.84	3756.0
Did, 1918	36 03 31.224 78 29 09.836	16 24 44.4	196 24 41.6	Dif	2.6170534	414.05	1358.4
Dic, 1918	36 03 38.307 78 29 02.396	40 27 50.1	220 27 45.7	Did	2.4577922	286.94	941.4
Dib, 1918	36 04 13.567 78 28 09.185	50 47 08.8	230 46 37.5	Dic	3.2352265	1718.80	5639.1
Dez, 1918	36 04 19.917 78 28 02.735	39 30 52.5	219 30 48.7	Dib	2.4043009	253.69	832.3
Dey, 1918	36 04 32.683 78 27 58.398	15 25 08.2	195 25 05.6	Dez	2.6108427	408.17	1339.1
Dex, 1918	36 04 53.794 78 28 01.415	353 22 53.4	173 22 55.2	Dey	2.8162644	655.03	2149.0
Dew, 1918	36 05 02.609 78 28 00.219	6 17 10.7	186 17 10.0	Dex	2.4366770	273.32	896.7
Franklinton, 1918	36 06 25.078 78 27 13.981	24 28 19.2	204 27 52.0	Dew	3.4460141	2792.63	9162.2
Deter, 1918	36 07 06.079 78 27 13.607	0 25 28.3	180 25 28.1	Franklinton	3.1016628	1263.75	4146.2
Det, 1918	36 07 59.387 78 27 00.031	11 40 31.0	191 40 23.0	Deter	3.2247254	1677.74	5504.4
Des, 1918	36 08 20.289 78 26 58.078	4 20 02.8	184 20 01.6	Det	2.8102945	646.09	2119.7
Der, 1918	36 09 03.533 78 27 02.315	355 27 20.9	175 27 23.4	Des	3.1261477	1337.05	4386.6
Dep, 1918	36 09 20.555 78 26 52.463	25 08 43.9	205 08 38.1	Der	2.7631109	579.58	1901.5
Deo, 1918	36 09 31.716 78 26 46.542	23 16 49.4	203 16 45.9	Dep	2.5734618	374.51	1228.7

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Den, 1918	36 10 43.488 78 26 41.940	2 58 35.8	182 58 33.1	Deo	3.3454024	2215.15	7267.5
Dem, 1918	36 10 56.103 78 26 46.614	343 16 46.1	163 16 48.9	Den	2.6085022	405.98	1332.0
Del, 1918	36 11 11.825 78 26 54.047	339 01 45.6	159 01 50.0	Dem	2.7151401	518.97	1702.7
Dek, 1918	36 11 30.123 78 27 03.652	336 56 53.4	156 56 59.1	Del	2.7874093	612.93	2010.9
Kittrell, 1918	36 11 44.232 78 27 04.201	358 11 31.5	178 11 31.8	Dek	2.6385889	435.10	1427.5
Deg, 1918	36 14 17.460 78 26 13.295	15 04 19.5	195 03 49.4	Kittrell	3.6893985	4891.01	16046.6
Def, 1918	36 14 32.045 78 26 00.041	36 21 38.6	216 21 30.8	Deg	2.7468035	558.22	1831.4
Ded, 1918	36 15 36.875 78 24 33.766	47 09 19.5	227 08 28.5	Def	3.4680675	2938.11	9639.4
Dec, 1918	36 16 48.260 78 24 12.655	13 28 11.6	193 27 59.1	Ded	3.3545843	2262.48	7422.8
Mobile, 1918	36 19 08.808 78 24 29.637	354 24 43.8	174 24 53.9	Dec	3.6387620	4352.73	14280.6
Mill, 1918	36 19 20.371 78 24 26.494	12 24 25.1	192 24 23.2	Mobile	2.5621985	364.92	1197.2
Henderson, 1918	36 19 29.622 78 24 18.866	33 42 55.9	213 42 51.4	Mill	2.5350399	342.80	1124.7
Daya, 1918	36 19 42.503 78 23 59.565	50 29 18.4	230 29 07.0	Henderson	2.7951878	624.00	2047.2
Dare, 1918	36 19 53.518 78 23 48.150	39 58 57.6	219 58 50.8	Daya	2.6464945	443.09	1453.7
Deb, 1918	36 20 37.928 78 23 20.963	26 21 08.3	206 20 52.2	Dare	3.1840027	1527.58	5011.7
Daz, 1918	36 20 50.557 78 22 59.642	53 47 28.7	233 47 16.1	Deb	2.8188528	658.95	2161.9
Day, 1918	36 20 52.751 78 22 35.490	83 35 38.8	263 35 24.5	Daz	2.7825029	606.04	1988.3
Das, 1918	36 20 56.146 78 22 01.714	82 55 12.1	262 54 52.1	Day	2.9287530	848.70	2784.4
Dar, 1918	36 21 01.036 78 21 51.222	60 03 22.9	240 03 16.7	Das	2.4798985	301.92	990.5
Dap, 1918	36 22 00.074 78 20 41.247	43 47 55.8	223 47 14.3	Dar	3.4015651	2520.96	8270.8
Daw, 1918	36 22 06.088 78 20 37.820	24 44 49.4	204 44 47.4	Dap	2.3098524	204.10	669.6
Dan, 1918	36 22 14.365 78 20 36.909	5 05 18.6	185 05 18.1	Daw	2.4084845	256.14	840.4
Dal, 1918	36 22 40.380 78 20 48.493	340 11 38.1	160 11 45.0	Dan	2.9305755	852.27	2796.2
Dag, 1918	36 22 52.096 78 20 46.953	6 03 57.0	186 03 56.1	Dal	2.5600915	363.15	1191.4
Daf, 1918	36 23 12.000 78 20 35.997	23 59 37.2	203 59 30.7	Dag	2.8270703	671.54	2203.2

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Middleburg, 1918	36 23 35.912 78 20 06.154	45 15 42.8	225 15 25.1	Daf	3.0199885	1047.10	3435.4
Dad, 1918	36 24 48.671 78 17 35.167	59 12 48.8	239 11 19.2	Middleburg	3.6414717	4379.98	14370.0
Dab, 1918	36 24 54.857 78 17 27.907	43 29 27.5	223 29 23.2	Dad	2.4196231	262.80	862.2
Cuz, 1918	36 25 08.774 78 17 18.341	29 03 16.1	209 03 10.4	Dab	2.6908449	490.73	1610.0
Cuy, 1918	36 25 16.095 78 17 09.817	43 15 37.8	223 15 32.7	Cuz	2.4911774	309.87	1016.6
Manson, 1918	36 25 17.334 78 16 56.367	83 29 56.7	263 29 48.7	Cuy	2.5279221	337.23	1106.4
Cux, 1918	36 25 09.125 78 16 04.206	101 01 23.7	281 00 52.7	Manson	3.1218449	1323.87	4343.4
Ridgeway, 1918	36 26 08.010 78 14 09.375	57 36 47.7	237 35 39.5	Cux	3.5299094	3387.74	11114.6
Cuv, 1918	36 26 12.031 78 13 59.208	63 55 22.5	243 55 16.5	Ridgeway	2.4501613	281.94	925.0
Norlina, 1918	36 26 50.338 78 10 58.880	75 17 05.1	255 15 18.0	Cuv	3.6668728	4643.79	15235.5
Cus, 1918	36 26 48.749 78 10 37.418	95 14 15.4	275 14 02.6	Norlina	2.7297586	536.73	1760.9
Warren, 1918	36 26 24.463 78 09 08.907	108 45 51.1	288 44 58.5	Cus	3.3669852	2328.01	7637.8
Cut, 1918	36 26 10.612 78 08 18.022	108 37 15.4	288 36 45.2	Warren	3.1262445	1337.35	4387.6
Cur, 1918	36 26 06.364 78 07 53.594	102 08 47.2	282 08 32.7	Cut	2.7940448	622.36	2041.9
Cup, 1918	36 26 05.965 78 07 30.725	91 14 22.4	271 14 08.8	Cur	2.7556908	569.76	1869.3
Macon, 1918	36 26 14.200 78 05 26.010	85 20 20.4	265 19 06.3	Cup	3.4936943	3116.69	10225.3
Cun, 1918	36 26 41.180 78 03 43.678	71 56 14.5	251 55 13.7	Macon	3.4282843	2680.92	8795.7
Cum, 1918	36 26 40.884 78 03 34.771	92 21 21.6	272 21 16.3	Cun	2.3463897	222.02	728.4
Cul, 1918	36 25 51.768 78 02 16.340	127 46 54.7	307 46 08.1	Cum	3.3929508	2471.44	8108.4
Cug, 1918	36 25 47.201 78 01 59.946	109 01 16.4	289 01 06.7	Cul	2.6354196	431.94	1417.1
Cuf, 1918	36 25 48.984 78 01 25.701	86 18 56.9	266 18 36.6	Cug	2.9318555	854.78	2804.4
Cue, 1918	36 25 51.572 78 00 30.707	86 40 17.3	266 39 44.6	Cuf	3.1374109	1372.18	4501.9
Cud, 1918	36 25 48.002 78 00 18.831	110 24 17.0	290 24 09.9	Cue	2.4991744	315.63	1035.5
Vaughan, 1918	36 25 26.781 77 59 59.366	143 27 06.8	323 26 55.2	Cud	2.9107477	814.23	2671.4
Cub, 1918	36 25 21.705 77 59 49.786	123 14 52.8	303 14 47.1	Vaughan	2.4553986	285.36	936.2
Cru, 1918	36 25 12.354 77 59 18.859	110 30 48.2	290 30 29.8	Cub	2.9151894	822.60	2698.8

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Cro, 1918	36 25 15.429 77 59 06.503	72 53 02.4	252 52 55.1	Cru	2.5079554	322.07	1056.7
Cote, 1918	36 25 19.415 77 58 55.828	65 12 15.9	245 12 09.6	Cro	2.4667740	292.94	961.1
Cri, 1918	36 25 46.350 77 58 19.723	47 17 34.2	227 17 12.8	Cote	3.0877823	1224.00	4015.7
Cre, 1918	36 25 59.035 77 56 47.511	80 20 49.4	260 19 54.6	Cri	3.3673470	2329.95	7644.2
Coz, 1918	36 25 58.719 77 56 37.663	92 16 35.0	272 16 29.2	Cre	2.3900154	245.48	805.4
Coy, 1918	36 25 50.790 77 55 36.806	99 09 51.2	279 09 15.1	Coz	3.1862338	1535.44	5037.5
Littleton, 1918	36 25 55.621 77 55 02.598	80 05 27.5	260 05 07.2	Coy	2.9370198	865.01	2838.0
Cox, 1918	36 26 18.839 77 54 19.582	56 15 45.2	236 15 19.7	Littleton	3.1100666	1288.45	4227.2
Cow, 1918	36 28 02.619 77 51 06.357	56 23 59.0	236 22 04.2	Cox	3.7617762	5777.98	18956.6
Cov, 1918	36 28 05.624 77 50 50.518	76 46 53.8	256 46 44.4	Cow	2.6075448	405.08	1329.0
Summit, 1918	36 27 52.312 77 49 39.558	103 04 49.9	283 04 07.7	Cov	3.2585808	1813.76	5950.6
Cot, 1918	36 27 50.833 77 48 59.413	92 36 55.6	272 36 31.7	Summit	3.0002508	1000.58	3282.7
Cos, 1918	36 27 49.284 77 48 25.846	93 16 24.4	273 16 04.5	Cot	2.9227940	837.13	2746.5
Cor, 1918	36 27 54.446 77 48 07.620	70 40 46.7	250 40 35.9	Cos	2.6820322	480.88	1577.7
Thelma, 1918	36 28 19.595 77 47 37.065	44 27 50.8	224 27 32.6	Cor	3.0358691	1086.10	3563.3
Cop, 1918	36 28 45.460 77 46 18.220	67 54 02.0	247 53 15.1	Thelma	3.3260422	2118.57	6950.7
Con, 1918	36 28 46.826 77 46 09.620	78 52 15.2	258 52 10.1	Cop	2.3388201	218.18	715.8
Cog, 1918	36 28 46.631 77 45 57.460	91 08 14.3	271 08 07.1	Con	2.4811021	302.76	993.3
Cof, 1918	36 28 45.429 77 45 50.757	102 30 52.6	282 30 48.6	Cog	2.2328193	170.93	560.8
Coe, 1918	36 28 42.911 77 45 44.010	114 48 00.2	294 47 56.2	Cof	2.2672313	185.03	607.1
Cod, 1918	36 28 27.712 77 45 18.583	126 30 29.1	306 30 14.0	Coe	2.8962516	787.50	2583.7
Cob, 1918	36 28 08.110 77 43 44.760	104 30 38.1	284 29 42.3	Cod	3.3825056	2412.71	7915.7
Coa, 1918	36 28 09.513 77 43 36.097	78 39 36.0	258 39 30.8	Cob	2.3423791	219.98	721.7
Cly, 1918	36 28 14.448 77 43 23.144	64 44 46.7	244 44 39.0	Coa	2.5521355	356.56	1169.8
Clu, 1918	36 28 16.314 77 43 13.717	76 13 47.5	256 13 41.9	Cly	2.3831778	241.64	792.8
Clo, 1918	36 28 07.271 77 42 24.394	102 47 32.2	282 47 02.9	Clu	3.1001012	1259.22	4131.3

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Cli, 1918	36 27 54.632 77 41 08.646	101 40 39.4	281 39 54.4	Clo	3.2846000	1925.75	6318.1
Cle, 1918	36 27 30.869 77 40 22.149	122 19 28.2	302 19 00.6	Cli	3.1367169	1369.99	4494.7
Roanoke, 1918	36 26 53.943 77 39 37.307	135 33 02.7	315 32 36.1	Cle	3.2026190	1594.48	5231.2
Cla, 1918	36 26 41.497 77 39 21.723	134 40 13.6	314 40 04.3	Roanoke	2.7369592	545.71	1790.4
Ciz, 1918	36 26 17.962 77 38 25.316	117 18 54.9	297 18 21.4	Cla	3.1989578	1581.09	5187.3
Civ, 1918	36 26 00.175 77 37 43.902	117 59 39.7	297 59 15.1	Ciz	3.0675092	1168.18	3832.6
Cit, 1918	36 25 56.784 77 37 28.674	105 24 24.8	285 24 15.8	Civ	2.5948763	393.44	1290.8
Cir, 1918	36 25 54.367 77 36 44.261	93 51 24.7	273 50 58.3	Cit	3.0448431	1108.77	3637.7
Cip, 1918	36 25 44.251 77 35 49.054	102 46 48.7	282 46 15.9	Cir	3.1492449	1410.08	4626.2
Weldon, 1918	36 25 44.682 77 35 41.094	86 09 46.6	266 09 41.9	Cip	2.2982416	198.72	652.0
Garysburg, 1918	36 26 46.386 77 33 37.058	58 23 31.9	238 22 18.2	Weldon	3.5596536	3627.89	11902.5
Cin, 1918	36 27 05.350 77 32 53.182	61 51 30.0	241 51 03.9	Garysburg	3.0931361	1239.18	4065.5
Cim, 1918	36 27 34.897 77 31 51.278	59 25 45.7	239 25 08.9	Cin	3.2529605	1790.44	5874.1
Cil, 1918	36 28 25.400 77 28 44.577	71 30 02.1	251 28 11.1	Cim	3.6903859	4902.14	16083.1
Cik, 1918	36 29 01.648 77 27 16.794	62 55 38.4	242 54 46.2	Cil	3.3899307	2454.32	8052.2
Cig, 1918	36 29 11.519 77 26 54.679	61 04 29.4	241 04 16.2	Cik	2.7986183	628.95	2063.5
Cid, 1918	36 29 39.970 77 26 06.831	53 38 15.6	233 37 47.1	Cig	3.1699610	1478.98	4852.3
Cib, 1918	36 29 59.639 77 24 57.970	70 31 27.9	250 30 46.9	Cid	3.2595672	1817.89	5964.2
Cia, 1918	36 30 18.964 77 24 17.503	59 23 59.0	239 23 34.9	Cib	3.0682066	1170.06	3838.8
Cra, 1918	36 30 25.718 77 23 55.524	69 09 50.7	249 09 37.6	Cia	2.7673230	585.23	1920.0
Cet, 1918	36 30 45.302 77 23 07.109	63 23 23.0	243 22 54.2	Cra	3.1295381	1347.53	4421.0
Cer, 1918	36 30 54.531 77 22 53.636	49 40 56.1	229 40 48.1	Cet	2.6431324	439.68	1442.5
Cep, 1918	36 31 15.741 77 22 34.145	36 34 07.0	216 33 55.4	Cer	2.9106234	814.00	2670.6
Cel, 1918	36 31 26.821 77 22 18.184	49 18 16.4	229 18 06.9	Cep	2.7191392	523.77	1718.4
Cef, 1918	36 31 32.510 77 22 03.945	63 39 49.6	243 39 41.1	Cel	2.5969041	395.28	1296.8

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Ced, 1918	36 31 52.442 77 20 57.590	69 35 27.5	249 34 48.0	Cef	3.2458585	1761.40	5778.9
Caz, 1918	36 32 02.308 77 20 32.434	64 05 01.5	244 04 46.5	Ced	2.8424695	695.78	2282.7
Care, 1918	36 32 37.600 77 18 28.041	70 38 24.9	250 37 10.8	Caz	3.5158575	3279.88	10760.7
Ceda (Va.), 1918	36 33 30.158 77 16 31.991	60 42 13.8	240 41 04.7	Care	3.5198060	3309.83	10859.0
Cay (Va.), 1918	36 34 27.329 77 14 26.244	60 36 18.6	240 35 03.7	Ceda	3.5549983	3589.20	11775.6
Boykins(Va.),1918	36 35 01.286 77 12 06.827	73 12 30.2	253 11 07.1	Cay	3.5587957	3620.73	11879.0
Caw (Va.), 1918	36 35 09.653 77 11 51.316	56 13 27.0	236 13 17.8	Boykins	2.6664234	463.90	1522.0
Cat (Va.), 1918	36 35 40.310 77 11 08.146	48 38 13.8	228 37 48.1	Caw	3.1552985	1429.88	4691.2
Cas (Va.), 1918	36 35 46.953 77 10 55.077	57 46 36.5	237 46 28.7	Cat	2.5843137	383.98	1259.8
Cap (Va.), 1918	36 36 05.448 77 10 02.536	66 25 14.0	246 24 42.7	Cas	3.1537954	1424.94	4675.0
Can (Va.), 1918	36 36 30.711 77 09 18.327	54 40 39.9	234 40 13.5	Cap	3.1292743	1346.71	4418.3
Cam (Va.), 1918	36 37 23.215 77 07 47.898	54 14 45.4	234 13 51.5	Can	3.4423652	2769.27	9085.5
Newsoms (Va.), 1918.	36 37 32.083 77 07 23.895	65 22 40.6	245 22 26.3	Cam	2.8169451	656.06	2152.4
Cal (Va.), 1918	36 38 06.069 77 04 57.890	73 54 13.8	253 52 46.7	Newsoms	3.5770072	3775.78	12387.7
Buck (Va.), 1918	36 38 28.080 77 03 25.348	73 33 56.4	253 33 01.2	Cal	3.3796742	2397.03	7864.3
Mack (Va.), 1918	36 38 34.220 77 01 20.629	86 30 53.7	266 29 39.3	Buck	3.4919183	3103.98	10183.6
Cab (Va.), 1918	36 39 11.870 76 59 13.305	69 51 36.5	249 50 20.5	Mack	3.5274845	3368.87	11052.7
Louis (Va.), 1918	36 40 24.343 76 55 41.186	67 02 14.8	247 00 08.1	Cab	3.7575484	5722.01	18773.0
Franklin (Va.), 1918.	36 40 33.162 76 55 22.528	59 35 56.1	239 35 45.0	Louis	2.7301111	537.17	1762.4
Small (Va.), 1918	36 41 12.247 76 54 23.297	50 40 48.1	230 40 12.7	Franklin	3.2790079	1901.11	6237.2
Low (Va.), 1918	36 41 24.594 76 54 00.203	56 25 33.0	236 25 19.2	Small	2.8376965	688.17	2257.8
Burnt (Va.), 1918	36 41 38.639 76 53 25.983	62 59 56.3	242 59 35.9	Low	2.9793043	953.46	3128.1
Carrs (Va.), 1918	36 42 57.662 76 48 49.697	70 28 05.2	250 25 20.1	Burnt	3.8619839	7277.53	23876.4
Center (Va.), 1918	36 43 03.773 76 48 22.000	74 40 36.7	254 40 20.1	Carrs	2.8529098	712.70	2338.2
Hill (Va.), 1918	36 43 09.833 76 47 42.200	79 17 38.0	259 17 14.2	Center	3.0022605	1005.22	3298.0
Purvis (Va.), 1918	36 43 20.885 76 44 56.175	85 17 13.1	265 15 33.8	Hill	3.6163884	4134.17	13563.5

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Kilby (Va.), 1918	36 43 49.505 76 37 51.584	85 14 55.8	265 10 41.9	Purvis	4.0241908	10572.82	34687.7
Church (Va.), 1918.	36 44 03.031 76 35 53.930	81 52 54.3	261 51 43.9	Kilby	3.4696622	2948.91	9674.9
Suffolk (Va.), 1918.	36 44 01.332 76 34 41.256	91 40 10.0	271 39 26.5	Church	3.2562227	1803.94	5918.4
Shade (Va.), 1918	36 44 54.181 76 31 55.196	68 26 21.3	248 24 42.0	Suffolk	3.6464303	4430.27	14535.0
Algren (Va.), 1918	36 46 31.564 76 26 49.508	68 25 33.7	248 22 30.7	Shade	3.9114017	8154.58	26753.8
Sunray (Va.), 1918	36 46 50.754 76 24 41.731	79 26 10.6	259 24 54.1	Algren	3.5083041	3223.33	10575.2
Wood (Va.), 1918	36 47 20.715 76 21 17.397	79 41 10.6	259 39 08.2	Sunray	3.7118115	5150.05	16896.5
Creek (Va.), 1918	36 47 51.853 76 17 53.029	79 17 25.0	259 15 22.6	Wood	3.7123936	5156.96	16919.1
Porter (Va.), 1918	36 48 11.091 76 17 57.697	348 57 28.5	168 57 31.3	Creek	2.781200	604.2	1982
Paradise (U. S. E.) (Va.), 1912	36 48 02.311 76 17 35.984	52 39 36.4 116 41 50.9	232 39 26.2 296 41 37.9	Creek Porter	2.725491 2.779941	531.5 602.5	1744 1977
Baugh (Va.), 1913	36 48 37.703 76 17 37.191	358 25 44.1	178 25 44.8	Paradise (U. S. E.)	3.037984	1091.4	3581
		15 31 31.4	195 31 21.9	Creek	3.166395	1466.9	4813
		31 47 07.6	211 46 55.3	Porter	2.984546	965.0	3166
Wilson (Va.), 1912	36 48 43.497 76 17 09.086	27 42 36.1	207 42 20.0	Paradise (U. S. E.)	3.156556	1434.0	4705
		34 23 07.7	214 22 41.4	Creek	3.285325	1929.0	6329
		50 20 43.3	230 20 14.2	Porter	3.194565	1565.2	5135
		75 37 24.4	255 37 07.6	Baugh	2.856832	719.2	2360
Poco (Va.), 1912	36 47 51.532 76 17 14.942	122 29 47.4	302 29 34.8	Paradise (U. S. E.)	2.791326	618.5	2029
		158 49 10.0	338 48 56.7	Baugh	3.183663	1526.4	5008
		185 10 40.0	5 10 43.5	Wilson	3.206396	1608.4	5277
Supplementary points.							
Colon, 1918	35 31 24.263 79 09 44.982	330 38 35.2	150 38 38.4	Allenby	2.4474221	280.17	919.2
Allenby A, 1918	35 31 47.663 79 08 39.416	66 25 20.2	246 24 42.1	Colon	3.2558688	1802.47	5913.6
Allenby B, 1918	35 31 59.693 79 08 31.018	29 43 01.3	209 42 56.4	Allenby A	2.6303026	426.88	1400.5
Allenby C, 1918	35 32 10.292 79 08 19.730	41 02 45.7	221 02 39.1	Allenby B	2.6365646	433.08	1420.9
Allenby D, 1918	35 32 18.238 79 08 06.907	52 50 18.5	232 50 11.1	Allenby C	2.6078607	405.38	1330.0
Allenby E, 1918	35 32 36.750 79 07 39.925	49 59 39.7 215 03 36.3	229 59 24.0 35 03 52.4	Allenby D Osgood	2.9481109 3.0847817	887.38 1215.58	2911.3 3988.1
Fetner, 1918	35 47 17.592 78 46 43.262	21 38 45.0 83 08 13.5	201 38 39.3 263 07 55.7	Cary Dof	2.8216515 2.8859979	663.21 769.13	2175.9 2523.4
Dod, 1918	35 47 34.289 78 46 03.374						
Thompson, 1918	35 47 09.451 78 43 33.834	101 32 02.3	281 30 34.8	Dod	3.5834877	3832.55	12574.0
Method, 1918	35 47 20.029 78 40 53.461	289 00 41.8	109 02 10.9	Raleigh	3.6070802	4046.51	13275.9

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points—Contd.	° ′ ″	° ′ ″	° ′ ″				
Southern, 1918	35 46 36.857 78 38 55.290	114 09 28.6 269 13 30.0	294 08 19.5 89 13 50.0	Method Raleigh	3.5122097 2.9333966	3252.44 857.82	10670.7 2814.4
East, 1918	35 45 58.751 78 38 19.968	178 34 46.8	358 34 46.1	Raleigh	3.0742107	1186.34	3892.2
Raleigh Longitude, 1853.[1]	35 46 46.90 78 38 19.00						
Millbrook, 1918	35 51 02.403 78 36 13.048						
Doc, 1918	35 54 02.249 78 34 02.570						
Wake Forest water tank, 1918.	35 58 47.663 78 30 37.085	224 06 17.6 224 21 00.2 13 42 17.5	44 06 56.6 44 22 14.5 193 42 03.1	Dim Wake Div	3.378692 3.656373 3.413505	2391.6 4532.9 2591.2	7846 14872 8501
Youngsville church spire, 1918.	36 01 31.180 78 28 17.259	8 52 12.9 10 29 47.9 148 01 23.9	188 52 07.8 190 29 10.1 328 01 06.5	Youngsville Wake Dil	3.152735 3.262838 3.145662	1421.5 1829.5 1398.5	4664 6002 4588
Primary traverse station No. 4 (U. S. G. S.) 1918.[1]	36 31 52.22 77 20 57.79	215 41 36	35 41 36	Ced	0.9226736	8.369	27.46
Primary traverse station No. 14 (U. S. G. S.) (Va.), 1918.[1]	36 34 59.60 77 12 11.62						
Primary traverse station No. 7P (U. S. G. S.) (Va.), 1918.[1]	36 40 31.32 76 55 27.51	245 23 55	65 23 58	Franklin	2.1339857	136.14	446.7
Primary traverse station No. 5P (U. S. G. S.) (Va.), 1918.[1]	36 44 15.15 76 34 57.23						

PRECISE TRAVERSE, SANFORD TO WILMINGTON, N. C.

Principal points.							
Spout Springs, 1918.	35 16 43.824 79 03 58.795	159 39 07.3	339 36 16.9	Jonesboro	4.3292664	21343.54	70024.6
Prince, 1918	35 09 43.643 78 58 25.661	146 58 36.8	326 55 24.7	Spout Springs	4.1888821	15448.35	50683.5
Camp, 1918	35 08 58.056 78 57 29.636	134 44 14.6	314 43 42.3	Prince	3.3001817	1996.10	6548.9
Lake, 1918	35 07 57.090 78 56 49.237	151 26 31.4	331 26 08.1	Camp	3.3302304	2139.10	7018.0
Shaw, 1918	35 05 17.046 78 54 16.917	141 58 57.6	321 57 30.0	Lake	3.7966672	6261.34	20542.4
Pine, 1918	35 04 48.492 78 53 42.259	135 03 59.7	315 03 39.8	Shaw	3.0944845	1243.04	4078.2
Fayetteville, 1918	35 02 43.437 78 51 22.363	137 24 07.3	317 22 46.9	Pine	3.7190094	5236.12	17178.8
Vander, 1918	35 01 33.395 78 46 02.277	104 55 23.2	284 52 19.4	Fayetteville	3.9240492	8395.55	27544.4

[1] No check on this position.

PRECISE TRAVERSE, SANFORD TO WILMINGTON, N. C.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Principal points—Continued.	° ′ ″	° ′ ″	° ′ ″				
Ville, 1918	35 00 09.659 78 39 44.653	105 06 49.4	285 03 12.7	Vander	3.9963328	9915.92	32532.5
Autry, 1918	35 00 02.721 78 39 17.796	107 25 55.1	287 25 39.7	Ville	2.8535785	713.80	2341.9
Empie, 1918	34 59 29.287 78 37 31.116	110 51 26.6	290 50 25.4	Autry	3.4616346	2894.91	9497.7
Hayne, 1918	34 58 48.963 78 35 20.030	110 30 13.7	290 28 58.5	Empie	3.5501461	3549.33	11644.8
Roseboro, 1918	34 57 22.746 78 30 43.442	110 45 40.8	290 43 02.3	Hayne	3.8752182	7502.71	24615.1
Mentz, 1918	34 52 41.064 78 28 51.125	161 49 33.4	341 48 29.1	Roseboro	3.9607767	9136.43	29975.1
Garland, 1918	34 47 02.766 78 23 39.633	142 48 59.3	322 46 01.4	Mentz	4.1169086	13089.06	42943.0
Kerr, 1918	34 40 07.109 78 17 18.515	142 54 08.7	322 50 31.6	Garland	4.2058744	16064.77	52705.8
Moores, 1918	34 37 34.399 78 16 06.266	158 38 59.4	338 38 18.3	Kerr	3.7035103	5052.55	16576.6
Black River, 1918	34 37 03.854 78 15 46.569	151 56 20.6	331 56 09.4	Moores	3.0280070	1066.61	3499.4
Ivanhoe, 1918	34 37 21.211 78 15 12.088	58 40 02.0	238 39 42.4	Black River	3.0121719	1028.42	3374.1
Corbet, 1918	34 35 21.887 78 13 27.894	144 10 40.1	324 09 40.9	Ivanhoe	3.6565863	4535.09	14878.9
Atkinson, 1918	34 32 11.521 78 10 40.828	144 01 54.4	324 00 19.6	Corbet	3.8602747	7248.94	23782.6
Denneys, 1918	34 27 56.951 78 06 58.166	144 06 25.7	324 04 19.6	Atkinson	3.9860974	9684.95	31774.7
Currie, 1918	34 27 53.704 78 06 12.302	94 53 22.6	274 52 56.6	Denneys	3.0699738	1174.83	3854.4
Montague, 1918	34 26 53.639 78 04 42.848	129 02 04.1	309 01 13.5	Currie	3.4682285	2939.20	9643.0
Huggins, 1918	34 24 08.361 78 02 52.738	151 06 22.8	331 05 20.6	Montague	3.7647198	5817.28	19035.5
Richards, 1918	34 21 35.739 78 01 10.480	150 57 22.4	330 56 24.7	Huggins	3.7307480	5379.58	17649.5
Dru, 1918	34 16 46.076 77 57 57.647	151 05 57.5	331 04 08.8	Richards	4.0084483	10196.43	33452.8
Yadkin, 1918	34 15 36.190 77 57 43.516	170 28 16.5	350 28 08.5	Dru	3.3391468	2183.47	7163.6
Bridge, 1918	34 15 30.458 77 56 51.737	97 35 51.6	277 35 22.5	Yadkin	3.1259634	1336.48	4384.8
Union, 1918	34 14 27.944 77 56 57.455	184 20 36.5	4 20 39.7	Bridge	3.2859466	1931.73	6337.7
Supplementary points.							
Spout Springs K, 1918.	35 22 59.521 79 06 46.242	101 09 33.5	281 09 21.2	Swan	2.7360814	544.60	1786.7
Spout Springs J, 1918.	35 21 59.642 79 06 44.326	178 29 55.3	358 29 54.2	Spout Springs K.	3.2662301	1845.99	6056.4
Spout Springs I, 1918.	35 20 55.306 79 06 42.327	178 32 31.0	358 32 29.8	Spout Springs J.	3.2973994	1983.35	6507.0

PRECISE TRAVERSE, SANFORD TO WILMINGTON, N. C.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points—Contd.	° ′ ″	° ′ ″	° ′ ″				
Spout Springs H, 1918.	35 20 50.582 79 06 41.407	170 56 05.0	350 56 04.5	Spout Springs I.	2.1685537	147.42	483.7
Spout Springs G, 1918.	35 20 35.271 79 06 35.105	161 21 44.7	341 21 41.1	Spout Springs H.	2.6972058	497.97	1633.8
Dum, 1918	35 20 17.081 79 06 27.670	161 29 01.3	341 28 57.0	Spout Springs G.	2.7717289	591.19	1939.6
Dul, 1918	35 19 49.802 79 06 02.867	143 18 39.7	323 18 25.4	Dum	3.0205219	1048.39	3439.6
Pineview, 1918	35 18 23.687 79 05 24.317	159 51 12.4	339 50 50.1	Dul	3.4513055	2826.87	9274.5
Spout Springs F, 1918.	35 18 01.511 79 05 18.644	168 09 17.3	348 09 14.0	Pineview	2.8440227	698.27	2290.9
Spout Springs E, 1918.	35 17 19.035 79 04 57.538	157 50 06.1	337 49 53.9	Spout Springs F.	3.1502882	1413.48	4637.4
Spout Springs D, 1918.	35 17 13.585 79 04 57.187	176 58 39.5	356 58 39.3	Spout Springs E.	2.2257648	168.18	551.8
Spout Springs C, 1918.	35 17 04.916 79 04 59.326	191 26 20.0	11 26 21.2	Spout Springs D.	2.4354800	272.57	894.3
Spout Springs B, 1918.	35 16 57.615 79 04 59.328	180 00 50.3	0 00 50.3	Spout Springs C.	2.3521989	225.01	738.2
Spout Springs A, 1918.	35 16 49.281 79 04 53.198	148 54 08.4	328 54 04.9	Spout Springs B.	2.4770026	299.92	984.0
Prince F Prime, 1918.	35 16 24.216 79 04 10.147	125 22 34.5	305 22 09.6	Spout Springs A.	3.1252656	1334.34	4377.7
Prince F, 1918	35 16 21.401 79 04 05.306	125 19 59.1	305 19 56.3	Prince F Prime.	2.1761008	150.00	492.1
Prince G, 1918	35 16 26.121 79 04 03.922	13 31 12.4 193 21 42.6	193 31 11.6 13 21 45.6	Prince F Spout Springs.	2.1749594 2.7487729	149.61 560.75	490.8 1839.7
Prince E, 1918	35 15 55.984 79 03 21.574	125 19 39.3	305 19 14.0	Prince F	3.1318498	1354.72	4444.6
Duf, 1918	35 15 50.415 79 03 15.253	137 03 25.8	317 03 22.2	Prince E	2.3701021	234.48	769.3
Dud, 1918	35 15 32.272 79 03 02.418	149 52 40.8	329 52 33.4	Duf	2.8105314	646.44	2120.9
Duc, 1918	35 14 27.307 79 02 31.060	158 24 03.0	338 23 44.9	Dud	3.3331024	2153.29	7064.6
Dub, 1918	35 13 52.437 79 02 05.568	149 02 51.1	329 02 36.4	Duc	3.0979848	1253.10	4111.2
Prince D, 1918	35 13 17.018 79 01 56.350	167 56 49.6	347 56 44.3	Dub	3.0477175	1116.14	3661.9
Overhills, 1918	35 13 10.435 79 01 49.601	139 55 43.1	319 55 39.2	Prince D	2.4234384	265.12	869.8
Manchester, 1918.	35 12 43.676 79 01 03.364	125 11 42.6	305 11 15.9	Overhills	3.1556115	1430.91	4694.6
Bragg, 1918	35 10 29.184 78 59 50.680	156 04 53.0	336 04 11.1	Manchester	3.6565038	4534.23	14876.1
Prince C, 1918	35 10 19.506 78 59 41.319	141 32 55.5	321 32 50.1	Bragg	2.5807765	380.87	1249.6
Prince B, 1918	35 09 55.766 78 58 51.190	119 58 39.6	299 58 10.7	Prince C	3.1656546	1464.38	4804.4

PRECISE TRAVERSE, SANFORD TO WILMINGTON, N. C.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points—Contd.	° ′ ″	° ′ ″	° ′ ″				
Prince A, 1918	35 09 48.693 78 58 31.820	314 57 42.1 113 58 40.7	134 57 45.6 293 58 29.5	Prince Prince B	2.3429060 2.7295304	220.24 536.45	722.6 1760.0
Fayetteville J, 1918	35 04 52.445 78 53 53.046	141 25 28.5 294 01 28.7	321 25 14.8 114 01 34.9	Shaw Pine	2.9866578 2.4759751	969.75 299.21	3181.6 981.7
Fayetteville I, 1918	35 03 53.056 78 53 13.206	151 07 30.5	331 07 07.6	Fayetteville J	3.3201573	2090.05	6857.1
Fayetteville H, 1918.	35 03 20.563 78 52 56.375	156 55 51.8	336 55 42.1	Fayetteville I	3.0367671	1088.35	3570.7
Fayetteville G, 1918.	35 03 14.617 78 52 56.709	182 38 43.7	2 38 43.9	Fayetteville H	2.2634566	183.42	601.8
Fayetteville E, 1918.	35 03 10.933 78 52 58.470	201 27 26.6	21 27 27.6	Fayetteville G	2.0863972	122.01	400.3
Fayetteville D, 1918.	35 03 04.812 78 53 54.511	152 00 00.1	331 59 57.8	Fayetteville E	2.3297265	213.66	701.0
Fayetteville C, 1918.	35 02 46.310 78 52 00.436	112 35 38.4	292 35 07.3	Fayetteville D	3.1715219	1484.30	4869.7
Fayetteville B, 1918.	35 02 47.827 78 51 48.436	81 15 50.5	261 15 43.6	Fayetteville C	2.4880966	307.68	1009.4
Fayetteville A, 1918.	35 02 44.325 78 51 25.193	100 23 08.3 290 53 05.9	280 22 55.0 110 53 07.5	Fayetteville B Fayetteville	2.7773310 1.8852148	598.87 76.77	1964.8 251.9
Primary traverse station No. 17 (U. S. G. S.), 1918.[1]	35 10 55.26 79 00 04.48						
Primary traverse station No. 18 (U. S. G. S.), 1918.[1]	35 09 47.85 78 58 29.78	116 41 41	296 41 40	Prince A	1.7618903	57.795	189.62
Primary traverse station No. 4 (U. S. G. S.), 1918.[1]	35 03 17.28 78 53 05.08	293 11 31	113 11 35	Fayetteville F	2.3572163	227.62	746.8
Fayetteville F, 1918.[1]	35 03 14.37 78 52 56.83	201 27 28	21 27 28	Fayetteville G	0.9082169	8.095	26.56
Fayetteville water tank, 1918.[1]	35 02 43.79 78 52 02.32	211 41 22 270 37 08	31 41 23 90 37 31	Fayetteville C Fayetteville	1.959578 3.005550	91.1 1012.9	299 3323
Primary traverse station No. 3 (U. S. G. S.), 1918.[1]	35 01 52.00 78 47 28.48						
Primary traverse station No. 2 (U. S. G. S.), 1918.[1]	35 00 35.44 78 41 42.23						
Primary traverse station No. 1 (U. S. G. S.), 1918.[1]	34 58 49.92 78 35 24.33	285 06 48	105 06 50	Hayne	2.0525785	112.87	370.3
Primary traverse station No. 3 (U. S. G. S.), 1918.[1]	34 15 25.79 77 59 32.21						

[1] No check on this position.

PRECISE TRAVERSE, SANFORD TO OSBORNE, N. C.

Station.	Latitude and longitude	Azimuth.	Back azimuth	To station	Distance.		
					Log (meters).	Meters	Feet
Principal points.	° ′ ″	° ′ ″	° ′ ″				
Carr, 1918	35 02 35.584 79 30 28.281	217 38 48.8	37 42 57.1	Foch	4.2526056	17889.81	58693.5
Hoffman, 1918	35 02 04.054 79 32 36.722	253 22 10.8	73 23 30.5	Carr	3.5311488	3397.42	11146.4
Broadacre, 1918	35 01 27.530 79 33 42.477	235 57 55.7	55 58 33.4	Hoffman	3.3034693	2011.26	6598.6
Marston, 1918	34 59 44.772 79 34 03.607	189 36 04.2	9 36 16.3	Broadacre	3.5067201	3211.59	10536.7
Cognac, 1918	34 58 30.242 79 36 13.661	235 08 27.0	55 09 41.6	Marston	3.6041569	4019.36	13186.9
Oise, 1918	34 56 47.387 79 36 45.162	194 08 57.8	14 09 15.9	Cognac	3.5143823	3268.75	10724.2
Ainse, 1918	34 56 03.151 79 37 37.680	224 20 57.7	44 21 27.8	Oise	3.2802176	1906.42	6254.6
Vesle, 1918	34 55 19.878 79 39 14.661	241 32 44.3	61 33 39.8	Ainse	3.4470700	2799.43	9184.5
Rockingham, 1918.	34 54 31.134 79 41 02.083	241 08 36.1	61 09 37.6	Vesle	3.4932041	3113.18	10213.8
Hamlet, 1918	34 53 14.953 79 42 32.847	224 27 44.5	44 28 36.4	Rockingham	3.5171457	3289.62	10792.7
Light, 1918	34 49 45.103 79 45 21.251	213 28 20.0	33 29 56.3	Hamlet	3.8894955	7753.46	25437.8
Osborne (S. C.), 1918.	34 47 51.011 79 46 20.860	203 18 26.7	23 19 00.7	Light	3.5830054	3828.29	12560.0
Supplementary points.							
Debeney A, 1918	35 31 17.830 79 09 49.607	210 26 53.1 280 15 32.3	30 26 55.8 100 15 38.2	Colon Allenby	2.3616366 2.4116378	229.95 258.01	754.4 846.5
Debeney, 1918	35 30 40.351 79 10 16.595	210 28 44.1	30 29 02.5	Colon	3.1959990	1570.36	5152.1
Brook, 1918	35 29 20.400 79 10 40.027	193 28 35.5	13 28 49.1	Debeney	3.4037674	2533.77	8312.9
Lee, 1918	35 28 47.235 79 10 37.053	175 48 19.2 354 35 57.6	355 48 17.5 174 36 04.4	Brook Sanford	3.0106568 3.4957657	1024.84 3131.60	3362.3 10274.3
Sanford C, 1918	35 28 30.875 79 10 35.347	175 07 14.2	355 07 13.2	Lee	2.7041644	506.02	1660.2
Sanford B, 1918	35 27 45.187 79 10 37.227	181 55 35.5	1 55 36.6	Sanford C	3.1488590	1408.83	4622.1
Sanford A, 1918	35 27 14.712 79 10 49.566	198 19 40.5 293 34 16.2	18 19 47.7 113 34 30.2	Sanford B Sanford	2.9953636 2.8233876	989.38 665.87	3246.0 2184.6
Troy, 1918	35 26 32.489 79 10 35.410	164 39 31.1 193 45 12.2	344 39 22.9 13 45 18.0	Sanford A Sanford	3.1301129 3.0275479	1349.31 1065.49	4426.9 3495.7
Fismes, 1918	35 25 25.612 79 11 16.694	206 48 08.4	26 48 32.3	Troy	3.3634575	2309.18	7576.0
Lennon, 1918	35 25 06.849 79 11 34.947	218 31 46.7	38 31 57.3	Fismes	2.8687599	739.20	2425.2
Gum, 1918	35 24 41.008 79 11 46.385	199 55 06.0	19 55 12.6	Lennon	2.9278997	847.03	2779.0
Alfair, 1918	35 24 18.601 79 11 39.515	165 54 31.1	345 54 27.1	Gum	2.8524558	711.96	2335.8

PRECISE TRAVERSE, SANFORD TO OSBORNE, N. C.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points—Contd.	° ′ ″	° ′ ″	° ′ ″				
Mangin, 1918	35 23 59.287 79 11 47.005	197 36 57.4	17 37 01.7	Alfair	2.7955372	624.51	2048.9
Reeves, 1918	35 23 15.232 79 11 46.842	38 33 01.2 179 49 35.7	218 32 19.8 359 49 35.6	Lemon Mangin	3.4613655 3.1328035	2893.11 1357.70	9491.8 4454.4
Lemon C, 1918	35 22 56.932 79 12 07.801	223 10 00.0	43 10 12.1	Reeves	2.8883141	773.24	2536.9
Lemon B, 1918	35 22 23.675 79 12 30.126	208 48 06.2	28 48 19.1	Lemon C	3.0680358	1169.60	3837.3
Lemon A, 1918	35 22 03.546 79 12 40.239	83 17 21.0 202 22 09.5	263 17 10.6 22 22 15.4	Lemon Lemon B	2.6610031 2.8266007	458.15 670.81	1503.1 2200.8
Morrison, 1918	35 21 00.361 79 13 09.638	188 37 21.9 200 51 49.1	8 37 28.5 20 52 06.1	Lemon Lemon A	3.2822376 3.3188703	1915.30 2083.87	6283.8 6836.8
Mihiel, 1918	35 20 42.546 79 13 35.860	230 20 01.2	50 20 16.4	Morrison	2.9345512	860.10	2821.8
Huron, 1918	35 19 51.237 79 14 24.894	218 03 39.6	38 04 08.0	Mihiel	3.3028485	2008.39	6589.2
Cameron, 1918	35 19 48.686 79 14 56.281	264 20 06.0	84 20 24.2	Huron	2.9012409	796.60	2613.5
Hayes, 1918	35 18 36.662 79 15 44.661	208 49 54.8	28 50 22.8	Cameron	3.4037690	2533.78	8312.9
Hamilton, 1918	35 18 17.753 79 15 45.921	183 07 29.7	3 07 30.4	Hayes	2.7661147	583.60	1914.7
Newton, 1918	35 16 52.456 79 16 11.525	193 49 28.3	13 49 43.1	Hamilton	3.4325026	2707.09	8881.5
Mt. Vernon, 1918	35 16 22.967 79 16 13.007	182 21 32.4	2 21 33.3	Newton	2.9588199	909.54	2984.0
Ailette, 1918	35 15 57.810 79 16 20.155	193 07 01.2 204 25 54.8	13 07 05.3 24 27 51.5	Mt. Vernon Lemon	2.9009330 4.0906967	796.04 12322.44	2611.7 40427.9
Vass, 1918	35 14 48.460 79 17 23.337	216 45 58.8	36 46 35.3	Ailette	3.4261961	2668.06	8753.5
Lakeview A, 1918	35 14 16.806 79 18 30.520	240 07 32.6	60 08 11.4	Vass	3.2919856	1958.78	6426.4
Guynemer A, 1918	35 14 14.218 79 18 43.981	256 48 40.8	76 48 48.6	Lakeview A	2.5435179	349.56	1146.8
Guynemer, 1918	35 14 01.868 79 19 03.080	231 45 20.9	51 45 31.9	Guynemer A	2.7887724	614.85	2017.2
Lakeview, 1918	35 14 13.215 79 18 39.178	59 56 54.4 104 17 09.4 240 27 51.5 243 10 48.3	239 56 40.6 284 17 06.6 60 28 35.3 63 10 53.3	Guynemer Guynemer A Vass Lakeview A	2.843996 2.097986 3.343103 2.389678	698.2 125.3 2203.4 245.3	2291 411 7229 805
Fonck, 1918	35 13 52.335 79 19 36.853	251 00 47.3	71 01 06.8	Guynemer	2.9557412	903.11	2963.0
Delaware, 1918	35 13 14.512 79 20 26.903	226 50 06.6	46 50 34.9	Fonck	3.2314605	1703.96	5590.4
Niagara D, 1918	35 12 44.153 79 20 48.410	211 12 07.4	31 12 20.3	Delaware	3.0389472	1093.82	3588.6
Niagara C, 1918	35 12 38.804 79 20 54.928	225 00 09.7	45 00 13.5	Niagara D	2.3675817	233.12	764.8
Niagara, 1918	35 12 28.911 79 21 01.928	39 32 07.1 210 08 53.7 212 52 57.6 227 52 37.8	219 30 49.6 30 08 57.7 32 53 13.3 47 55 20.4	Foch Niagara C Delaware Ailette	3.7282708 2.5472209 3.2236120 3.9823757	5348.98 352.55 1673.45 9602.31	17549.1 1156.7 5490.3 31503.6

PRECISE TRAVERSE, SANFORD TO OSBORNE, N. C.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points—Contd.	° ′ ″	° ′ ″	° ′ ″				
Niagara B, 1918	35 12 34.626 79 21 09.201	250 22 21.7 313 45 11.8	70 22 29.9 133 45 16.0	Niagara C Niagara	2.5835196 2.4059797	383.28 254.67	1257.5 835.5
Niagara A, 1918	35 12 27.135 79 21 18.745	226 16 46.7 262 39 55.9	46 16 52.2 82 40 05.6	Niagara B Niagara	2.5237945 2.6323408	334.04 428.88	1095.9 1407.1
Foch E, 1918	35 12 11.510 79 21 25.481	199 29 04.7 228 00 24.9	19 29 08.6 48 00 38.5	Niagara A Niagara	2.7082273 2.9039398	510.77 801.57	1675.8 2629.8
Foch D, 1918	35 10 52.776 79 22 33.343	215 16 38.3	35 17 17.4	Foch E	3.4730914	2972.29	9751.6
Foch C, 1918	35 10 48.055 79 22 41.994	236 23 26.7	56 23 31.7	Foch D	2.4196845	262.84	862.3
Foch B, 1918	35 10 45.653 79 22 58.782	260 06 52.2	80 07 01.9	Foch C	2.6346767	431.20	1414.7
Foch A, 1918	35 10 28.652 79 23 26.604	233 20 26.4 328 36 52.8	53 20 42.4 148 36 58.6	Foch B Foch	2.9432704 2.6919037	877.55 491.93	2879.1 1613.9
Quentin E, 1918	35 10 10.414 79 23 56.258	233 09 54.5 261 57 46.3	53 10 11.6 81 58 09.2	Foch A Foch	2.9719909 3.6071462	937.54 1016.59	3075.9 3335.3
Quentin D, 1918	35 09 37.935 79 24 15.360	205 46 42.7 232 30 17.9	25 46 53.7 52 30 51.8	Quentin E Foch	3.0459265 3.2730912	1111.54 1877.98	3646.8 6161.3
Quentin C, 1918	35 09 29.902 79 24 28.891	234 08 14.6	54 08 22.4	Quentin D	2.6259011	422.57	1386.4
Quentin B, 1918	35 09 21.991 79 24 34.198	208 51 16.9	28 51 20.0	Quentin C	2.4445700	278.34	913.2
Quentin A, 1918	35 09 00.732 79 24 36.373	184 48 08.6	4 48 09.9	Quentin B	2.8178628	657.45	2157.0
Quentin, 1918	35 08 50.987 79 24 40.613	199 39 52.4 219 25 13.7	19 39 54.8 39 26 02.1	Quentin A Foch	2.5036838 3.5254043	318.92 3352.77	1046.3 10999.9
Aberdeen, 1918	35 08 04.051 79 25 29.805	220 43 22.7	40 43 51.0	Quentin	3.2807183	1908.62	6261.9
Griffin, 1918	35 06 40.262 79 26 27.864	209 39 00.7	29 39 34.1	Aberdeen	3.4729382	2971.24	9748.1
Pond A, 1918	35 06 07.950 79 27 10.345	227 12 40.6	47 13 05.0	Griffin	3.1661108	1465.92	4809.4
Keyser A, 1918	35 05 55.890 79 27 17.182	204 58 54.4	24 58 58.3	Pond A	2.6127973	410.01	1345.2
Keyser, 1918	35 05 09.495 79 27 22.343	185 13 26.5	5 13 29.5	Keyser A	3.1570585	1435.68	4710.2
Pond, 1918	35 06 04.505 79 27 06.912	12 59 06.8 44 25 01.2 140 41 06.0 221 54 11.5	192 58 57.9 224 24 55.3 320 41 04.0 41 54 33.9	Keyser Keyser A Pond A Griffin	3.240467 2.570157 2.137472 3.170434	1730.7 371.7 137.2 1480.6	5708 1219 450 4858
Erie, 1918	35 03 34.061 79 28 34.875	211 59 37.5	32 00 19.2	Keyser	3.5400613	3467.86	11377.5
Ratle, 1918	35 03 05.039 79 29 03.915	219 26 45.6	39 27 02.3	Erie	3.0637845	1158.20	3799.9
Alexander, 1918	35 03 03.869 79 29 33.376	267 13 54.4	87 14 11.3	Ratle	2.8736071	747.49	2452.4
Richmond, 1918	35 02 57.191 79 29 55.211	249 35 51.9 51 32 15.2	69 36 04.4 231 31 56.2	Alexander Carr	2.7711316 3.0295622	590.38 1070.44	1936.9 3511.9
Carr A, 1918	35 02 45.536 79 30 05.275	62 15 33.7 215 22 44.2	242 15 20.5 35 22 50.0	Carr Richmond	2.8187659 2.6439712	658.82 440.53	2161.5 1445.3
Hoffman A, 1918	35 02 33.729 79 30 35.168	73 28 40.9 244 20 43.1 251 51 47.7	253 27 31.1 64 21 00.3 71 51 51.6	Hoffman Carr A Carr	3.5070193 2.9245212 2.2640647	3213.80 840.47 183.68	10543.9 2757.4 602.6

PRECISE TRAVERSE, SANFORD TO *OSBORNE*, N. C.—*Continued.*

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points—Contd.	° ′ ″	° ′ ″	° ′ ″				
Hamlet F, 1918	34 53 58.989 79 41 21.446	206 23 27.8	26 23 38.9	Rockingham	3.0436902	1105.83	3628.0
Hamlet E, 1918	34 53 21.120 79 41 28.749	189 01 40.8	9 01 45.0	Hamlet F	3.0724632	1181.58	3876.6
Hamlet D, 1918	34 53 17.028 79 41 36.842	238 27 51.6	58 27 56.2	Hamlet E	2.3821922	241.10	791.0
Hamlet C, 1918	34 53 06.758 79 41 58.962	240 35 55.1	60 36 07.8	Hamlet D	2.8093701	644.72	2115.2
Hamlet B, 1918	34 53 00.780 79 41 54.947	151 02 20.7	331 02 18.4	Hamlet C	2.3233671	210.56	690.8
Hamlet A, 1918	34 52 51.189 79 42 08.665	140 01 11.8 229 41 15.0	320 00 58.0 49 41 22.8	Hamlet Hamlet B	2.9803153 2.6597780	955.69 456.85	3135.5 1498.8
Light I, 1918	34 52 11.340 79 43 09.897	205 38 14.8 231 41 54.5	25 38 36.0 51 42 29.5	Hamlet Hamlet A	3.3373375 3.2969873	2174.39 1981.47	7133.8 6500.9
Light J, 1918	34 52 14.962 79 43 04.784	231 55 25.4 49 19 31.6	51 55 57.5 229 19 28.7	Hamlet A Light I	3.2577737 2.2335877	1810.40 171.23	5939.6 561.8
Light H, 1918	34 51 44.532 79 43 40.122	211 30 39.5 222 53 59.5	31 31 18.0 42 54 16.8	Hamlet Light I	3.5143479 3.0522115	3268.50 1127.75	10723.4 3700.0
Light G, 1918	34 50 51.230 79 44 41.895	223 41 17.5	43 41 52.8	Light H	3.3563373	2271.63	7452.8
Light F, 1918	34 50 44.358 79 45 00.226	245 32 49.4	65 32 59.9	Light G	2.7089220	511.59	1678.4
Light D, 1918	34 50 41.907 79 45 04.478	235 02 09.2	55 02 11.6	Light F	2.1199642	131.81	432.4
Light C, 1918	34 50 37.714 79 45 09.927	226 58 37.3	46 58 40.4	Light D	2.2773073	189.37	621.3
Light E, 1918	34 50 44.660 79 45 00.413	246 42 55.3 332 53 51.7 48 28 24.9 50 35 32.0	66 43 05.9 152 53 51.8 228 28 19.5 230 35 29.7	Light G Light F Light C Light D	2.709423 1.019301 2.509013 2.125957	512.2 10.5 322.9 133.6	1680 34 1059 438
Light B, 1918	34 49 57.729 79 45 11.628	182 00 30.9 32 08 56.3	2 00 31.9 212 08 50.8	Light C Light	3.0909237 2.6623156	1232.89 459.53	4044.9 1507.6
Light A, 1918	34, 49 49.002 79 45 15.004	52 52 40.6 197 41 35.7	232 52 37.0 17 41 37.6	Light Light B	2.2990158 2.4506816	199.07 282.28	653.1 926.1
Osborne I, 1918	34 49 42.556 79 45 20.491	166 10 18.0 215 03 34.8	346 10 17.6 35 03 38.0	Light Light A	1.9076743 2.3850467	80.85 242.69	265.3 796.2
Osborne H, 1918	34 49 35.910 79 45 26.133	214 59 21.3	34 59 24.5	Osborne I	2.3979271	249.99	820.2
Osborne G, 1918	34 49 31.409 79 45 28.961	204 54 16.6 207 23 00.0 212 04 15.9	24 54 21.0 27 23 01.6 32 04 20.7	Light Osborne H Osborne I	2.6676816 2.1937330 2.6078383	465.24 156.22 405.36	1526.4 512.5 1329.9
Osborne F, 1918	34 49 11.458 79 45 33.001	189 28 47.5	9 28 49.8	Osborne, G	2,7946988	623.30	2044.9
Osborne E, 1918	34 48 58.526 79 45 42.587	211 26 13.6	31 26 19.1	Osborne F	2.6693813	467.07	1532.4
Osborne D, 1918	34 48 51.411 79 45 45.210	196 54 28.1	16 54 29.6	Osborne E	2.3601479	229.16	751.8
Osborne C, 1918	34 48 39.377 79 45 43.100	171 46 10.1	351 46 08.9	Osborne D	2.5736776	374.69	1229.3
Osborne B, 1918	34 48 33.594 79 45 43.220	180 58 27.7	0 58 27.8	Osborne C	2.2509693	178.23	584.7

PRECISE TRAVERSE, SANFORD TO OSBORNE, N. C.—Continued.

Station.	Latitude and longitude.	Azimuth.	Back azimuth.	To station.	Distance.		
					Log (meters).	Meters.	Feet.
Supplementary points—Contd.	° ′ ″	° ′ ″	° ′ ″				
Osborne A (S. C.), 1918.	34 47 54.671 79 45 57.322	79 19 41.8 196 38 13.8	259 19 28.4 16 38 21.8	Osborne Osborne B	2.7845315 3.0975488	608.88 1251.84	1997.6 4107.1
Sanford, red steel standpipe, 1918.	35 28 55.007 79 09 42.538	17 49 58.4 180 59 48.4 333 43 49.0	197 49 33.5 0 59 50.1 153 44 17.7	Sanford Allenby Jonesboro	3.547360 3.639118 3.449587	3526.6 4356.3 2815.7	11570 14292 9238
Sanford, tall steel water tank, 1918.	35 28 53.420 79 10 39.208	312 46 53.8 344 05 26.1 353 58 34.8	132 47 55.4 164 05 27.3 173 58 42.8	Jonesboro Lee Sanford	3.561689 2.297160 3.522012	3644.9 198.2 3326.7	11958 650 10914
Jonesboro, tall square white steeple with spiral, 1918.	35 27 17.878 79 09 19.726	29 31 49.4 77 36 24.9 235 04 52.9	209 29 42.7 257 35 46.8 55 05 08.2	Lemon Sanford Jonesboro	4.048947 3.229114 2.912921	11193.0 1694.8 818.3	36722 5560 2685
Carthage, lower water tank, 1918.	35 20 48.476 79 25 07.054	262 56 22.1 338 03 38.7 351 50 33.5	83 03 23.8 158 06 00.2 171 51 36.4	Lemon Niagara Foch	4.268078 4.219977 4.294914	18538.6 16595.0 19720.3	60822 54445 64699
Carthage, taller water tank, 1918.	35 20 44.685 79 24 57.736	262 29 16.4 338 40 20.5 352 28 39.1	82 36 12.8 158 42 36.7 172 29 36.7	Lemon Niagara Foch	4.262927 4.214834 4.291645	18320.1 16399.6 19572.4	60105 53804 64214
Carthage, courthouse, dome, 1918.	35 20 44.450 79 25 01.811	262 30 24.2 338 19 41.6 352 10 31.7	82 37 22.9 158 22 00.1 172 11 31.7	Lemon Niagara Foch	4.265361 4.215653 4.291792	18423.0 16430.6 19579.1	60443 53906 64236
Vass, white steeple, shingle roof, 1918.[1]	35 15 24.99 79 17 02.61	48 08 14 226 41 35	228 05 56 46 42 00	Niagara Ailette	3.909991 3.168667	8128.1 1474.6	26667 4838
Lakeview, green water tank, black roof, 1918.	35 14 35.191 79 18 30.498	0 03 27.5 17 57 22.9 44 33 03.8	180 03 27.5 197 57 17.9 224 31 36.5	Lakeview A Lakeview Niagara	2.753250 2.852423 3.737174	566.6 711.9 5459.8	1859 2336 17913
Niagara water tank, 1918.	35 12 24.441 79 21 16.498	145 35 55.4 210 27 25.0 249 30 11.2	325 35 54.1 30 27 29.2 69 30 19.6	Niagara A Niagara B Niagara	2.002654 2.561252 2.594877	100.6 364.1 393.4	330 1195 1291
Southern Pines, Congregational Church, steeple, 1918.[1]	35 10 30.66 79 23 32.30	320 15 59 44 10 56	140 16 08 224 10 42	Foch Quentin E	2.798843 2.939431	626.4 869.8	2055 2854
Southern Pines water tank, 1918.	35 10 18.963 79 22 58.190	75 18 29.9 214 03 45.5 216 17 17.7	255 18 19.4 34 04 38.9 36 18 24.7	Foch Foch E Niagara	2.679853 3.621904 3.696248	478.5 4187.0 4968.8	1570 13737 16302
Aberdeen, Seaboard Air Line R. R., water tank, 1918.[1]	35 08 05.02 79 25 28.43	49 33 46 220 30 24	229 33 45 40 30 51	Aberdeen Quentin	1.661206 3.270291	45.8 1863.3	150 6113
Hoffman, Seaboard Air Line R. R., semaphore, 1918.[1]	35 01 48.93 79 33 04.18	236 10 57 55 49 16	56 11 13 235 48 54	Hoffman Broadacre	2.923060 3.069531	837.6 1173.6	2748 3850
Hamlet, city water tank, 1918.	34 53 15.313 79 42 32.514	224 29 33.7 320 49 43.8 37 19 46.4	44 30 25.4 140 49 57.4 217 19 46.2	Rockingham Hamlet A Hamlet	3.515324 2.981748 1.144263	3275.9 958.8 13.94	10748 3146 45.7
Hamlet, Seaboard Air Line R. R., water tank, 1918.[1]	34 53 00.67 79 41 52.71	113 21 37 204 45 03	293 21 14 24 45 32	Hamlet Rockingham	3.045403 3.487109	1110.2 3069.8	3642 10072

[1] No check on this position.

DESCRIPTIONS OF TRIANGULATION AND TRAVERSE STATIONS.

This list of descriptions of stations may be conveniently consulted by reference to the illustrations at the end of this publication or to the index on page 177. All azimuths given in the descriptions are reckoned continuously from true south around by west to 360°, south being 0°, west 90°, north 180°, and east 270°. Where magnetic azimuths are given they are indicated as such. The distance between the station and reference mark is the horizontal distance unless otherwise noted. In general, except where the contrary is specifically stated, the surface and underground mark 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 name and dates given in each description immediately after the county refer to the chief of party by whom the station was established, the date of the establishment of the station, and the 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 Director, U. S. Coast and Geodetic Survey, Washington, D. C.

The standard station and reference marks (see fig. 1) referred to in the following descriptions and notes consist of a disk and shank of bronze cast in one piece. The disk of the station mark is 90 millimeters in diameter, with a hole at the center surrounded by a 20-millimeter equilateral triangle, and has the following inscribed legend: "U. S. Coast and Geodetic Survey Triangulation Station. For information write to the Director, Washington, D. C. $250 fine or imprisonment for disturbing this mark." The shank is 25 millimeters in diameter and 80 millimeters long, with several grooves cut around it to give a secure anchorage in concrete. The name of the station and the year in which it was established are stamped on the station mark.

The standard reference mark (shown in fig. 1) is the same size and shape as the station mark, with an arrow on the top in place of the triangle, which, when properly set, points to the station. The legend is the same, except the words "reference mark" take the place of the words "triangulation station."

The standard bench mark (shown in fig. 1) is the same size and shape as the station mark, with a straight line on the top instead of the triangle. When this bench mark is set in place in a vertical position, as in the side of a building, the line is placed horizontal and is the mark to which the elevation refers.

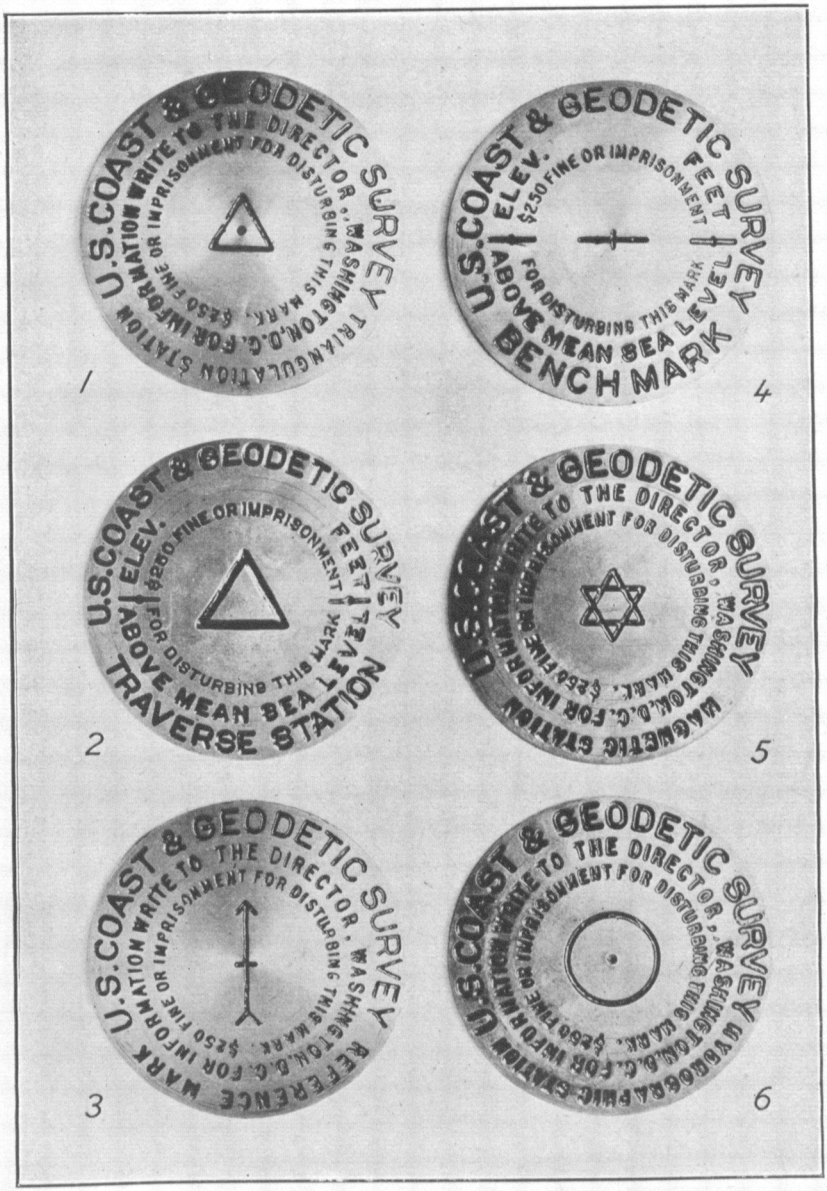

FIG. 1.—STANDARD MARKS OF THE U. S. COAST AND GEODETIC SURVEY

1. Triangulation station mark
2. Traverse station mark
3. Reference mark
4. Bench mark
5. Magnetic station mark
6. Hydrographic station mark

STANDARD NOTES ON MARKING OF STATIONS.

Surface marks.

Note 1.—A standard bronze tablet 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 bronze tablet wedged in a drill hole in outcropping bedrock, (*a*) and surrounded by a triangle chiseled in the rock, (*b*) and surrounded by a circle chiseled in the rock, (*c*) at the intersection of two lines chiseled in the rock.

Note 3.—A standard bronze tablet set in concrete in a depression in outcropping bedrock.

Note 4.—A standard bronze tablet wedged in a drill hole in a bowlder.

Note 5.—A standard bronze tablet set in concrete in a depression in a bowlder.

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

Underground marks.

Note 7.—A block of concrete 3 feet below the ground containing at the center of its upper surface (*a*) a standard bronze tablet, (*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 bronze tablet wedged in a drill hole, (*b*) a standard bronze tablet 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 bowlder 3 feet below the ground, (*a*) a standard bronze tablet wedged in a drill hole, (*b*) a standard bronze tablet 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 horizontal position with a drill hole in its upper surface.

Reference marks.

Note 11.—A standard bronze tablet, 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 bronze tablet, 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 bowlder, (*d*) set in concrete in a depression in a bowlder.

Note 13.—A standard bronze tablet, 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.

PRECISE TRIANGULATION, EASTERN OBLIQUE ARC.

Principal points.

Buffalo (Floyd County, Va., A. T. Mosman, 1876; 1918).—About 25 miles by road northwest of Stuart, on Buffalo Mountain, on the west end of a rocky ridge about 150 yards long with no trees on it. The east end of the ridge is about 6 feet higher. The underground mark is a copper bolt with a cross on it driven into the solid rock. In 1876 masonry was built over this, the center transferred to the top and marked by a cross on a square copper bolt set flush with the top of the masonry. The reference marks (1876) were copper bolts set in solid rock at distances and directions from the station as follows: 8.76 feet north, 10.37 feet east, 8.38 feet south, and 8.75 feet west. When the station was recovered in 1918, the surface mark (copper bolt in masonry) had been destroyed and the reference bolts removed, but the drill holes were found. The underground mark was found in good condition and a standard bronze tablet was set over it and surrounded by a mound of concrete. Two new reference marks were established, both being bronze tablets set in the rock as described in note 12*a*. One is due west, 2.66 meters (8.73 feet) from the station; the other is about 10° south of east and 4.11 meters (13.48 feet) from the station. The elevation of the station mark is 1,210.4 meters (3,971 feet).

Moore (Stokes County, A. T. Mosman, 1876; 1918).—About 12 miles northwest of Walnut Cove railway station on the Norfolk & Western and Southern Railways, on the highest part of the solid rock forming the top of Moores Mountain or Moores Knob of what are locally known as the Sauratown Mountains. The station was originally marked by a cross on a copper bolt set in the rock which had been leveled by blasting. Four reference marks, similar copper bolts with crosses, were placed as follows: 6 feet north (true meridian) and 6 inches below the station, 5.97 feet south and 1 foot above the station, 7.12 feet east and 18 inches below the station, and 6.03 feet west and 18 inches below the station. When the station was recovered in 1918, the center bolt and the north and south reference bolts had been removed. The station was remarked by a bronze tablet as described in note 2. An additional reference mark, a bronze tablet as described in note 12*b*, was placed 12.90 meters (42.32 feet) from the station in azimuth 169° 56′. The elevation of the station mark is 784.0 meters (2,572 feet).

Poore (Wilkes County, C. O. Boutelle, 1877; 1907).—About 7 miles south of Wilkesboro, 11 miles by road from North Wilkesboro on the Southern Railway, on the summit of Poores Mountain (locally known as Poor Knob). The station is marked by a stone post surrounded by four other stone posts as reference marks. In 1907 the station and reference marks were recovered and found to be in good condition. The elevation of the station mark is 816.9 meters (2,680 feet).

Young (Rowan County, C. O. Boutelle, 1876; 1917).—About 2 miles east of the railway station known as Third Creek on the division of the Southern Railway (formerly known as the Western North Carolina Railroad), about 12 miles northwest of Salisbury, 2 miles northwest of Barber railway station, on Youngs Mountain which is only about 1,100 feet in elevation and easy of ascent. The station was marked by a buried bottle and a central stone post surrounded by four other stone posts as reference marks. In 1917 the station and reference marks were recovered and found to be in good condition. The elevation of the station mark is 332.9 meters (1,092 feet).

Benn (Burk County, C. O. Boutelle, 1877).—About 13 miles south from Morganton, 20 miles west of north from Shelby, on Benns Knob, the most southerly high summit of the South Mountains. The underground mark is the center of a buried lamp chimney. The surface mark is a granite post surrounded by four similar granite posts as reference marks. The elevation of the station mark is 886.4 meters (2,908 feet).

Roan High Bluff (Mitchell County, A. H. Buchanan, 1894; 1907).—About 5 miles north of Bakersville, about ¾ mile from the Cloudland Hotel, and on a very large rock on the edge of a high bluff. The station is marked by a drill hole 2 inches deep with grooves cut in the rock on north-and-south and east-and-west lines intersecting at the center. The letters "U. S. G. S." are cut in the rock around the center. The rock is large, and no reference marks were considered necessary. In 1907 the station mark was recovered and found to be in good condition. The elevation of the station mark is 1,912 meters (6,273 feet).

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Rogers (Grayson-Smyth Counties, Va., A. H. Buchanan, 1894; 1907).—About 25 miles east from Abingdon, on Mount Rogers (locally known as Balsam), and on a large rock which is the highest point and easily found. The station is marked by an inch drill hole in the rock and two grooved lines extending north and south and east and west and with the letters "U. S. C. S." around the center. In 1907 the station mark was recovered and found to be in good condition. The elevation of the station mark is 1,745 meters (5,725 feet).

King (Gaston County, C. O. Boutelle, 1876; 1917).—About 3 miles southeast of Kings Mountain railway station on the Southern Railway (formerly known as The Atlanta & Richmond Air Line Railroad), about 26 miles west-southwest from Charlotte, on the highest point of Kings Mountain, and at an elevation of about 1,700 feet. The summit is a ridge of broken rocks about 200 yards long and with an average width of 15 feet, and the perpendicular height of the cliff at the station is 97 feet. The station is marked by a glass lamp shade plugged at both ends and filled with ashes; above this was built a brick platform, 5 feet square, with diagonals on north and south and east and west lines (true), and having a hole 8 inches square at the center. The station was recovered in 1917, but the brick platform had been partly torn away. The elevation of the station mark is 515.7 meters (1,692 feet).

Hogback (Greenville County, S. C., C. O. Boutelle, 1876).—About 15 miles southeast of Hendersonville, N. C., near the northeastern end of Hogback Range of mountains and on the highest point of this range. The surface of the mountain near the station is broad and flat, but the ascent is rough and steep. The station is marked by a cross, cut on the top of a stone post about 6 inches square, which also has the letters "U. S. C. S." cut on it. The underground mark is a glass bottle. There are four reference posts, similar to the one marking the center, north, east, south, and west of the station, each one about 6 feet from the station. An arrow cut in the top of each reference post points to the station. The elevation of the station mark is 984.4 meters (3,230 feet).

Wofford (Spartanburg County, S. C., C. O. Boutelle, 1876).—At Spartanburg, on the roof of Wofford College. The station is on the ridge of the roof, 49 feet from the south end and 32 feet from the north end. A tripod and scaffold signal was built on the roof, the ridge of the roof being 18.97 meters (62.25 feet) above the ground and the telescope 29.70 meters (97.43 feet) above the ground. There were four reference marks placed in the ground on the south and east sides of the college. Each reference mark was a stone post, 1 foot square and 3 feet long, buried its entire length in the ground and having on its exposed end two deep diagonal grooves with one groove pointing north and south and the letters "U. S. C. S." Two posts were in the meridian south of the station and the other two were due east of it. The nearest post to the south was 32.23 meters (105.74 feet) from the station and the other post was 89.13 meters (292.42 feet). The other two posts were 21 meters (68.90 feet) and 87.50 meters (287.07 feet) east of the station. The north and south and east and west lines through the posts intersect at the station. The elevation of the station mark on the roof of the building is 267.6 meters (878 feet).

Big Knob (Scott County, Va., A. H. Buchanan, 1893; 1907).—In the Clinch Mountain range, about 5½ miles northeast from Gate City, 2½ miles by road from Hiltons, stations on the Southern Railway (formerly South Atlantic & Ohio R. R.), and on a large rock level with the surface of the ground. The station is marked by a drill hole 2 inches deep with cross grooves in the rock intersecting at the center and extending north and south and east and west. The letters "U. S. C. S." surround the drill hole. The reference marks are three drill holes with arrows pointing to the station. The distances and azimuths from the station to the reference marks are as follows: 39.42 feet, 49° 01′; 21.67 feet, 78° 59′; and 49.67 feet, 122° 03′. In 1907 the station and reference marks were recovered and found to be in good condition. The elevation of the station mark is 962 meters (3,156 feet).

Big Butt (Madison County, A. H. Buchanan, 1892; 1907).—On or near the state boundary between North Carolina and Tennessee, at the northern extremity of Madison County, about 20 miles southeast from Greenville, Tenn., 15 miles south from Chuckey on the Southern Railway (East Tennessee, Virginia & Georgia Railway). The station is marked by a drill hole at the intersection of north and south and east and west grooved lines on a large rock which is set flush with the ground. There are three reference marks which are drill holes in rock in place with arrows pointing to the station. Distances and azimuths from the station are as follows: 16.87 feet, 301° 08′; 11.04 feet, 354° 01′; and

11.79 feet, 85° 00′. In 1907 the station and reference marks were recovered and found to be in good condition. The elevation of the station mark is 1,479 meters (4,852 feet).

Supplementary points.

Anderson (Catawba County, C. H. Sinclair, 1878).—About 10 miles southeast of Newton, about 15 miles southwest of Statesville, on the highest point of Anderson Mountain. The station is marked by a nail in a wooden stake flush with the surface of the ground. The elevation of the station mark is 471.6 meters (1,547 feet).

Statesville longitude (Iredell County, E. Smith, 1878).—In the grounds of Simonton College, southwest of the college building, 42.975 meters (140.99 feet) south and 22.387 meters (73.45 feet) west of the center of the cupola. The station is marked by a stone and brick pier.

PRECISE TRIANGULATION, EASTERN OBLIQUE ARC TO SANFORD, N. C.

Principal points.

Bull (Patrick County, Va., C. L. Garner, 1918).—About 6 miles north of Patrick Springs, which is a station on the Danville & Western Railway, on the top of Bull Mountain, and about 3 miles northwest of the home of L. S. Martin. The station and reference marks are bronze tablets set in rock, as described in notes 5 and 12*d*. Cairns of stones are piled around them. An old and poorly marked U. S. Geological Survey triangulation station is near. The reference mark is 7.55 meters (24.77 feet) from the station in azimuth 157° 33′. The U. S. Geological Survey triangulation station is 5.48 meters (17.98 feet) from the station in azimuth 351° 29′. The elevation of the station mark is 978.8 meters (3,211 feet).

Stuart (Patrick County, Va., C. L. Garner, 1918).—About 6 miles north of Patrick Springs, on the south shoulder of Bull Mountain, about 2 miles west of the home of L. S. Martin, at a point on the shoulder of the mountain where Buffalo Knob just clears the west spur of Bull Mountain and about the middle of the ridge. The station and reference marks are bronze tablets set in bowlders, as described in notes 5 and 12*d*. Stones are piled around the station mark. The reference mark is 5.80 meters (19.03 feet) from the station in azimuth approximately 197°. The elevation of the station mark is 858.6 meters (2,817 feet).

Cedder Mountain (Rockingham County, C. L. Garner, 1918).—About 4 miles north of Madison, 3 miles south of Stoneville, ¼ mile west of the Madison-Stoneville road, on the highest point of Cedar Point or Bonds Mountain, in an apple orchard known as Cedar Point orchard and owned by Joe Barker. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 10*a*, and 11*c*. The reference mark is about 1 yard northeast of an apple tree and 23.68 meters (77.7 feet) from the station in azimuth (magnetic) 192° 30′. The elevation of the station mark is 303.4 meters (995 feet).

Kernersville (Forsyth County, C. L. Garner, 1918.)—About 275 yards northwest of the Southern Railway station at Kernersville, under a steel water tank owned jointly by the Kernersville Furniture Co. and the Ring Furniture Co., whose factories are on the street which runs parallel to the Southern Railway, 1.23 meters (4.0 feet) west of the center pipe of the tank, which is in the middle of a lumberyard. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 10*a*. and 11*c*. The reference mark is about 5 yards north of the northeast corner of the power house of the Ring Furniture Co. and 36.51 meters (119.8 feet) from the station in azimuth 148° 39′. The elevation of the station mark is 310.2 meters (1,018 feet).

Ogburn (Guilford County, C. L. Garner, 1918).—About 4 miles south of Summerfield, 4 miles east of Stokesdale, in the edge of a cultivated field, on the property of J. B. Ogburn, about 700 yards southwest of Ogburn's house and at the edge of an oak grove. There are two persimmon trees about due west 150 yards from the station which is in the Y made by the county road from Greensboro and the road from Stokesdale, being about equidistant from both and about 400 yards southwest of their intersection. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 10*a*, and

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11c. The reference mark is in the edge of the oak grove, 32.45 meters (106.5 feet) from the station in azimuth 210° 19′. The elevation of the station mark is 277.9 meters (912 feet).

Guilford (Guilford County, C. L. Garner, 1918).—About ¾ mile from Guilford College railroad station, in the forks of the old Jamestown road and the Dobson road, about 30 yards from each road and 40 yards from their intersection, in a group of apple trees in the edge of a cultivated field owned by Green Staples. There are two honey locust trees about 10 yards northwest of the station. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 10*a*, and 11c. The reference mark is 1½ yards south of Dobson road, about 4 yards southeast of an oak tree, and 34.11 meters (111.9 feet) from the station in azimuth 178° 34′. The elevation of the station mark is 295.7 meters (970 feet).

High Point (Guilford County, C. L. Garner, 1918).—At High Point, on the east side of north Main Street, about 50 yards north of the grade crossing of the Southern Railway, on top of the Bank of Commerce Building. The station is not marked, the paper roof making this impossible. Distances and azimuths to various pipes on the roof are as follows: To pipe No. 1, near the northwest corner of the east wing of the building, 9.96 meters (32.7 feet), 185° 31′; to pipe No. 2, near the north edge of the east wing and east of the center, 12.52 meters (41.1 feet), 190° 26′; to pipe No. 3, near the south edge of the east wing, 9.91 meters (32.5 feet), 253° 26′; to pipe No. 4, near the south edge of the center portion of the building and near the east wing, 1.34 meters (4.4 feet), 298° 56′. The following measurements, to corners of the building, were made to inside corners on the roof: To the northwest corner of the east wing, 10.88 meters (35.70 feet); to the northeast corner of the east wing, 16.20 meters (53.15 feet); to the southeast corner of the east wing, 14.61 meters (47.93 feet); to the southwest corner of the east wing, 6.83 meters (22.41 feet); to the southeast corner of the elevator shaft house, 2.18 meters (7.15 feet); to the northeast corner of the elevator shaft house, 3.56 meters (11.68 feet). The elevation of the station mark on the roof of the building is 307.0 meters (1,007 feet).

Greensboro (Guilford County, C. L. Garner, 1918).—At Greensboro, on the corner of North Elm Street and Bellemeade Avenue, on the highest point of the O. Henry hotel, on the roof covering the hotel water tank. Distances and azimuths form the station to various points are as follows: To the southwest corner of the roof covering the tank, 5.57 meters (18.3 feet), 57° 23′; to the northwest corner of the building, 32.41 meters (106.3 feet), 133° 00′; to the northwest corner of the roof covering the tank, 3.2 meters (10.5 feet), 152° 51′; to the northeast corner of the roof covering the tank, 3.35 meters (11.0 feet), 267° 40′. Distances from the station to additional points are as follows: To the east corner of the ventilator hole that is south of the station, 1.56 meters (5.1 feet); to the west corner of the same ventilator hole, 1.51 meters (5.0 feet); to the north edge of the coping of the roof covering the tank (measured perpendicular to the coping), 1.77 meters (5.8 feet). The elevation of the station mark on the roof of the building is 285.8 meters (938 feet).

Climax (Guilford County, C. L. Garner, 1918).—About 1 mile east of Climax, on land owned by J. T. Ledbetter, about 5 yards east of a private road leading from the main Climax-Liberty highway to Ledbetter's house, about 200 yards north of the house, in the edge of pine woods and on the opposite side of the road from a cultivated field. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*d*, and 11*a*. The reference mark is about 1 yard east of the road and 29.22 meters (95.9 feet) from the station in azimuth 169° 40′. The elevation of the station mark is 256.637 meters (841.983 feet).

Asheboro (Randolph County, C. L. Garner, 1918).—About 3 miles northwest of Ashboro, on the top of Back Creek Mountain, 40 yards east of the highest point, on a flint bowlder, about equidistant from two oak trees and about 1 yard east of a line joining the two trees. The oak trees are about 1 foot in diameter and about 2½ yards apart. The station and reference marks are bronze tablets set as described in notes 4 and 12*a*. The azimuth (magnetic) from the station to the reference mark is 205° 30′. The elevation of the station mark is 337.3 meters (1,107 feet).

Liberty (Randolph County, C. L. Garner, 1918).—About 4 miles southwest of Liberty, on land owned by J. B. Breedlove, about 160 yards northeast of his house and about 15 yards east of a fork of roads. The southwest fork leads to

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Breedlove's house and the east fork runs about 8 yards west of the station. The station is on top of a solid white rock. The station and reference marks are bronze tablets set as described in notes 2 and 12*a*. The reference mark is set in solid rock, about 5 yards west of a cornfield, and 19.41 meters (63.7 feet) from the station in azimuth 141° 09′. The elevation of the station mark is 252.3 meters (828 feet).

Ramsure (Randolph County, C. L. Garner, 1918).—About 4½ miles south of Ramsure, on the top of Pilot Mountain (sometimes called Pine Mountain), in a bowlder about 40 yards north of the highest point of the mountain. The mountain belongs to Lee Silver, of Greensboro, and is covered with a growth of blackjack oaks, most of which around the top in the northeast and northwest quadrants were cut to clear lines. The station and reference marks are bronze tablets set as described in notes 4 and 12*c*. The reference mark is 14.01 meters (46.0 feet) from the station in azimuth 337° 37′. The elevation of the station mark is 278.5 meters (914 feet).

Siler (Chatham County, C. L. Garner, 1918).—About 2 miles west of Siler City, on land owned by R. H. Dixon, about 4 yards east of the property line running northeast and southwest which divides the lands of R. H. Dixon and J. J. D. Heckman and 4.70 meters (15.4 feet) southwest of a cornerstone. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*d*, and 11*a*. The reference mark is about 40 yards from a fork of the roads, 1 yard east of the left-hand road and 27.72 meters (90.9 feet) from the station in azimuth 355° 12′. The elevation of the station mark is 234.518 meters or 769.414 feet.

Paul Beck (Chatham County, M. Steinberg, 1918):—About 6 miles south of Bonlee, about 1 mile west of a stop on the Bonlee & Western Railway known as Beck Springs, in a small clearing on the highest point of Paul Beck Mountain. It is reached by following the road from Beck Springs west for about ½ mile and then turning to the right up the hill. The location of the station is well known to the inhabitants in the vicinity. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is 40.56 meters (133.1 feet) from the station in azimuth 17° 29′.

Ore Hill (Chatham County, M. Steinberg, 1918).—On the Southern Railway at Ore Hill, about ¼ mile west of the depot, at the topmost point of a hill, about 100 yards south of the track. The station and reference marks are bronze tablets set in concrete, as described in notes 3*b* and 11*a*. The reference mark is about 30 meters (98 feet) from the station in azimuth 266° 38′.

Carthage (Moore County, M. Steinberg, 1918).—About 2 miles east by south from the town of Carthage, 100 yards north of the highway between Carthage and Cameron, and about the same distance south of the railroad between these towns, on top of a flat highland which offers a good view of the surrounding country. Highway milepost No. 2 is about 100 yards south, and a telephone line runs 10 yards west of the station. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is to the south, toward the road, 65.0 meters (213.3 feet) from the station in azimuth 13° 33′.

Jonesboro (Lee County, C. L. Garner, 1918).—About 2 miles east of Sanford, on the Atlantic Coast Line Railroad, about 6 feet east of the town water tank at Jonesboro. The water tank is on the side of the hill north of the railroad station at Jonesboro and near the intersection of North Main Street and the road running to Swan's. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is in the northeast corner of the front yard of Elto Avant, about 2 yards west of the west edge of North Main Street, and 41.94 meters (137.6 feet) from the station in azimuth 352° 25′. The azimuth from the station to the tall steel water tank at Sanford is 132° 48′ and to a red steel standpipe at Sanford is 153° 44′.

Lemon (Lee County, C. L. Garner, 1918).—About 1 mile south of Lemon Springs, on the summit of a hill about ¼ mile west of the Seaboard Air Line Railway, near a road which crosses the railroad about ¼ mile south of milepost 207. At this crossing there is U. S. Coast and Geodetic Survey bench mark D 11. The said road intersects the main dirt road from Sanford to Southern Pines at a point about 100 yards northwest of the station. The station is about 75 yards east of the Sanford-Southern Pines road and is in a clearing surrounded by scrub oaks. The underground mark is a copper bolt set in concrete as described in note 7*b*. The station and reference marks are bronze tablets set in concrete as

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described in notes 1*a* and 11*c*. The reference mark is about 2 yards west of an oak tree and 22.21 meters (72.9 feet) from the station.

Foch (Moore County, C. L. Garner, 1918).—About ⅛ mile east of the railroad station at Southern Pines, on the top of a hill, in front of a house owned by Mrs. F. H. Galey, and about 25 yards west of the house which faces on Ridge Street. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is between the sidewalk and the edge of Ridge Street and 22.13 meters (72.6 feet) from the station in azimuth 127° 34′. Other azimuths from the station are: To a water tank at Southern Pines, 255° 18′; to the steeple of the Congregational Church, 140° 16′.

Swan (Lee County, C. L. Garner, 1918).—About ½ mile southwest of Swan which is a station about 8 miles southeast of Sanford on the Atlantic Coast Line Railroad, about 40 yards south of a public road running east from Jonesboro, in a cotton field on the land of C. W. Wicker, about 100 yards east of his house, about 20 yards west of a road which intersects the main highway at a point about 80 yards east of Wicker's house, and about 50 yards northwest of a persimmon tree. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is at the intersection of the roads, about 80 yards east of Wicker's house, 4 yards south of the public road running east from Jonesboro, and 36.02 meters (118.2 feet) from the station in azimuth 255° 14′.

Sanford (Lee County, C. L. Garner, 1918).—About 2 miles south of Sanford, about 15 yards south of a road or trail that crosses the Seaboard Air Line Railway at the north end of the second curve south of Sanford and ends at a small cabin that is about 95 yards southeast of the station on the top of a cultivated flat-topped hill, and about 100 yards north of two lone persimmon trees. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete as described in notes 1*a* and 11*c*. The reference mark is about 1 yard west of the southwest corner of the cabin and 83.10 meters (272.6 feet) from the station in azimuth 278° 31′. Other azimuths from the station are: To a tall steel water tank, 173° 58′; to a red steel standpipe about 2 miles north of Sanford, 197° 50′.

Allenby (Lee County, C. L. Garner, 1918).—About ½ mile south of the Colon railroad station, about 300 yards east of the Seaboard Air Line Railway, at the first curve south of Colon, on the land of J. F. Wicker, about 9 yards east of his house and 15 yards northeast of a large locust tree. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The reference mark is about 1 yard north of the northeast corner of the house and 11.34 meters (37.20 feet) from the station in azimuth 149° 23′.

PRECISE TRAVERSE, SANFORD, N. C., TO NORFOLK, VA.

Principal points and bench marks.

Bench mark **J 11.**—At **Colon**, Lee County, on the Seaboard Air Line Railway, 80 feet southeast of the depot, ¼ mile south of milepost 195, and 15 feet south of a road crossing. A concrete post with disk in top. (97.023 meters, or 318.316 feet.)

Bench mark **K 11.**—About ½ mile north of **Colon**, Lee County, on the Seaboard Air Line Railway, ½ mile north of milepost 195, and 10 feet west of the track, on the overhead trestle of the Norfolk Southern Railroad, in the northeast corner of the concrete abutment. A brass disk. (87.326 meters, or 286.502 feet.)

Bench mark **L 11.**—At **Osgood**, Lee County, on the Seaboard Air Line Railway, 65 feet southeast of the depot and 800 feet south of milepost 193, in the southeast quarter of a road crossing, about 15 feet south of the road. A concrete post with disk in top. (74.064 meters, or 242.992 feet.)

Osgood (Lee County, C. L. Garner, 1918).—About 1 mile north of Osgood railroad station, just east of the right of way of the Seaboard Air Line Railway, at the intersection of the tangents to the west rail, at the first curve north of Osgood, about 55 yards east of the railroad, and about 2 yards south of a 12-inch oak tree. The underground mark is a copper bolt set in concrete, as described

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in note 7b. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 27.20 meters (89.2 feet) from the station in azimuth 35° 39′.

Davis (Lee County, C. L. Garner, 1918).—About 2 miles north of the Seaboard Air Line Railway station at Osgood, at the second curve north of Osgood, at the intersection of the tangents to the west rail from the south and east rail from the north, at the first curve north of milepost 192, about 2 yards south of a drainage ditch, and 15 yards west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad from the station, on the side of a hill, 10 meters (33 feet) east of the rail, and 35.0 meters (115 feet) from the station in azimuth 287° 55′.

Gibbons (Lee County, C. L. Garner, 1918).—About 3 miles north of Osgood, on the Seaboard Air Line Railway, about 125 yards south of milepost 191, at the intersection of the tangents to the east rail from the south and the west rail from the north, between the crossties of the main track, and 0.40 meters (1.3 feet) west of the west rail. The station is marked by a nail in a 2 by 4 inch stake set in concrete.

Bench mark **M 11**.—About 3½ miles south of **Moncure**, Chatham County, on the Seaboard Air Line Railway, ½ mile north of milepost 191, 20 feet south of an overhead wagon-road crossing, and 35 feet west of the track. A concrete post with disk in top. (74.192 meters, or 243.412 feet.)

Espey (Lee County, C. L. Garner, 1918).—About ¼ mile north of Olives, on the right of way of the Seaboard Air Line Railway, about 125 yards north of the point of tangency of the first curve north of Olives, or the first curve south of milepost 190, on the tangent to the east rail from the north, about 4 yards offset from the tangent to the west rail from the south, and about 5 yards east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 15 yards east of the east rail, about 3 yards south of a telephone pole, and 29.50 meters (96.78 feet) from the station in azimuth 214° 10′.

Farley (Lee County, C. L. Garner, 1918).—About ¾ mile north of Olives, on the right of way of the Seaboard Air Line Railway, at the intersection of the tangents to the east rails at the first curve north of milepost 190 and 13.58 meters (44.6 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track from the station, 5 yards east of the edge of a cut, and 27.54 meters (90.35 feet) from the station in azimuth 288° 19′. The elevation of the station mark is 66.744 meters, or 218.976 feet.

Bench mark **N 11**.—About 1½ miles south of **Moncure**, Chatham County, on the Seaboard Air Line Railway, ½ mile north of milepost 189, in the southwest quarter of a road crossing, 25 feet south of the road and 35 feet west of the track. A concrete post with disk in top. (62.206 meters, or 204.088 feet.)

Dro (Chatham County, M. Steinberg, 1918).—About ¼ mile south of the Seaboard Air Line Railway station at Moncure, at the first curve south of the station, on the left rail tangent toward the station, on level ground at the bottom of a fill, about 30 yards west of the track, 80 yards south of a section house, and 100 yards north of a bridge over Deep River. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 20 yards west of the track and 23.09 meters (75.8 feet) from the station in azimuth 254° 50′.

Bench mark **O 11**.—At **Moncure**, Chatham County, on the Seaboard Air Line Railway, 80 feet north of the depot, ¼ mile south of milepost 187, and 15 feet west of the main track. A concrete post with disk in top. (59.432 meters, or 194.986 feet.)

Moncure (Chatham County, M. Steinberg, 1918).—About ½ mile north of the Seaboard Air Line Railway station at **Moncure**, on the first curve north of the station, on the line of the left rail tangent toward the station, about 40 yards west of the west rail, in a field at the bottom of a fill, and about 55 yards south of a negro house. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete,

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as described in notes 1*a* and 11*a*. The reference mark is about 30 yards from the track and 29.23 meters (95.9 feet) from the station in azimuth 298° 17′. The elevation of the station mark is 61.423 meters, or 201.519 feet.

Dri (Chatham County, M. Steinberg, 1918).—About ¾ mile north of the Seaboard Air Line Railway station at **Moncure,** on the first curve north of the station, about 8 yards north of the north rail, and 10 yards west of a small barn on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 10 yards from the track and 31.92 meters (104.7 feet) from the station in azimuth 303° 05′. The elevation of the station mark is 67.361 meters, or 221.000 feet.

Dre (Chatham County, M. Steinberg, 1918).—About 1 mile north of the Seaboard Air Line Railway station at **Moncure,** on the first curve south of the Haw River, on the line of the right rail tangent toward the river, about 20 yards south of the south rail, and at the foot of a fill. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is in a pine thicket 22.64 meters (74.3 feet) from the station in azimuth 100° 13′. The elevation of the station mark is 59.658 meters, or 195.728 feet.

Dra (Chatham County, M. Steinberg, 1918).—About 2 miles north of the Seaboard Air Line Railway station at **Moncure,** on the first curve north of Haw River, on the line of the left-rail tangent toward the river, in a cornfield about 105 yards south of the track, and 10 yards west of a wagon road leading through the field. The underground mark is a nail set in concrete, as described in note 7*c*. The station and underground marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is about 2 yards northeast of the road and 20.49 meters (67.2 feet) from the station in azimuth 224° 06′. The elevation of the station mark is 59.097 meters, or 193.887 feet.

Doz (Chatham County, M. Steinberg, 1918).—About 2½ miles north of the Seaboard Air Line Railway station at **Moncure,** on the second curve north of Haw River, about 265 yards south of milepost 184, 55 yards south of a pipe culvert under the track, and about 25 yards east of the east rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is about 30 yards from the track, at the edge of the woods, and 14.6 meters (47.9 feet) from the station in azimuth 253° 08′. The elevation of the station mark is 61.565 meters, or 201.985 feet.

Doy (Chatham County, M. Steinberg, 1918).—About 1 mile south of the Seaboard Air Line Railway station at **Merry Oaks,** at about the middle of the short tangent between the first and second curves south of the station, 6 yards west of the west rail, 30 yards north of a wagon-road crossing, 80 yards south of a negro house on the opposite side of the track. The station is marked by a nail in the top of a 4 by 4 inch post which projects 1 foot above the ground. The reference mark is a railroad spike in the east face of an oak tree 6.10 meters (20.0 feet) from the station in azimuth 172° 54′. The elevation of the station mark is 73.947 meters, or 242.608 feet.

Dox (Chatham County, M. Steinberg, 1918).—About ¾ mile south of the Seaboard Air Line Railway station at **Merry Oaks,** at the north end of the first curve south of the station, on the line of the right-rail tangent toward the station, on the west side of the track, on top of a 2-foot cut, 30 yards north of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is at the edge of the woods, 25 yards west of the track, and 25.10 meters (82.3 feet) from the station in azimuth 213° 36′. The elevation of the station mark is 75.236 meters, or 246.837 feet.

Dow (Chatham County, M. Steinberg, 1918).—About 1¼ miles north of the Seaboard Air Line Railway station at **Merry Oaks,** at the top of the highest rise north of the station, about 9 yards west of the west rail, on the top of a 12-foot cut, 25 yards north of a whistle post, and directly across the track from a "Railroad Crossing" sign. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track, 2 yards west of a highway, and 40.74 meters (133.7 feet) from the station in azimuth 326° 10′. The elevation of the station mark is 94.922 meters, or 311.423 feet.

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Dov (Wake County, M. Steinberg, 1918).—About 1 mile north of the Seaboard Air Line Railway station at **Newhill**, at about the middle of the first curve north of the station, on the line of the left-rail tangent toward the station, about 15 yards west of the west rail, at the east side of a highway, 55 yards north of a road crossing, and 80 yards south of a negro dwelling on the same side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 10 yards west of the track and 20.0 meters (65.6 feet) from the station in azimuth 247° 12′. The elevation of the station mark is 108.678 meters, or 356.554 feet.

Dot (Wake County, M. Steinberg, 1918).—About 3¼ miles south of the Seaboard Air Line Railway station at **Apex**, near the end of the third curve south of the station, 12.8 meters (42 feet) east of the east rail, in a cotton field, 6 yards north of a whistle post, and 55 yards south of a negro dwelling. The station is marked by a nail in the top of a 4 by 4 inch post which projects 1 foot above the ground. The reference mark is 25 yards east of the track and 18.3 meters (60 feet) from the station in azimuth 39° 18′. The elevation of the station mark is 118.888 meters, or 390.052 feet.

Dos (Wake County, M. Steinberg, 1918).—About 3 miles south of the Seaboard Air Line Railway station at **Apex**, at the beginning of the third curve south of the station, 4.74 meters (15.6 feet) east of the east rail, 6 yards north of a highway crossing, and about 75 yards south of a negro house on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track, 1 yard south of a telegraph pole, 25.10 meters (82.3 feet) from the station in azimuth 98° 08′. The elevation of the station mark is 121.244 meters, or 397.781 feet.

Dor (Wake County, M. Steinberg, 1918).—About 2 miles south of the Seaboard Air Line Railway station at **Apex**, at the south end of the second curve south of the station, on the line of the left-rail tangent looking toward Apex, 8.8 meters (29 feet) east of the east rail, 125 yards north of a road crossing, and about 100 yards north of a small cabin. The underground mark in a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a spike in the northwest side of a large oak tree 23.17 meters (76 feet) from the station in azimuth 332° 41′. The elevation of the station mark is 127.035 meters, or 416.781 feet.

Dop (Wake County, M. Steinberg, 1918).—About 1½ miles south of the Seaboard Air Line Railway station at **Apex**, at the second curve south of the station, on the line of the left-rail tangent toward the station, about 100 yards west of the track, in a cultivated field, 20 yards south of a wagon road, and 140 yards north of a road crossing. The station is marked by a nail in the top of a 4 by 4 inch post projecting 1 foot above the ground. The reference mark is a railroad spike in the southeast side of a large oak tree 139 meters (456 feet) from the station in azimuth 264° 56′. The elevation of the station mark is 138.216 meters, or 453.464 feet.

Don (Wake County, M. Steinberg, 1918).—About 1 mile south of the Seaboard Air Line Railway station at **Apex**, at the south end of the first curve south of the station, about 9 yards east of the east rail, about 200 yards south of a road crossing, and 40 yards south of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is about 5 yards east of the track, near the whistle post, and 18.5 meters (60.7 feet) from the station in azimuth 255° 59′. The elevation of the station mark is 143.130 meters, or 469.586 feet.

Baldwin (Wake County, M. Steinberg, 1918).—About ½ mile south of the Seaboard Air Line Railway station at **Apex**, at the north end of the first curve south of the station, on the line of the right rail tangent toward the station, about 60 yards east of the east rail, in the yard of a negro dwelling, about 40 yards northwest of the house, and 55 yards north of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is in front of the house and 34.5 meters (113 feet) from the station in azimuth 54° 47′. The elevation of the station mark is 147.962 meters, or 485.439 feet.

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Apex (Wake County, M. Steinberg, 1918).—About 210 yards north of the Seaboard Air Line Railway station at **Apex**, 50 yards south of the crossing of the Durham & Southern Railway, and 1.5 meters (5 feet) east of the east rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the northeast corner of the railway station 195.0 meters (640 feet) from the station in azimuth 29° 44′. The elevation of the station mark is 153.952 meters, or 505.091 feet.

Dom (Wake County, M. Steinberg, 1918).—About 1½ miles north of the Seaboard Air Line Railway station at **Apex**, at the south end of the first curve north of the station, on the line of the left rail tangent toward the station, 4 yards west of the top of the slope of a deep cut, about 20 yards above the track, and 140 yards north of a road crossing. The underground mark is a nail in concrete, as described in note 7*c*. The station mark is a nail in the top of a 4 by 4 inch post projecting 1 foot above the ground. The reference mark is a railroad spike in the west side of the largest pine tree on the opposite side of the track, 63.54 meters (208.5 feet) from the station in azimuth 329° 26′. The elevation of the station mark is 137.225 meters, or 450.212 feet.

Dol (Wake County, M. Steinberg, 1918).—About 2 miles north of the Seaboard Air Line Railway station at **Apex**, at the north end of the first curve north of the station, 17.64 meters (57.9 feet) west of the west rail, on level ground midway between the track and a highway, and about 40 yards north of a small dwelling on the opposite side of the road. The underground mark is a nail set in concrete, as described in note 7*c*. The station and underground marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 8 yards west of the highway and 17.28 meters (56.7 feet) from the station in azimuth 88° 28′. The elevation of the station mark is 134.913 meters, or 442.627 feet.

Dok (Wake County, M. Steinberg, 1918).—About 3½ miles north of the Seaboard Air Line Railway station at **Apex**, at the south end of the second curve north of the station, about 9 yards east of the east rail, on top and 2 yards from the edge of a cut, about 100 yards from a whistle post, and 65 yards south from a negro dwelling on the same side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 17.92 meters (58.8 feet) from the station in azimuth 289° 04′. The elevation of the station mark is 143.706 meters, or 471.475 feet.

Dol (Wake County, M. Steinberg, 1918).—About 2 miles south of the Seaboard Air Line Railway station at **Cary**, on the second curve south of the station, on the line of the left rail tangent toward the station, 34 yards east of the track, in a field, 3 yards east of a wagon road leading through the field, about south along the track from a dwelling. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the wagon road, 10 yards west of the track, and 21.87 meters (71.8 feet) from the station in azimuth 85° 29′. The elevation of the station mark is 139.960 meters, or 459.185 feet.

Doh (Wake County, M. Steinberg, 1918).—About 1 mile south of the Seaboard Air Line Railway station at **Cary**, at the south end of the first curve south of the station, 7.5 meters (25 feet) west of the west rail, 55 yards north of a road crossing, at the bottom of a fill, and 10 yards northeast of a large oak tree. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the other side of the wagon road 56.40 meters (185 feet) from the station in azimuth 35° 37′. The elevation of the station mark is 140.424 meters, or 460.708 feet.

Doj (Wake County, M. Steinberg, 1918).—About ¾ mile south of the Seaboard Air Line Railway station at **Cary**, at the north end of the first curve south of the station, on the right rail tangent toward the station, 55 yards north of milepost 166, 11.10 meters (36.4 feet) north of the north rail, and about 3 feet higher than the track. The station is marked by a nail in the top of a 4 by 4 inch post. The reference mark is a railroad spike in the south side of a large oak tree 81.0 meters (266 feet) from the station in azimuth 250° 39′. The elevation of the station mark is 146.352 meters, or 480.157 feet.

Dof (Wake County, M. Steinberg, 1918).—About 670 yards west of the Seaboard Air Line Railway station at **Cary**, about 5 yards south of the south rail of the main track, 60 yards east of a semaphore signal, and directly in front of a

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large yellow house on the same side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, at the edge of a cultivated field, 10 yards south of the semaphore, and 56.50 meters (185.4 feet) from the station in azimuth 74° 56′. The elevation of the station mark is 148.608 meters, or 487.558 feet.

Cary (Wake County, M. Steinberg, 1918).—At Cary, on top of the Cary High School Building, at about the middle point of the north bay of the roof, 1.25 meters (4.1 feet) from the north end, and 1.5 meters (5 feet) east of a flagpole. The reference mark is a bronze tablet set in the north face of the east chimney, 2 feet above the roof, and 10.6 meters (35 feet) from the station in azimuth 328° 25′.

Bench mark **L 20.**—At **Raleigh**, Wake County, on the Southern Railway, at the southwest corner of the Agricultural Building of the North Carolina State College, in the south face of the foundation. A brass disk. (123.679 meters, or 405.770 feet.)

Raleigh (Wake County, M. Steinberg, 1918).—At Raleigh, on the top of the Citizens National Bank Building, near the northwest corner of the roof of the elevator house. Distances from the station to various points are as follows: To the northwest corner of the roof of the elevator house, 1.962 meters (6.44 feet); to the southwest corner of the same, 4.472 meters (14.67 feet); to the southeast corner of the same, 5.880 meters (19.29 feet); to the southwest corner of the chimney in the northeast corner of the elevator house roof, 3.293 meters (10.80 feet). The reference mark is a bronze tablet set in the inner side of the parapet at the southeast corner of the roof of the bank building, 20.60 meters (67.6 feet) from the station in azimuth 295° 11′.

Bench mark **I 20.**—At **Raleigh**, Wake County, at the northwest corner of the post office, in the north face of the foundation. A brass disk. (104.134 meters, or 341.646 feet.)

Bench mark **J 20.**—At **Raleigh**, Wake County, at the southeast corner of the Union Depot, in the south face of the foundation. A brass disk. (98.222 meters, or 322.250 feet.)

For additional bench marks at Raleigh see pages 78, 79, and 105.

Bench mark **H 20.**—About 3 miles north of **Raleigh**, Wake County, on the Seaboard Air Line Railway, on the south abutment of the trestle over Crabtree Creek, in the southeast corner of the abutment on the east side of the track. A brass disk. There are no triangulation or traverse data for this mark. (70.750 meters, or 232.119 feet.)

Hilltop (Wake County, M. Steinberg, 1918).—About 1½ miles north of the railway station at **Millbrook**, about ¼ mile east of the Seaboard Air Line Railway, in the yard adjoining the house of W. P. Wiggins, 50 yards east of the east end of the house, 80 yards south of a county road, and on the highest hill in the vincinity. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in south face of the chimney of the Wiggins house, 68.2 meters (224 feet) from the station in azimuth 93° 35′. The elevation of the station mark is 108.746 meters, or 356.777 feet.

Bench mark **D 20.**—About 1½ miles north of **Neuse**, Wake County, on the Seaboard Air Line Railway, at the north end of the trestle over the Neuse River, on the top face of the abutment on the west side of the track. A brass disk. There are no triangulation or traverse data for this mark. (71.528 meters, or 234.671 feet.)

Dob (Wake County, M. Steinberg, 1918).—About 2¾ miles south of the Seaboard Air Line Railway station at **Wake Forest**, on the top of a cut, about 8 feet higher than the track, at the edge of a cultivated field, 3 yards west of a small road leading to a negro house about 65 yards away and 12.05 meters (39.5 feet) east of the east rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set as described in notes 1*a* and 12*b*. The reference mark is on the opposite side of the track, in the east face of a large rock, and 31.00 meters (101.7 feet) from the station in azimuth 78° 59′. The elevation of the station mark is 100.988 meters, or 331.325 feet.

Diz (Wake County, M. Steinberg, 1918.).—About 2½ miles south of the Seaboard Air Line Railway station at **Wake Forest**, about 330 yards south of mile-

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post 143, on top of a small cut, 4 feet above the track, 130 yards south of a road crossing leading to a house on the opposite side of the track, about 55 yards south of a large white house on the same side of the track, and 7.98 meters (26.2 feet) east of the east rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track 17.00 meters (55.8 feet) from the station in azimuth 233° 19′. The elevation of the station mark is 102.520 meters, or 336.351 feet.

Dix (Wake County, M. Steinberg, 1918.—About 2 miles south of **Wake Forest** depot, on the Seaboard Air Line Railway, about 690 yards north of milepost 143, 7.29 meters (23.9 feet) east of the east rail, about 3 feet above the track, and 3 yards west of a telegraph pole. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete as described in note 1*a*. The reference mark is a bronze tablet set in concrete 24.05 meters (78.9 feet) from the station in azimuth 113° 47′. The elevation of the station mark is 105.570 meters, or 346.358 feet.

Div (Wake County, M. Steinberg, 1918).—About 1½ miles south of the **Wake Forest** depot, on the Seaboard Air Line Railway, on the second curve south of the depot, about 50 yards south of milepost 142, 65 yards west of a small house, 55 yards north of a yellow house on the opposite side of the track, in a cotton field, and 30.9 meters (101 feet) east of the east rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the north face of the stone chimney of a house, 99.6 meters (327 feet) from the station in azimuth 65° 37′. The elevation of the station mark is 113.912 meters or 373.726 feet.

Dit (Wake County, M. Steinberg, 1918).—About ¾ mile south of the Seaboard Air Line Railway station at **Wake Forest**, on the second curve south of the station, on the line of the left rail tangent toward Forestville, on the west side of the track, about 15 feet lower than the track, and about 20 yards south of a large yellow house on the other side of a highway. The station is marked by a nail in a 4 by 4 inch post. The reference mark is a spike driven in the southeast side of a large tree in the yard of a small galvanized house on the other side of the track and is 140.0 meters (459 feet) from the station in azimuth 232° 21′. The elevation of the station mark is 115.491 meters, or 378.907 feet.

Dis (Wake County, M. Steinberg, 1918).—About 750 yards south of the Seaboard Air Line Railway station at **Wake Forest**, on the first curve south of the station, on the line of the left rail tangent toward the station, 10 yards north of a negro house, and about 20 yards east of the east rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east corner of the brick bottling works 60.0 meters (197 feet) from the station in azimuth 173° 08′. The elevation of the station mark is 121.408 meters, or 398.319 feet.

Bench mark **V 9**.—At **Wake Forest**, Wake County, northeast of the Seaboard Air Line Railway depot, in the southwest corner of the red brick building nearest the track, and occupied by the store of the Powers Drug Co. A brass disk. (122.020 meters, or 400.327 feet.)

Bench mark **W 9**.—At **Wake Forest**, Wake County, 500 feet south of the Seaboard Air Line Railway depot, 38 feet east of the track, at the northwest corner of the Elvis Gill Building, in the west face. A brass disk. (123.360 meters, or 404.724 feet.)

Forrest (Wake County, M. Steinberg, 1918).—About 350 yards north of the Seaboard Air Line Railway station at **Wake Forest**, on the first curve north of the station, on the line of the right rail tangent toward the station, on the west side of the track, in a small ditch, 4 feet below the track, 55 yards north of a road crossing and about 100 yards east of a red brick house. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is at the road crossing, 10 yards west of the track, 3 yards north of the road, and 45.31 meters (148.7 feet) from the station in azimuth 25° 46′. The elevation of the station mark is 120.668 meters, or 395.892 feet.

Dir (Wake County, M. Steinberg, 1918).—About 880 yards north of the Seaboard Air Line Railway station at **Wake Forest**, 10 yards north of milepost 140, 1 yard east of a fence, and 15.66 meters (51.4 feet) west of the west rail. The underground mark is a nail set in concrete, as described in note 7*c*. The

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station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the southeast pier under a house 12.64 meters (41.5 feet) from the station in azimuth 101° 34′. The elevation of the station mark is 125.752 meters, or 412.571 feet.

Dip (Wake County, M. Steinberg, 1918).—About 1¼ miles north of the Seaboard Air Line Railway station at **Wake Forest**, on the second curve north of the station, on the line of the right rail tangent toward the station, 20.38 meters (66. 9 feet) east of the east rail, 55 yards south of a wagon road crossing and fork of the roads, and 1 yard west of a highway. The station is marked by a nail in a 4 by 4 inch post projecting 18 inches above the ground. The reference mark is a spike driven in the east side of the largest oak tree on the opposite side of the track 61.15 meters (200.6 feet) from the station in azimuth 129° 07′. The elevation of the station mark is 132.523 meters, or 434.786 feet.

Dim (Wake County, M. Steinberg, 1918).—About 1½ miles north of the Seaboard Air Line Railway station at **Wake Forest**, about 185 yards north of milepost 139, 7.66 meters (25. 1 feet) west of the west rail, 1 yard west of the edge of the top of a cut, and 2 yards east of the edge of a cotton field. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track 33.43 meters (109.7 feet) from the station in azimuth 256° 26′. The elevation of the station mark is 139.344 meters, or 457.164 feet.

Wake (Wake County, M. Steinberg, 1918).—About 1¼ miles south of the Seaboard Air Line Railway station at **Youngsville**, on the first curve south of the station, about 970 yards south of milepost 137, 11.73 meters (38.5 feet) east of the east rail, on top of a cut, 130 yards south of a road crossing, and 75 yards north of a house on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, 2 yards west of a highway, and 36.70 meters (120.4 feet) from the station in azimuth 217° 45′. The elevation of the station mark is 144.193 meters, or 473.073 feet.

Youngsville (Franklin County, M. Steinberg, 1918).—About ¾ mile south of the Seaboard Air Line Railway station at **Youngsville**, at the beginning of the first curve south of the station, on the line of the left rail tangent toward the station, about 530 yards south of milepost 137, 16 yards east of the east rail, on the bank of a cut, 8 yards west of a cornfield, about 300 yards north of a road crossing, and 22 yards south of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track 43.82 meters (143.8 feet) from the station in azimuth 135° 59′. The elevation of the station mark is 143.389 meters (470.435 feet) and of the reference mark 142.059 meters (466.072 feet).

Dil (Franklin County, M. Steinberg, 1918).—About ¾ mile north of the Seaboard Air Line Railway station at **Youngsville**, on the first curve north of the station, on the line of the right rail tangent toward the station, about 55 yards north of milepost 136, on top of a small cut, about 8 yards east of the east rail, 7 yards south of a switch target, and 5 yards west of a wagon road. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is directly across the track, on top of the cut, and 25.0 meters (82 feet) from the station in azimuth 61° 53′. The elevation of the station mark is 135.689 meters (445.173 feet) and of the reference mark 137.120 meters (449.868 feet).

Dik (Franklin County, M. Steinberg, 1918).—About 1 mile north of the Seaboard Air Line Railway station at **Youngsville**, at the north end of the first curve north of the station, on top of a cut, 7.0 meters (23 feet) east of the east rail, 2 yards from the edge of the cut, and 5 yards west of a country road running parallel to the track. The station is marked by a nail in the top of a 4 by 4 inch post. The reference mark is a nail driven in the east face of the largest pine tree 12.00 meters (39.4 feet) from the station in azimuth 221° 56′. The elevation of the station mark is 135.158 meters, or 443.431 feet.

Dig (Franklin County, M. Steinberg, 1918).—About 1¼ miles north of the Seaboard Air Line Railway station at **Youngsville**, at the beginning of the second curve north of the station, on the line of the right rail tangent toward the station, about 440 yards south of milepost 135, and 1.61 meters (5.3 feet) west of the

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west rail. The station is marked by a nail in the top of a 4 by 4 inch post The reference mark is a spike driven in the west side of a large pine tree 23.65 meters (77.6 feet) from the station in azimuth 192° 05′. The elevation of the station mark is 130.129 meters, or 426.932 feet.

Tank (Franklin County, M. Steinberg, 1918.—About 1½ miles north of the Seaboard Air Line Railway station at **Youngsville,** on the second curve north of the station, on the line of the right rail tangent toward Franklinton, 40 yards north of milepost 135, 1.80 meters (5.9 feet) west of the west rail, and 25 yards south of Brandy Creek water tank. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the west face of a stone post under the water tank 22.85 meters (75.0 feet) from the station in azimuth 185° 17′. The elevation of the station mark is 128.913 meters, or 422.942 feet.

Dif (Franklin County, M. Steinberg, 1918.—About 2 miles north of the Seaboard Air Line Railway station at **Youngsville,** on the first curve north of a water tank, about 440 yards south of milepost 134, on the line of the left rail tangent toward Youngsville, about 25 yards west of the west rail, on level ground about 12 yards from the top of the bank of a cut, and 10 yards north of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station and underground marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, 2 yards west of the edge of the cut, and 30 meters (98 feet) from the station in azimuth 204° 14′. The elevation of the station mark is 137.145 meters (449.950 feet) and of the reference mark 136.256 meters (447.033 feet).

Did (Franklin County, M. Steinberg, 1918).—About 3¾ miles south of the Seaboard Air Line Railway station at **Franklinton,** on the fourth curve south of the station, 8 yards north of milepost 134, 40 yards south of a road crossing, 16 yards south of a water-tank sign, and 12.20 meters (40 feet) west of the west rail on top of a small rise. The station is marked by a nail in the top of 4 by 4 inch cedar post which projects 1 foot above ground. The reference mark is a spike driven in the west side of an oak tree on the opposite side of the track 55.36 meters (181.6 feet) from the station in azimuth 242° 45′. The elevation of the station mark is 135.189 meters, or 443.533 feet.

Dic (Franklin County, M. Steinberg, 1918).—About 3½ miles south of the Seaboard Air Line Railway station at **Franklinton,** about 300 yards north of milepost 134, 1.73 meters (5.7 feet) west of the west rail, at the foot of a cut, 2 yards south of a whistle post, and north of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of and 9 yards from the track, and 140.91 meters (462.3 feet) from the station in azimuth 65° 42′. The elevation of the station mark is 133.361 meters (437.535 feet) and of the reference mark 134.826 meters (442.342 feet).

Dib (Franklin County, M. Steinberg, 1918).—About 2½ miles south of the Seaboard Air Line Railway station at **Franklinton,** at the end of the second curve south of the station, on the line of the right rail tangent toward Youngsville, about 400 yards north of milepost 133, 3 yards east of the east rail, at the foot of a steep cut, and 1 foot below the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track 30.0 meters (98 feet) from the station in azimuth 57° 26′. The elevation of the station mark is 120.407 meters (395.035 feet) and of the reference mark 120.609 meters (395.698 feet).

Dez (Franklin County, M. Steinberg, 1918).—About 2⅝ miles south of the Seaboard Air Line Railway station at **Franklinton,** on the second curve south of the station, about 680 yards north of milepost 133, 13.8 meters (45.3 feet) east of the east rail, and 5 yards north of a small country road crossing. The station is marked by a nail in a 4 by 4 inch cedar post projecting 1 foot above ground. The reference mark is a railroad spike in the east side of the largest pine tree directly across the track 28.03 meters (92.0 feet) from the station in azimuth 131° 48′. The elevation of the station mark is 118.193 meters, or 387.772 feet.

Dey (Franklin County, M. Steinberg, 1918).—About 2⅛ miles south of the Seaboard Air Line Railway station at **Franklinton,** at the beginning of the second curve south of the station, about 660 yards south of milepost 132, and 13.89 meters (45.6 feet) east of the east rail. The underground mark is a nail set

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in concrete, as described in note 7c. The station mark is a nail in a 4 by 4 inch cedar post projecting 1 foot above the ground. The reference mark is a railroad spike driven in the west side of the largest sweet-gum tree in the vicinity, 18.01 meters (59.1 feet) from the station in azimuth 194° 20′. The elevation of the station mark is 115.610 meters, or 379.297 feet.

Dex (Franklin County, M. Steinberg, 1918).—About 1¾ miles south of the Seaboard Air Line Railway station at **Franklinton**, at the end of the first curve south of the station, on the line of the left rail tangent toward Youngsville, about 80 yards north of milepost 132, 190 yards north of a railway trestle, at the top of a fill, and 1.65 meters (5.4 feet) west of the west rail. The station mark is a nail in the top of a cedar post projecting 1 foot above the ground. The reference mark is a bronze tablet set in the west side of the trestle 178.97 meters (587.2 feet) from the station in azimuth 354° 33′. The elevation of the station mark is 115.099 meters (377.621 feet) and of the reference mark 113.665 meters (372.916 feet).

Dew (Franklin County, M. Steinberg, 1918).—About 1½ miles south of the Seaboard Air Line Railway station at **Franklinton**, at the beginning of the first curve south of the station, on the line of the left rail tangent toward the station, 380 yards north of milepost 132, about 8 yards west of the west rail, on top of the highest point of a cut and 1 yard from the top of the slope, and about 15 yards south of a cultivated field surrounding a negro house which is about 80 yards to the north. The underground mark is a nail set in concrete, as described in note 7c. The station and reference marks are bronze tablets set in concrete as described in notes 1a and 11a. The reference mark is 15 yards west of the track, at the edge of a field, and 16.84 meters (55.2 feet) from the station in azimuth 184° 22′. The elevation of the station mark is 121.944 meters (400.078 feet) and of the reference mark 120.877 meters (396.577 feet).

Bench mark **V 8**.—At **Franklinton**, Franklin County, on the Seaboard Air Line Railway, at the northeast corner of the bank building, in the east face. A brass disk. (131.725 meters or 432.168 feet.)

Franklinton (Franklin County, M. Steinberg, 1918).—About 450 yards north of the Seaboard Air Line Railway station at **Franklinton**, on the first curve north of the station, 110 yards south of milepost 130, 15.10 meters (49.5 feet) east of the east rail, in a cultivated field, 3 yards south of a whistle post, and 55 yards west of a small yellow house. The underground mark is a nail set in concrete, as described in note 7c. The station and reference marks are bronze tablets set in concrete, as described in notes 1a and 11a. The reference mark is 8 yards east of the track, at the edge of a cultivated field, and 22.12 meters (72.6 feet) from the station in azimuth 28° 30′. The elevation of the station mark is 131.937 meters (432.863 feet) and of the reference mark 131.219 meters (430.508 feet).

Deter (Franklin County, M. Steinberg, 1918).—About 1⅛ miles north of the Seaboard Air Line Railway station at **Franklinton**, at about the middle of the second curve north of the station, on the line of the left rail tangent toward the station, 7.15 meters (23.5 feet) west of the west rail; about 520 yards south of milepost 129, and 120 yards south of the yard-limit sign. The underground mark is a nail set in concrete, as described in note 7c. The station and reference marks are bronze tablets set in concrete, as described in notes 1a and 11a. The reference mark is on the same side of the track, about 9 yards west of the rail, and 24.90 meters (81.7 feet) from the station in azimuth 5° 20′. The elevation of the station mark is 132.253 meters (433.900 feet) and of the reference mark 131.428 meters (431.193 feet).

Det (Franklin County, M. Steinberg, 1918; 1919).—About 2¼ miles north of the Seaboard Air Line Railway station at **Franklinton**, on the third curve north of the station, on the line of the left rail tangent toward Franklinton, about 400 yards south of milepost 128, 7.66 meters (25.1 feet) east of the east rail, at the bottom of a fill, 6 feet below the track, 220 yards south of a small railroad trestle (No. 29.3), and 10 yards west of a highway. The underground mark is a nail set in concrete, as described in note 7c. The station mark is a nail in a 4 by 4 inch stake driven in the ground. The reference mark is a bronze tablet set in the top of a concrete culvert at the trestle, 3 feet west of the track, and 193.61 meters (635.2 feet) from the station in azimuth 183° 47′. The elevation of the station mark is 118.252 meters (387.965 feet) and of the reference mark 118.144 meters (387.611 feet).

Des (Franklin County, M. Steinberg, 1918).—About 2½ miles north of the Seaboard Air Line Railway station at **Franklinton**, about 310 yards north of

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milepost 128, 12.18 meters (40.0 feet) east of the east rail, 65 yards north of a small road crossing, 55 yards north of the south end of a tobacco field, on the line of the tangent of the right rail toward Kittrell, and on the third curve north of Franklinton. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track 36.90 meters (121.1 feet) from the station in azimuth 8° 57′. The elevation of the station mark is 114.045 meters (374.163 feet) and of the reference mark 114.579 meters (375.915 feet).

Der (Franklin County, M. Steinberg, 1918; 1919).—About 3¼ miles north the Seaboard Air Line Railway station at **Franklinton**, on the fourth curve north of the station, 8 yards north of milepost 127, on the line of the left rail tangent toward Franklinton, 11.70 meters (38.4 feet) west of the west rail, at the bottom of a fill, and 5 yards east of a highway. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is directly across the highway 14.71 meters (48.3 feet) from the station in azimuth 76° 05′. The elevation of the station mark is 102.816 meters (337.322 feet) and of the reference mark 104.593 meters (343.152 feet).

Dep (Franklin County, M. Steinberg, 1918).—About 3½ miles north of the Seaboard Air Line Railway station at **Franklinton**, about 1,200 yards south of milepost 126, at the end of the first curve south of the bridge over Tar River, 7.15 meters (23.5 feet) east of the east rail, on top of and 1 yard east of the edge of a small cut, 55 yards south of a rock formation in the cut, and 5 yards south of the north edge of a cornfield on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the rock, at the south end of the rock formation in the cut, 2 feet above ground, and 64.03 meters (210.1 feet) from the station in azimuth 199° 08′. The elevation of the station mark is 102.564 meters (336.495 feet) and of the reference mark 101.356 meters (332.532 feet).

Deo (Franklin County, M. Steinberg, 1918).—About 3¾ miles north of the Seaboard Air Line Railway station at **Franklinton**, about 825 yards south of milepost 126, 275 yards north of a road crossing, 15.81 meters (51.9 feet) east of the east rail, on top of a small cut about 5 feet above the track, on the first curve south of the bridge over Tar River, and on the line of the left rail tangent toward the bridge. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the top of a small projecting rock, on the opposite side of the track, and 28 meters (91.9 feet) from the station in azimuth 66° 02′. The elevation of the station mark is 100.213 meters (328.782 feet) and of the reference mark 98.430 meters (322.932 feet).

Den (Franklin County, M. Steinberg, 1918; 1919).—About 5¼ miles north of the Seaboard Air Line Railway station at **Franklinton**, 45 yards south of milepost 125, 9.35 meters (30.7 feet) east of the east rail, on top of a cut, 3 yards east of the edge, on the first curve north of the bridge over Tar River, and on the line of the right rail tangent toward the bridge. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the northeast face of sharp projecting rock in the side of the cut, 23.58 meters (77.4 feet) from the station in azimuth 33° 33′. The elevation of the station mark is 100.599 meters (330.049 feet) and of the reference mark 100.762 meters (330.583 feet).

Dem (Franklin County, M. Steinberg, 1918).—About 5½ miles north of the Seaboard Air Line Railway station at **Franklinton**, 385 yards north of milepost 225, 1.89 meters (6.2 feet) east of the east rail, 3 yards south of a road crossing, and 40 yards north of a cut through high rocks. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the west face of a large rock on the same side of the track and 43.06 meters (141.3 feet) from the station in azimuth 341° 20′. The elevation of the station mark is 100.928 meters (331.128 feet) and of the reference mark 101.635 meters (333.447 feet).

Del (Vance County, M. Steinberg, 1918).—About 2¾ miles south of the Seaboard Air Line Railway station at **Kittrell**, midway between the second and third

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curves south of the station, 930 yards north of milepost 125, 3.15 meters (10.3 feet) east of the east rail, directly in front of a large house on the opposite side of the track, 1 yard north of the road crossing leading to the same, and 50 yards south of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the stone foundation of the above mentioned house, 2 feet north of the south end of a porch bay, 3 feet above ground, and 88.88 meters (291.6 feet) from the station in azimuth 80° 57′. The elevation of the station mark is 104.336 meters (342.309 feet) and of the reference mark 109.738 meters (360.032 feet).

Dek (Vance County, M. Steinberg, 1918; 1919).—About 2¼ miles south of the Seaboard Air Line Railway station at **Kittrell,** on the prolongation of the southward tangent to the east rail of the first curvesouth of the station, 165 yards south of milepost 124, on the west side of the track, on the top of a high cut, 8 yards west of the edge, 130 yards north of a road crossing, and 25 yards south of a tobacco barn. The underground mark is a nail set in concerte, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track 16.65 meters (54.6 feet) from the station in azimuth 336° 15′. The elevation of the station mark is 111.359 meters (365.350 feet) and of the reference mark 111.840 meters (366.928 feet).

Kittrell (Vance County M. Steinberg, 1918).—About 2 miles south of the Seaboard Air Line Railway station at **Kittrell,** at the beginning of the first curve south of the station, on the line of the right rail tangent toward the station, about 325 yards north of milepost 124, 7.83 meters (25.7 feet) west of the west rail, at the top of a cut, about 6 feet above the track, and 30 yards north of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is about 10 yards west of the track, opposite the whistle post, and 24.83 meters (81.5 feet) from the station in azimuth 13° 57′. The elevation of the station mark is 113.245 meters (371.538 feet) and of the reference mark 113.680 meters (372.965 feet).

Deg (Vance County, M. Steinberg, 1918.)—About 1 mile north of the Seaboard Air Line Railway station at **Kittrell,** about 420 yards north of milepost 121, 25.66 meters (84.2 feet) west of the west rail, at the edge of a wagon road, at the northeast corner of a fence around a new white house, and 25 yards east of the well belonging to the house. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the north chimney of the new white house owned by Jim Blacknon, 33.75 meters (110.7 feet) from the station in azimuth 99° 12′. The elevation of the station mark is 138.219 meters (453.473 feet) and of the reference mark 138.676 meters (454.973 feet).

Def (Vance County, M. Steinberg, 1918; 1919).—About 1½ miles north of the Seaboard Air Line Railway station at **Kittrell,** at the north end of the first curve north of the station, on the prolongation of the northward tangent to the curve of the west rail, 3.96 meters (13.0 feet) west of the west rail, on earth thrown out from a cut, and about 335 yards south of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 25.96 meters (85.2 feet) from the station in azimuth 203° 47′. The elevation of the station mark is 138.603 meters (454.733 feet) and of the reference mark 138.127 meters (453.172 feet).

Ded (Vance County, M. Steinberg, 1918).—About 4¾ miles south of the Seaboard Air Line Railway station at **Henderson,** about 690 yards north of milepost 119, on the first curve south of Gill siding, about 25 yards south of the south rail, in a field. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the southwest corner of the foundation of the house of H. A. Finch, on the west face, about 2 feet above ground, and 90.97 meters (298.5 feet) from the station in azimuth 238° 10′. The elevation of the station mark is 145.493 meters (477.338 feet) and of the reference mark 148.988 meters (488.805 feet).

Dec (Vance County, M. Steinberg, 1918; 1919).—About 3 miles south of the Seaboard Air Line Railway station at **Henderson,** at about the middle of the second curve south of the station, at the intersection of the tangents of the east

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rails, ½ mile north of Gill siding, in a cultivated field, 33.34 meters (109.4 feet) east of the east rail, about 85 yards north of a negro dwelling on the same side of the track, and 130 yards south of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the north face of the stone chimney of the negro dwelling, 3 feet above ground, and 80.27 meters (263.4 feet) from the station in azimuth 338° 10′. The elevation of the station mark is 156.347 meters (512.948 feet) and of the reference mark 158.203 meters (519.038 feet).

Mobile (Vance County, M. Steinberg, 1918).—About 1,160 yards south of the Seaboard Air Line Railway station at **Henderson**, at the end of the first curve south of the station, 1.72 meters (5.6 feet) west of the west rail, 12 yards south of the railroad water tank, and 20 yards north of the railroad coal chute. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the south face of the southeast concrete pier under the water tank 10.42 meters (34.2 feet) from the station in azimuth 173° 57′. The elevation of the station mark is 155.446 meters (509.992 feet) and of the reference mark 155.497 meters (510.160 feet).

Mill (Vance County, M. Steinberg, 1918).—About 790 yards south of the Seaboard Air Line Railway station at **Henderson**, 15 yards south of the south end of the Seaboard Produce Co.'s warehouse, 3 yards south of a large switch target, and 2.72 meters (8.4 feet) east of the east rail of the main track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a a bronze tablet set in the east face of the stone foundation of the warehouse of the Seaboard Produce Co. and 20.75 meters (68.1 feet) from the station in azimuth 155° 31′. The elevation of the station mark is 154.670 meters (507.446 feet) and of the reference mark 154.236 meters (506.023 feet).

Henderson (Vance County, M. Steinberg, 1918).—About 420 yards south of the Seaboard Air Line Railway station at **Henderson**, 1 yard south of the second crossing (Orange Street) south of the station, 25 yards south of milepost 114, 2.58 meters (8.5 feet) west of the west rail of the main track, and directly opposite the front door of a brick schoolhouse on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the west face of the schoolhouse, about 10 yards from the south end, about 6 feet from the ground, and 62.98 meters (206.6 feet) from the station in azimuth 328° 03′. The elevation of the station mark is 155.187 meters (509.143 feet) and of the reference mark 157.881 meters (517.981 feet).

Bench mark **K 7**.—At **Henderson**, Vance County, on the Seaboard Air Line Railway, in the foundation at the northeast corner of the post-office building, about 4 feet above the ground. A brass disk. (156.001 meters, or 511.813 feet.)

Bench mark **H 7**.—At **Henderson**, Vance County, on the Seaboard Air Line Railway, at the northwest corner of the foundation of the Vance Hotel, on the north face 1 foot above the ground. A brass disk. (155.222 meters, or 509.258 feet).

Daya (Vance County, M. Steinberg, 1918; 1919).—About 330 yards north of the Seaboard Air Line Railway station at **Henderson**, on the prolongation of the southward tangent to the curve of the west rail, 2.23 meters (7.3 feet) east of the east rail of the track, directly across the track from the section house, 70 yards south of a large switch target, and 35 yards north of an old building with a cupola now used as a tobacco warehouse. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the north face of the stone foundation of the tobacco warehouse 35.62 meters (116.9 feet) from the station in azimuth 89° 54′. The elevation of the station mark is 154.891 meters (508.172 feet) and of the reference mark 155.267 meters (509.405 feet).

Dare (Vance County, M. Steinberg, 1918).—About 700 yards north of the Seaboard Air Line Railway station at **Henderson**, 7.41 meters (24.3 feet) east of the east rail, on a grassy terrace, 3 yards west of a road (William Street) running parallel to the track, 35 yards north of Rockspring Street, and directly opposite a driveway leading to the second house north of the corner on the opposite side of the street. The underground mark is a nail set in concrete, as described in

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note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the west face of the brick foundation of the third house north of Rockspring Street, about 1 foot from the corner, 2 feet above ground, and 40.90 meters (134.2 feet) from the station in azimuth 249° 49′. The elevation of the station mark is 156.063 meters (512.017 feet) and of the reference mark 156.643 meters (513.929 feet.)

Deb (Vance County, M. Steinberg, 1918).—About 1½ miles north of the Seaboard Air Line Railway station at **Henderson**, 4.32 meters (14.2 feet) north of the north rail, at the bottom of a fill, and 6 yards south of a highway. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the west face of the North Henderson High School near the northeast corner, across the track and 137.64 meters (451.6 feet) from the station in azimuth 324° 53′. The elevation of the station mark is 152.002 meters (498.693 feet) and of the reference mark 154.200 meters (505.904 feet).

Daz (Vance County, M. Steinberg, 1918).—About 1¾ miles north of the Seaboard Air Line Railway station at **Henderson**, about 35 yards south of milepost 112, on the line of the left rail tangent looking north, across the ditch on the west side of the track, 7.06 meters (23.2 feet) from the west rail, 11 yards north of a small new house, and directly in line with this house and a larger new house about 200 yards distant on the same side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the west face of the northeast brick pier under the house of L. Kittrell, and 30.88 meters (101.3 feet) from the station in azimuth 356° 31′. The elevation of the station mark is 154.992 meters (508.503 feet) and of the reference mark 154.354 meters (506.410 feet).

Day (Vance County, M. Steinberg, 1918; 1919).—About 2¼ miles north of the Seaboard Air Line Railway station at **Henderson**, ⅔ mile south of milepost 111, 2.71 meters (8.9 feet) east of the east rail, at the bottom of a cut, 320 yards south of a road crossing, and about 190 yards north of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a nail set in concrete. The reference mark is a bronze tablet set in concrete, as described in note 11*a*. It is on top of a cut, about 10 yards east of the track, and 22.26 meters (73.03 feet) from the station in azimuth 280° 45′. The elevation of the station mark is 157.111 meters (515.455 feet) and of the reference mark 159.355 meters (522.817 feet).

Das (Vance County, M. Steinberg, 1918).—About 1¼ miles south of the Seaboard Air Line Railway station at **Greystone**, at the end of the first curve south of the station, 17.28 meters (56.7 feet) east of the east rail, at the edge of a cotton field, on the line of the right rail tangent looking toward Henderson, about 200 yards south of milepost 111, 20 yards south of a whistle post, 30 yards south of a road crossing, and directly opposite a white house on the same side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the west face of the north chimney of the above-mentioned house, about 4 feet above the ground, and 114.12 meters (374.4 feet) from the station in azimuth 1° 43′. The elevation of the station mark is 153.997 meters (505.238 feet) and of the reference mark 155.467 meters (510.061 feet).

Dar (Vance County, M. Steinberg, 1918).—About 1 mile south of the Seaboard Air Line Railway station at **Greystone**, at the beginning of the first curve south of the station, about 100 yards north of milepost 111, on the line of the right rail tangent looking toward Greystone, 8.69 meters (28.5 feet) east of the east rail, at the bottom of a small fill, at the edge of a cotton field, 30 yards south of a small road crossing, 260 yards north of the main highway crossing, and 100 yards north of a house on the opposite side of the track. The underground mark is a nail in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a nail in a concrete pier on the opposite side of the track, in the direction of the house, on top of the cut, about 10 yards west of the track, and 40.51 meters (132.9 feet) from the station in azimuth 83° 38′. The elevation of the station mark is 154.188 meters (505.865 feet) and of the reference mark 155.619 meters (510.560 feet).

Dap (Vance County, M. Steinberg, 1918; 1919).—About 850 yards north of the Seaboard Air Line Railway station at **Greystone**, at the south end of the first curve north of the station, about 675 yards south of milepost 109, 5.75

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meters (18.9 feet) east of the east rail, 40 yards north of a small negro church on the same side of the track, and on line with the left rail tangent looking toward Graystone. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the stone foundation of the church, about 18 inches above ground, and 36.35 meters (119.3 feet) from the station in azimuth 359° 45′. The elevation of the station mark is 147.484 meters (483.870 feet) and of the reference mark 150.464 meters (493.647 feet).

Daw (Vance County, M. Steinberg, 1918).—About 1,100 yards north of the Seaboard Air Line Railway station at **Greystone**, on the first curve north of the station, 465 yards south of milepost 109, 1.5 meters (5 feet) east of the east rail on top of a high fill, 50 yards south of a small negro house set on a stone foundation on the same side of the track, and 7 yards south of a natural spring at the bottom of the fill. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bolt driven in the west side of a lone tall tree, 16.10 meters (52.8 feet) from the station in azimuth 275° 20′. The elevation of the station mark is 146.990 meters (482.250 feet).

Dan (Vance County, M. Steinberg, 1918).—About ¾ mile north of the Seaboard Air Line Railway station at **Greystone**, at the north end of the first curve north of the station, 190 yards south of milepost 109, 9.94 meters (32.6 feet) east of the east rail, on top of a cut, and about 8 feet above the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track 28.41 meters (93.2 feet) from the station in azimuth 37° 02′. The elevation of the station mark is 149.657 meters (491.000 feet) and of the reference mark 149.020 meters (488.910 feet).

Dal (Vance County, M. Steinberg, 1918; 1919).—About 2¼ miles south of the Seaboard Air Line Railway station at **Middleburg**, on the second curve south of the station, about 1,000 yards south of milepost 108, 19.62 meters (64.4 feet) west of the west rail, on top of a cut, in a cornfield, at the edge of a wagon road, and 65 yards north of a house on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is at the edge of a cut 19.00 meters (62.3 feet) from the station in azimuth 212° 26′. The elevation of the station mark is 150.336 meters (493.227 feet) and of the reference mark 150.487 meters (493.723 feet)

Dag (Vance County, M. Steinberg, 1918).—About 2 miles west of the Seaboard Air Line Railway station at **Middleburg**, at the east end of second curve west of the station, 8.55 meters (28.1 feet) west of the west or nearest rail, directly across the track from the station whistle post, and 30 yards south of a crossing of a road leading to a large white house on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the south face of the house of J. H. Paschan 70 25 meters (230.5 feet) from the station in azimuth 265° 49′. The elevation of the station mark is 149.486 meters (490.439 feet) and of the reference mark 151.934 meters (498.470 feet).

Daf (Vance County, M. Steinberg, 1918).—About 1½ miles west of the Seaboard Air Line Railway station at **Middleburg**, at the west end of the first curve west of the station, 125 yards east of milepost 108, 5.19 meters (17.0 feet) north of the north rail, 7 yards south of a highway running parallel to the track, on the bank of a ditch, about level with the track, and 165 yards east of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track 41.49 meters (136.1 feet) from the station in azimuth 34° 13′. The elevation of the station mark is 149.347 meters (489.983 feet) and of the reference mark 149.902 meters (491.803 feet).

Middleburg (Vance County, M. Steinberg, 1918; 1919).—About 1 mile west of the Seaboard Air Line Railway station at **Middleburg**, about 135 yards east of the beginning of the first curve west of the station, 7.21 meters (23.7 feet) west of the west rail of the main track, 135 yards east of a switch target, and 25 yards east of a negro cabin on the same side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze

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tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the chimney of the negro cabin 71.26 meters (233.8 feet) from the station in azimuth 134° 24′. The elevation of the station mark is 147.248 meters (483.096 feet) and of the reference mark 149.356 meters (490.012 feet).

Bench mark **F 6**.—At **Middleburg,** Vance County, about 1,000 feet south of the Seaboard Air Line Railway depot, 325 feet west of the track, in the southeast corner of the Middleburg School, 2 feet above the ground. A brass disk. (150.685 meters, or 494.372 feet.)

Dad (Vance County, M. Steinberg, 1918).—About 2 miles east of the Seaboard Air Line Railway station at **Middleburg**, at the beginning of the first curve east of the station, on the line of the left rail tangent looking toward Middleburg, 5.67 meters (18.6 feet) south of the south rail, about 70 yards west of a whistle post, 2 yards east of a road crossing, and 15 yards north of a fork in the road. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is about 15 yards south of the track and 22.41 meters (73.5 feet) from the station in azimuth 245° 18′. The elevation of the station mark is 137.629 meters (451.538 feet) and of the reference mark 137.883 meters (452.371 feet).

Dab (Vance County, M. Steinberg, 1918; 1919).—About 2¼ miles east of the Seaboard Air Line Railway station at **Middleburg,** on the first curve east of the station, 4.24 meters (13.9 feet) south of the south rail of the railroad track, at the bottom of a cut, about 300 yards west of a road crossing, and on the line of the left rail tangent looking toward Manson. The underground mark is a nail set in concrete, as described in note 7*c*. The station is marked by a nail in a 4 by 4 inch stake set in concrete. The reference mark is a bronze tablet set in concrete, as described in note 11*a*, at the top of the cut 11.07 meters (36.3 feet) from the station in azimuth 279° 48′. The elevation of the station mark is 136.305 meters (447.194 feet) and of the reference mark 139.345 meters (457.168 feet).

Cuz (Warren County, M. Steinberg, 1918).—About 750 yards west of the Seaboard Air Line Railway station at **Manson,** at the west end of the first curve west of the station, 125 yards west of milepost 104, 2.04 meters (6.7 feet) north of the north rail of the railroad track, at the top edge of a fill and 80 yards east of a white house with stone chimneys. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is at the bottom of the fill 19.35 meters (63.5 feet) from the station in azimuth 112° 56′. The elevation of the station mark is 132.187 meters (433.684 feet) and of the reference mark 129.597 meters (425.186 feet).

Cuy (Warren County, M. Steinberg, 1918; 1919).—About 390 yards west of the Seaboard Air Line Railway station at **Manson,** 31.68 meters (103.9 feet) north of the north rail of the track, on top of the first hill west of Manson, 3 yards south of a highway, and 65 yards south and 3 yards east of a large white house. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a nail in a 4 by 4 inch stake set in concrete. The reference mark is a bronze tablet set in the south face of a concrete pier of the large white house 58.59 meters (192.2 feet) from the station in azimuth 145° 18′. The elevation of the station mark is 133.069 meters (436.577 feet) and of the reference mark 134.730 meters (442.027 feet).

Manson (Warren County, M. Steinberg, 1918; 1919).—About 25 yards east of the Seaboard Air Line Railway station at **Manson,** 6.67 meters (21.9 feet) north of the north rail, and 2 yards west of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the southwest stone pillar of the house east of the station 31.03 meters (101.8 feet) from the station in azimuth 266° 15′. The elevation of the station mark is 129.380 meters (424.474 feet) and of the reference mark 129.653 meters (425.370 feet).

Cux (Warren County, M. Steinberg, 1918; 1919).—About 1 mile east of the Seaboard Air Line Railway station at **Manson,** on the first curve east of the station, 230 yards east of milepost 103, on line of the right rail tangent looking toward Manson, about 100 yards south of the south rail of the railroad track, in the yard of a negro house, 10 yards west of same, and 20 yards west of a tobacco warehouse on the opposite side of the track. The underground mark is a nail

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set in concrete, as described in note 7c. The station and reference marks are bronze tablets set in concrete, as described in notes 1a and 11a. The reference mark is at the edge of the highway 20.00 meters (65.6 feet) from the station in azimuth 330° 15′. The elevation of the station mark is 130.950 meters (429.625 feet) and of the reference mark 130.892 meters (429.435 feet).

Ridgeway (Warren County, M. Steinberg, 1918).—About 220 yards east of the Seaboard Air Line Railway station at **Ridgeway**, at the beginning of the first curve east of the station, 1.84 meters (6.0 feet) north of the north rail, 20 yards east of a switch target, and 40 yards east of the east end of a church. The underground mark is a nail set in concrete, as described in note 7c. The station and reference marks are bronze tablets set in concrete, as described in notes 1a and 11a. The reference mark is at the edge of the church grounds, about 8 yards north of the track, and 28.05 meters (92.0 feet) from the station in azimuth 70° 48′. The elevation of the station mark is 128.166 meters (420.491 feet) and of the reference mark 128.332 meters (421.036 feet).

Cuv (Warren County, M. Steinberg, 1918).—About 540 yards east of the Seaboard Air Line Railway station at **Ridgeway**, on the first curve west of Norlina, on the line of the right tangent looking toward Norlina, about 10 yards north of the north rail of the track, at the bottom of a fill, 20 yards west of a whistle post, and 20 yards east of the Norlina yard limit sign. The underground mark is a nail set in concrete, as described in note 7c. The station and reference marks are bronze tablets set in concrete, as described in notes 1a and 11a. The reference mark is midway between the track and the highway, 25.00 meters (82.0 feet) from the station in azimuth 241° 21′. The elevation of the station mark is 128.000 meters (419.947 feet) and of the reference mark 128.856 meters (422.755 feet).

Bench mark **N 5**.—At **Norlina**, Warren County, 215 feet west of the Seaboard Air Line Railway depot, on the foundation of the water tank, on the northeast corner of the northeast cement pier which is capped by a 1-inch iron plate. A square cut. (133.661 meters, or 438.519 feet.)

Bench mark **O 5**.—At **Norlina**, Warren County, across the street from the Seaboard Air Line Railway depot, in the stone front of the bank building, 5 feet east of the entrance and 2 feet above the sidewalk. A brass disk. (133.432 meters, or 437.768 feet.)

Norlina (Warren County, M. Steinberg, 1918).—About 1,150 yards east of the Seaboard Air Line Railway station at **Norlina**, on the first curve east of the station, on the line of the left rail tangent looking toward the station, 130 yards east of a switch target, in a field, 23.79 meters (78.1 feet) north of the north rail, and 25 yards east of a small negro cabin on the same side of the track. The underground mark is a nail set in concrete, as described in note 7c. The station and reference marks are bronze tablets set in concrete, as described in notes 1a and 11a. The reference mark is at a road crossing, about 3 yards north of the track and 35.55 meters (116.6 feet) from the station in azimuth 55° 58′. The elevation of the station mark is 135.691 meters (445.180 feet) and of the reference mark 135.258 meters (443.759 feet).

Cus (Warren County, M. Steinberg, 1918; 1919).—About 1 mile east of the Seaboard Air Line Railway station at **Norlina**, on the first curve east of the station, 125 yards east of the Norlina yard-limit sign, 8.92 meters (29.3 feet) north of the north rail, on top of a 6-foot bank, and 20 yards east along the track from a small negro cabin on the opposite side of a cotton field. The underground mark is a nail set in concrete, as described in note 7c. The station and reference marks are bronze tablets set in concrete as described in notes 1a and 11a. The reference mark is on the opposite side of the track 31.79 meters (104.3 feet) from the station in azimuth 51° 37′. The elevation of the station mark is 137.426 meters (450.872 feet) and of the reference mark 135.219 meters (443.631 feet).

Warren (Warren County, M. Steinberg, 1918; 1919).—About ¼ mile east of the Seaboard Air Line Railway station at **Warren Plains**, 2.29 meters (7.5 feet) south of the south rail, and 25 yards east of the beginning of the first cut east of the railroad station. The underground mark is a nail set in concrete, as described in note 7c. The station and reference marks are bronze tablets set in concrete, as described in notes 1a and 11a. The reference mark is on the opposite side of the track 24.74 meters (81.2 feet) from the station in azimuth 130° 48′. The elevation of the station mark is 138.762 meters (455.255 feet) and of the reference mark 138.809 meters (455.409 feet).

Cut (Warren County, M. Steinberg, 1918).—About 1 mile east of the Seaboard Air Line Railway station at **Warren Plains**, on the first curve east of the station,

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2.81 meters (9.2 feet) south of the south rail, 7 yards east of a whistle post, and at the east edge of a cross road leading to a house directly opposite. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is at the edge of the highway 30.05 meters (98.6 feet) from the station in azimuth 29° 52′. The elevation of the station mark is 132.389 meters (434.346 feet) and of the reference mark 132.774 meters (435.609 feet).

Cur (Warren County, M. Steinberg, 1918; 1919).—About 1½ miles east of the Seaboard Air Line Railway station at **Warren Plains**, at the middle of the second curve west of Macon, about 640 yards east of milepost 112, 9.40 meters (30.8 feet) south of the south rail, 5 feet above the track, 100 yards west of a whistle post, 425 yards east of a road crossing, and at the edge of a cornfield. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is about 12 yards south of the track and 23.35 meters (76.6 feet) from the station in azimuth 93° 12′. The elevation of the station mark is 131.652 meters (431.928 feet) and of the reference mark 131.150 meters (430.281 feet).

Cup (Warren County, M. Steinberg, 1918).—About 2¼ miles west of the Seaboard Air Line Railway station at **Macon**, at the beginning of the second curve west of the station, about 510 yards west of milepost 111, 3.78 meters (12.4 feet) south of the south rail, and 2 yards west of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track, 3 yards west of the road, and 17.31 meters (56.8 feet) from the station in azimuth 188° 03′. The elevation of the station mark is 132.354 meters (434.231 feet) and of the reference mark 132.592 meters (435.012 feet).

Macon (Warren County, M. Steinberg, 1918.)—About ⅜ mile west of the Seaboard Air Line Railway station at **Macon**, on the first curve west of the station, 11.50 meters (37.7 feet) south of the south rail, 50 yards west of a road crossing, 125 yards west of a whistle post, directly in front of and 120 yards from a large house belonging to Tom Marks, on the same side of the track, and on the north edge of a roadway. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the north face of the west chimney of the house of Tom Marks 101.35 meters (332.5 feet) from the station in azimuth 358° 13′. The elevation of the station mark is 114.220 meters (374.737 feet) and of the reference mark 117.275 meters (384.760 feet).

Bench mark **Y 4**.—At **Macon**, Warren County, on the Seaboard Air Line Railway, south of the track and the street opposite the depot, on the northeast corner of W. G. Egerton's large stone building, 14 inches south of the corner and 3 feet above the cement work. A brass disk (117.685 meters, or 386.105 feet).

Cun (Warren County, M. Steinberg, 1918; 1919).—About 1⅜ miles east of the Seaboard Air Line Railway station at **Macon**, on the first curve east of the station, about 550 yards east of milepost 108, on the line of the right-rail tangent looking toward Macon, about 15 yards north of the north rail, across the highway from the track, at the south edge of a cotton field, and about 200 yards west of a negro cabin. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is in a cotton field, on the same side of the track, 24.24 meters (79.5 feet) from the station in azimuth 189° 25′. The elevation of the station mark is 117.107 meters (384.209 feet) and of the reference mark 117.335 meters (384.957 feet).

Cum (Warren County, M. Steinberg, 1918; 1919).—About 1½ miles east of the Seaboard Air Line Railway station at **Macon**, on the prolongation of the eastward tangent to the south rail of the first curve east of the station, about 1,000 yards west of milepost 107, 37.57 meters (123.3 feet) north of the north rail, on the opposite side of the highway from the track, on the top of a small rise, 2 feet above the road, 50 yards east of the small house of Nat Faine, and 3 yards east of his blacksmith shop. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the chimney of Faine's house 50.71 meters (166.4 feet) from the station in

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azimuth 122° 07′. The elevation of the station mark is 113.862 meters (373.562 feet) and of the reference mark 115.710 meters (379.625 feet).

Cul (Warren County, M. Steinberg, 1918).—About 3 miles east of the Seaboard Air Line Railway station at **Macon**, at the west end of the second curve east of the station, about 60 yards west of milepost 106, 3.46 meters (11.4 feet) south of the south rail, on ground about 2 feet lower than the track, and on a line perpendicular to the track to a large white house across a field. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track 33.34 meters (109.4 feet) from the station in azimuth 142° 36′. The elevation of the station mark is 107.795 meters (353.657 feet) and of the reference mark 107.848 meters (353.831 feet).

Cug (Warren County, M. Steinberg, 1918).—About 1¾ miles west of the Seaboard Air Line Railway station at **Vaughan**, about 425 yards east of milepost 106, on the second curve west of Vaughan, 7.81 meters (25.6 feet) south of the south rail, about 115 yards west of a road crossing, 100 yards west of a white house, and on the top of a small bank about 4 feet above the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track and 32.07 meters (105.2 feet) from the station in azimuth 227° 34′. The elevation of the station mark is 112.118 meters (367.840 feet) and of the reference mark 110.903 meters (363.854 feet).

Cuf (Warren County, M. Steinberg, 1918).—About 1⅛ miles west of the Seaboard Air Line Railway station at **Vaughan**, about 400 yards west of milepost 105, 1.71 meters (5.6 feet) north of the north rail, 30 yards east of a road crossing, and 40 yards east of a house in a thicket on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is toward the house, near the cross road, and 46.26 meters (151.8 feet) from the station in azimuth 62° 17′. The elevation of the station mark is 112.975 meters (370.652 feet) and of the reference mark 112.781 meters (370.016 feet).

Cue (Warren County, M. Steinberg, 1918; 1919).—About 750 yards west of the Seaboard Air Line Railway station at **Vaughan**, about 1,090 yards east of milepost 105, 8.84 meters (29.0 feet) north of the north rail of the first curve west of Vaughan, 190 yards east of the yard-limit sign, and on the line of the left rail tangent looking toward Macon. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track, 22.02 meters (72.2 feet) from the station in azimuth 328° 35′. The elevation of the station mark is 106.883 meters (350.665 feet) and of the reference mark 106.176 meters (348.346 feet).

Cud (Warren County, M. Steinberg, 1918; 1919).—About 400 yards west of the Seaboard Air Line Railway station at **Vaughan**, on the first curve west of the station, about 15 yards north of the north rail, at the edge of a cornfield, and on the prolongation of the left rail tangent looking toward Vaughan. The underground mark is a nail set in concrete, as described in note 7*c*. The station is marked by a nail in a 4 by 4 inch stake set in concrete. The reference mark is a bronze tablet set in concrete, as described in note 11*a*, about 6 yards north of the track, on the other side of the fence, and 30.0 meters (98 feet) from the station in azimuth 327° 17′. The elevation of the station mark is 103.655 meters (340.075 feet) and of the reference mark 105.562 meters (346.331 feet).

Vaughan (Warren County, M. Steinberg, 1918).—About 490 yards east of the Seaboard Air Line Railway station at **Vaughan**, on the line of the right rail tangent looking toward the station, 11.33 meters (37.2 feet) south of the south rail, 2 yards south of the edge of a bank and 10 feet above the track, 3 yards west and 10 yards north of a small negro church, 90 yards west of a switch target, and 20 yards east of a ginhouse on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is in the woods 23.33 meters (76.5 feet) from the station in azimuth 85° 07′. The elevation of the station mark is 111.767 meters (366.689 feet) and of the reference mark 110.944 meters (363.989 feet).

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Cub (Warren County, M. Steinberg, 1918).—About 870 yards east of the Seaboard Air Line Railway station at **Vaughan**, at the east end of the first curve east of the station, about 900 yards west of milepost 103, 3.44 meters (11.3 feet) south of the south rail, about 80 yards west of a whistle post, and 6 yards east of the freight house of the Greenleaf-Johnson Lumber Co. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, on the top of a 5-foot rise, and 50.58 meters (165.9 feet) from the station in azimuth 298° 05′. The elevation of the station mark is 108.774 meters (356.869 feet) and of the reference mark 109.971 meters (360.797 feet).

Cru (Warren county, M. Steinberg, 1918).—About 1 mile east of the Seaboard Air Line Railway station at **Vaughan**, 4 yards west of milepost 103, 45.11 meters (148.0 feet) south of the south rail, in a cotton field belonging to J. R. Sledge, 30 yards east of a negro cabin, and 40 yards west of another negro cabin. The underground mark is a nail set in concrete as described in note 7*c*. The station mark is a spike in a cedar post. The reference mark is a bronze tablet set in the east face of the southwest stone post under the west wing of the house of G. W. Sledge, 29.39 meters (96.4 feet) from the station in azimuth 89° 03′. The elevation of the station mark is 106.395 meters (349.064 feet) and of the reference mark 105.596 meters (346.443 feet).

Cro (Warren County, M. Steinberg, 1918).—About 1¼ miles east of **Vaughan**, on the Seaboard Air Line Railway, on the first curve east of the station, about 330 yards east of milepost 103, 9.74 meters (32.0 feet) north of the north rail, and on top of the bank 10 feet above the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 25.20 meters (82.7 feet) from the station in azimuth 341° 40′. The elevation of the station mark is 108.738 meters (356.751 feet) and of the reference mark 107.408 meters (352.388 feet).

Cote (Warren County, M. Steinberg, 1918).—About 1⅜ miles east of the Seaboard Air Line Railway station at **Vaughan**, about 1,100 yards west of milepost 102, at the east end of the second curve east of Vaughan, 3.78 meters (12.4 feet) south of the south rail, 20 yards east along the track from the line of the east end of a house which is 50 yards away, and about 300 yards west of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the north face of a stone chimney of the above-mentioned house 48.209 meters (158.17 feet) from the station in azimuth 352° 01′. The elevation of the station mark is 105.383 meters (345.744 feet) and of the reference mark 106.127 meters (348.185 feet).

Cri (Warren County, M. Steinberg, 1918).—About 2⅛ miles east of the Seaboard Air Line Railway station at **Vaughan**, at about the middle of the third curve east of the station, 230 yards east of milepost 102, about 30 yards north of the north rail, 10 yards north of a wagon road running parallel to the track, and on the line of the left rail tangent looking toward Vaughan. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is in a clearing 15 yards north of the road and 25.0 meters (82 feet) from the station in azimuth 226° 29′. The elevation of the station mark is 104.265 meters (342.076 feet) and of the reference mark 104.577 meters (343.100 feet).

Cre (Warren County, M. Steinberg, 1918).—About 2⅛ miles west of the Seaboard Air Line Railway station at **Littleton**, on the second curve west of the station, about 740 yards west of milepost 100, 1.94 meters (6.4 feet) north of the north rail, at the top of a fill, and 240 yards west of a road crossing which leads to a negro cabin on the opposite side of the track. The station mark is a nail in a 4 by 4 inch stake which projects 10 inches above ground. The underground mark is a nail set in concrete, as described in note 7*c*. The reference mark is a bronze tablet set in concrete, as described in note 12*b*, on a flat rock at the edge of a wagon road 39.11 meters (128.3 feet) from the station in azimuth 156° 20′. The elevation of the station mark is 105.625 meters, or 346.538 feet.

Coz (Warren County, M. Steinberg, 1918).—About 2 miles west of the Seaboard Air Line Railway station at **Littleton**, at the beginning of the second curve west of the station, 480 yards west of milepost 100, 6.91 meters (22.7 feet) north of the north rail, on the top of a small embankment, 1 yard north of the

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edge, and 55 yards east of the crossing for a small road leading to a negro cabin on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track 25.73 meters (84.4 feet) from the station in azimuth 121° 08′. The elevation of the station mark is 108.587 meters (356.256 feet) and of the reference mark 107.236 meters (351.823 feet).

Coy (Warren County, M. Steinberg, 1918).—About 1 mile west of the Seaboard Air Line Railway station at **Littleton,** 560 yards west of milepost 99, 6.75 meters (22.2 feet) south of the south rail, at the corner of a cornfield, 4 yards east of a road crossing, 1 yard east of a railroad crossing sign, and 20 yards east of a section sign marked "52 | 53." The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, at the edge of a cornfield and 26.90 meters (88.3 feet) from the station in azimuth 269° 43′. The elevation of the station mark is 109.743 meters (360.048 feet) and of the reference mark 109.508 meters (359.277 feet).

Littleton (Halifax County, M. Steinberg, 1918).—About 800 yards west of the Seaboard Air Line Railway station at **Littleton,** on the first curve west of the station, about 380 yards east of milepost 99, 20.2 meters (66.3 feet) south of the south rail, 2 yards north of the stone fence of the Littleton Female College, 10 yards east of the west end of the fence, 165 yards west of a road crossing, and 130 yards east of the east fence of a cemetery on the opposite side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the north face of the northwest corner of the northwest building of the Littleton Female College 196.90 meters (646.0 feet) from the station in azimuth 21° 21′. The elevation of the station mark is 115.160 meters (377.821 feet) and of the reference mark 116.298 meters (381.554 feet).

Bench mark **P 3.**—At **Littleton,** Halifax County, on the Seaboard Air Line Railway, in the north or front face of the depot just east of the center and 1½ feet above the ground. A brass disk. (118.391 meters, or 388.421 feet.)

Bench mark **Q 3.**—At **Littleton,** Halifax County, on the east brick face of the Bank of Littleton Building, 1 foot south of the northeast corner, and 3 feet above the ground. A brass disk. (117.992 meters, or 387.112 feet.)

Cox (Halifax County, M. Steinberg, 1918).—About 600 yards east of the Seaboard Air Line Railway station at **Littleton,** 1.31 meters (4.3 feet) north of the north rail of the main line, 3 yards east of a wagon road crossing, 30 yards east of milepost 98, at the southwest corner of a lumber mill. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the southwest corner of the brick foundation of a cottonseed house about 1 foot above ground and 10.875 meters (35.68 feet) from the station in azimuth 140° 07′. The elevation of the station mark is 116.614 meters (382.591 feet) and of the reference mark 116.922 meters (383.602 feet).

Bench mark **M 3.**—About ¾ mile east of **Littleton,** Halifax County, on the Seaboard Air Line Railway, at the eastern edge of the town, 7 feet south of the track, in the east end of a prominent granite rock. A square cut. (112.770 meters or 369.980 feet.)

Cow (Halifax County, M. Steinberg, 1918).—About 4 miles east of the Seaboard Air Line Railway station at **Littleton,** on the prolongation of the south tangent of the first curve east of the station, 8.405 meters (27.6 feet) north of the north rail, and 35 yards west of a wagon road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the northeast corner of the stone foundation post of a negro church 53.56 meters (175.7 feet) from the station in azimuth 315° 42′. The elevation of the station mark is 93.723 meters (307.490 feet) and of the reference mark 92.850 meters (304.625 feet).

Cov (Halifax County, M. Steinberg, 1918).—About 4¼ miles east of the Seaboard Air Line Railway station at **Littleton,** on the first curve east of the station, 235 yards west of milepost 94, on the north side of the track, on the line of the left rail tangent looking east, 230 yards west of a whistle post, 20 yards south of a wagon road and 19.31 meters (63.4 feet) north of the north rail. The under-

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ground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, toward Littleton, and 42.409 meters (139.14 feet) from the station in azimuth 79° 47′. The elevation of the station mark is 93.392 meters (306.404 feet) and of the reference mark 92.795 meters (304.445 feet).

Summit (Halifax County, M. Steinberg, 1918).—On the Seaboard Air Line Railway, on the second curve east of **Littleton**, at a place known as Print, about 25 yards west of milepost 93, 12.803 meters (42.00 feet) south of the south rail, 25 yards west of a road crossing, and 3 yards north of a highway. The underground mark is a nail in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the stone chimney of Chas. Zolhcoffer's house 85.805 meters (281.51 feet) from the station in azimuth 29°59′. The elevation of the station mark is 93.834 meters (307.854 feet) and of the reference mark 92.107 meters (302.188 feet).

Bench mark **F 3.**—At **Summit**, Halifax County, on the Seaboard Air Line Railway, at the water tank near the southeast end of the passing track, on top of the southeast corner of the northeast foundation pier. An outlined square. (94.906 meters, or 311.371 feet).

Cot (Halifax County, M. Steinberg, 1918.).—About $^1/_5$ mile east of **Summit** water tank, on the Seaboard Air Line Railway, 690 yards west of milepost 92, 3.560 meters (11.68 feet) north of the north rail, at the bottom of a cut, 90 yards east of a small road crossing, 175 yards east of a switch target, 45 yards east of a speed limit sign, and 130 yards west of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track, toward Summit, on the top of the cut, and 64.730 meters (212.37 feet) from the station in azimuth 81° 02′. The elevation of the station mark is 95.140 meters (312.138 feet) and of the reference mark 96.250 meters (315.780 feet.)

Cos (Halifax County, M. Steinberg, 1918; 1919).—About 1 mile west of the Seaboard Air Line Railway station at **Thelma**, on the prolongation of the westward tangent of the south rail of the first curve west of the station, about 200 yards east of milepost 92, 9.53 meters (31.3 feet) south of the south rail, across the ditch, 130 yards west of a negro cabin, 150 yards west of a whistle post, and 50 yards east of a road crossing. The station is marked by a nail in a 4 by 4 inch stake set in concrete. The reference mark is a bronze tablet set in concrete, as described in note 11*a*. It is toward the woods, 3 yards from the largest pine tree and 29.43 meters (96.6 feet) from the station in azimuth 313° 31′. The elevation of the station mark is 84.566 meters, or 277.447 feet.

Cor (Halifax County, M. Steinberg, 1918; 1919).—About ½ mile west of the Seaboard Air Line Railway station at **Thelma**, 130 yards west of the beginning of the first curve west of the station, 21.650 meters (71.03 feet) south of the south rail, on top of a high bank, and 20 yards west of the road. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is in a grape vineyard on the opposite side of the road 45.090 meters (147.94 feet) from the station in azimuth 253° 15′. The elevation of the station mark is 82.037 meters (269.150 feet) and of the reference mark 81.146 meters (266.226 feet).

Thelma (Halifax County, M. Steinberg, 1918).—About 240 yards east of the Seaboard Air Line Railway station at **Thelma**, 17.7 meters (58 feet) north of the north rail of the main track, 7 yards north of the bottom of a grade leading from the track, 8 feet lower than the track, 30 yards east of a small white house north of mark on opposite side of switch track, and directly across the main track from the west end of a yellow house. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the depot 115.40 meters (378.6 feet) from the station in azimuth 39° 33′. The elevation of the station mark is 65.291 meters (214.209 feet) and of the reference mark 68.296 meters (224.068 feet).

Cop (Halifax County, M. Steinberg, 1918).—About 1⅝ miles east of the Seaboard Air Line Railway station at **Thelma**, 710 yards east of milepost 90, 2.60 meters (8.5 feet) north of the north rail, at the bottom of a cut, on the first curve east of Thelma, 65 yards east of the beginning of the first cut east of Thelma,

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350 yards east of a road crossing, and on line with the right rail tangent looking toward Thelma. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in a bowlder, as described in note 12*c*, on the opposite side and 3 yards south of the track, at the foot of the cut, and 19.326 meters (63.41 feet) from the station in azimuth 52° 15′. The elevation of the station mark is 49.049 meters (160.922 feet) and of the reference mark 49.704 meters (163.071 feet).

Con (Halifax County, M. Steinberg, 1918; 1919).—About 1½ miles east of the Seaboard Air Line Railway station at **Thelma**, 950 yards east of milepost 90, 1.85 meters (6.1 feet) north of the north rail, at the foot of a perpendicular cut, the second cut east of Thelma, and on line with the right rail tangent looking toward Weldon. The station is marked by a nail in a 4 by 4 inch stake set in concrete. The reference mark is a bronze tablet set in concrete, as described in note 11*a*. The reference mark is on the same side of the track, at the east end of a cut, 4 yards north of the track, and 32.40 meters (106.3 feet) from the station in azimuth 264° 56′. The elevation of the station mark is 46.984 meters (154.147 feet) and of the reference mark 45.841 meters (150.397 feet).

Cog (Halifax County, M. Steinberg, 1918).—About 1¾ miles east of the Seaboard Air Line Railway station at **Thelma**, 490 yards west of milepost 89, about 3 yards north of the north rail, at the beginning of a fill and of a path leading down the slope to a truck field. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bonze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, at the foot of the hill, and 21.21 meters (69.6 feet) from the station in azimuth 234° 12′. The elevation of the station mark is 43.537 meters, or 142.838 feet.

Cof (Halifax County, M. Steinberg, 1918; 1919).—About 1⅞ miles east of the Seaboard Air Line Railway station at **Thelma**, about 320 yards west of milepost 89, 1.93 meters (6.3 feet) north of the north rail, at the top of a fill, 40 yards west of a 40-foot clay embankment on the south side of the track, and opposite a corn field on the north side. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a nail in a 4 by 4 inch stake set in concrete. The reference mark is a bronze tablet set in concrete, as described in note 11*a*, at the foot of a fill on the same side of the track and 35.20 meters (115.5 feet) from the station in azimuth 267° 33′. The elevation of the station mark is 43.066 meters, or 141.292 feet.

Coe (Halifax County, M. Steinberg, 1918).—About 2 miles east of the Seaboard Air Line Railway station at **Thelma**, 100 yards west of milepost 89, 1.84 meters (6.0 feet) north of the north rail, 45 yards west of the west end of a cut east of a road crossing, and at the beginning of the first cut west of the road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track and 25.0 meters (82 feet) from the station in azimuth 314° 20′. The elevation of the station mark is 43.317 meters (142.116 feet) and of the reference mark 43.073 meters (141.315 feet).

Cod (Halifax County, M. Steinberg, 1918; 1919.)—About 2½ miles east of the Seaboard Air Line Railway station at **Thelma**, about 985 yards west of milepost 88, 10.880 meters (35.70 feet) south of the south rail, about 380 yards west of a railroad bridge over the Roanoke River, and 65 yards west of a country-road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track 46.665 meters (153.10 feet) from the station in azimuth 291° 49′. The elevation of the station mark is 46.810 meters (153.576 feet) and of the reference mark 44.648 meters (146.483 feet).

Cob (Halifax County, M. Steinberg, 1918).—About 4 miles east of **Thelma**, on the Seaboard Air Line Railway, about 115 yards west of milepost 87, about 13 yards south of the south rail, on the bank of a cut, about 10 feet higher than the track, and about 100 yards west of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track 40.0 meters (131 feet) from the station in azimuth 254° 16′. The elevation of the station mark is 59.246 meters (194.376 feet) and of the reference mark 57.211 meters (187.700 feet).

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Coa (Halifax County, M. Steinberg, 1918; 1919).—About 4⅛ miles east of **Thelma**, on the Seaboard Air Line Railway, about 130 yards east of milepost 87, 2.03 meters (6.7 feet) south of the south rail, at the edge of a fill, about 70 yards west of a country-road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a nail in a 4 by 4 inch cedar post which projects about 18 inches above the ground. The reference mark is a bronze tablet set in concrete, as described in note 11*c*. It is on the same side of the track 8 yards east of a cross road and 70.88 meters (232.5 feet) from the station in azimuth 251° 06′. The elevation of the station mark is 57.231 meters (187.765 feet) and of the reference mark 58.765 meters (192.798 feet).

Cly (Halifax County, M. Steinberg, 1918).—About 4¼ miles east of the Seaboard Air Line Railway station at **Thelma**, about 500 yards east of milepost 87, 40 yards west of the first deep cut west of Bolling, about 3 yards north of the north rail, and on ground about 2 feet higher than the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in concrete, as described in note 12*c*, in the top of a large boulder 35.0 meters (114.8 feet) from the station in azimuth 150° 08′. The elevation of the station mark is 60.460 meters (198.359 feet) and of the reference mark 60.973 meters (200.042 feet).

Clu (Halifax County, M. Steinberg 1918).—About 4½ miles east of the Seaboard Air Line Railway station at **Thelma**, about 770 yards east of milepost 87, about 13 yards north of the north rail, and about 65 yards east of the beginning of a deep cut west of Bolling. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track 37.0 meters (121 feet) from the station in azimuth 57° 11′. The elevation of the station mark is 61.336 meters (201.233 feet) and of the reference mark 62.356 meters (204.580 feet).

Clo (Halifax County, M. Steinberg, 1918).—About 1 mile west of the Seaboard Air Line Railway station at **Bolling**, about 400 yards east of milepost 86, 4.78 meters (15.7 feet) south of the south rail, 5 yards from a road crossing, and half way up a small embankment. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track at the foot of a railroad crossing sign 31.646 meters (103.83 feet) from the station in azimuth 264° 57′. The elevation of the station mark is 65.932 meters (216.312 feet) and of the reference mark 65.380 meters (214.501 feet).

Cli (Halifax County, M. Steinberg, 1918).—About 1¾ miles west of the Seaboard Air Line Railway station at **Roanoke Junction**, on the second curve west of the station, about 1,000 yards west of milepost 84, about 10 yards north of the north rail, at the south edge of a truck garden, directly in front of a house which is about 100 yards distant on the same side of the track, and about 40 yards from the crossing of a road leading to the house. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the chimney of the above mentioned house 96.19 meters (315.6 feet) from the station in azimuth 199° 59′. The elevation of the station mark is 61.414 meters (201.489 feet) and of the reference mark 62.226 meters (204.153 feet).

Cle (Halifax County, M. Steinberg, 1918).—About 1 mile west of the Seaboard Air Line Railway station at **Roanoke Junction**, about 480 yards east of milepost 84, 9.844 meters (32.30 feet) north of the north rail, at the foot of an 8-foot slope leading from the track, 1 yard east of a whistle post, about 400 yards east of a road crossing, at the intersection of the right tangent toward Roanoke Junction and the right tangent toward Thelma, and at about the middle of the first curve west of Roanoke Junction. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track 40.234 meters (132.00 feet) from the station in azimuth 283° 59′. The elevation of the station mark is 47.272 meters (155.092 feet) and of the reference mark 48.213 meters (158.179 feet).

Roanoke (Halifax County, M. Steinberg, 1918).—About 20 yards east of **Roanoke Junction** depot, on the Seaboard Air Line Railway, 5.326 meters (17.47 feet) south of south rail, and on top of a 6-foot rise. The underground mark is

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a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the south face of the bay in the front of the depot 31.665 meters (103.89 feet) from the station in azimuth 166° 44′. The elevation of the station mark is 51.937 meters (170.397 feet) and of the reference mark 51.362 meters (168.510 feet).

C1a (Halifax County, M. Steinberg, 1918, 1919).—About ¼ mile east of the Seaboard Air Line Railway station at **Roanoke Junction**, at the intersection of the tangents to the south rails of the first curve east of the station, about 700 yards west of milepost 82, 20.53 meters (67.4 feet) south of the south rail, in a truck garden, 10 yards north of a road running parallel to the track, and 200 yards west of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is at the edge of a field 46.59 meters (152.9 feet) from the station in azimuth 291° 28′. The elevation of the station mark is 47.038 meters (154.324 feet) and of the reference mark 45.684 meters (149.882 feet).

C1z (Halifax County, M. Steinberg, 1918, 1919).—About 1½ miles east of **Roanoke Junction** depot, on the Seaboard Air Line Railway, about 730 yards west of milepost 81, about 10 yards north of the north rail, 1 yard north of the top edge of a 10-foot rise, 135 yards west of a whistle post, and 200 yards east along the track from a large farm house. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track 16.75 meters (55.0 feet) from the station in azimuth 163° 24′. The elevation of the station mark is 47.631 meters (156.269 feet) and of the reference mark 46.524 meters (152.637 feet).

C1v (Halifax County, M. Steinberg, 1918, 1919).—About 2 miles west of **Weldon**, on the Seaboard Air Line Railway, on the prolongation of the westward tangent to the curve of the south rail, about 530 yards east of milepost 81, 8.11 meters (26.6 feet) south of the south rail, on level ground at the top of a small rise, and 5 feet above the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is across the track, 34.51 meters (113.2 feet) from the station in azimuth 248° 16′. The elevation of the station mark is 38.877 meters (127.549 feet) and of the reference mark 38.444 meters (126.128 feet).

C1t (Halifax County, M. Steinberg, 1918, 1919).—About 1½ miles west of **Weldon** depot, on the Seaboard Air Line Railway, on the prolongation of the easterly tangent to the south rail of the second curve west of the depot, 6.95 meters (22.8 feet) south of the south rail, and 10 yards east of a whistle post. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is directly across the track 25.150 meters (82.51 feet) from the station in azimuth 176° 45′. The elevation of the station mark is 34.242 meters (112.342 feet) and of the reference mark 33.203 meters (108.934 feet).

C1r (Halifax County, M. Steinberg, 1918).—About 1 mile west of the Seaboard Air Line Railway station at **Weldon**, at about the middle of the first curve west of the station, 2.625 meters (8.60 feet) north of the north rail, about 15 yards east of a road crossing and the office of the Goldsboro Brick works, and 130 yards west of a switch target. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the south face of a brick warehouse 73.703 meters (241.81 feet) from the station in azimuth 104° 16′. The elevation of the station mark is 26.290 meters (86.253 feet) and of the reference mark 26.312 meters (86.325 feet).

C1p (Halifax County, M. Steinberg, 1918, 1919).—At **Weldon** depot, on the Seaboard Air Line Railway, 4.39 meters (14.4 feet) south of the south rail, about 27 yards west of the first abutment south of the track of the Atlantic Coast Line Railroad bridge, and 15 yards west of the northwest corner of the Southern Express office. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the Terminal Hotel, at the southeast corner, and 75.1 meters (246 feet) from

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the station in azimuth 87° 42′. The elevation of the station mark is 23.940 meters (78.543 feet) and of the reference mark 25.132 meters (82.454 feet).

Weldon (Halifax County, M. Steinberg, 1918).—About 120 yards east of the east end of the depot at **Weldon**, on the Seaboard Air Line Railway, 1.5 meters (5 feet) south of the south rail of the main track, 4 yards east of a car derailer, 100 yards west of the most easterly switch target, and directly in line between a white house about 550 yards north of the track and a large smoke stack about the same distance south of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the white waiting room of the depot 133.71 meters (438.7 feet) from the station in azimuth 76° 34′. The elevation of the station mark is 23.036 meters (75.577 feet) and of the reference mark 24.363 meters (79.931 feet).

Bench mark **J 1**.—About 2 miles west of **Garysburg**, Northampton County, on the Seaboard Air Line Railway, on the north side of the east abutment of the bridge over the Roanoke River, on top of the coping, 14 inches from the north edge and 12 inches west of a girder. A brass disk. (24.658 meters, or 80.899 feet.)

Garysburg (Northampton County, M. Steinberg, 1918).—About 500 yards west of the Seaboard Air Line station at Garysburg, on the first curve west of the station, directly across the track from the west corner of a white house, 70 yards west of a road crossing, and about 2 yards north of the north rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the west face of the brick bank building 70.40 meters (231.0 feet) from the station in azimuth 175° 25′. The elevation of the station mark is 42.668 meters (139.987 feet) and of the reference mark 42.587 meters (139.721 feet).

Cin (Northampton County, M. Steinberg, 1918).—About ½ mile east of the Seaboard Air Line Railway station at **Garysburg**, about 200 yards west of the center of the first curve east of the depot, 200 yards east of a switch target, across a small ditch and about 2 feet above the track, 2 yards from a road running parallel to the track, and 6.14 meters (20.1 feet) south of the south rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track 16.51 meters (54.2 feet) from the station in azimuth 113° 21′. The elevation of the station mark is 41.131 meters (134.944 feet) and of the reference mark 40.838 meters (133.983 feet).

Cim (Northampton County, M. Steinberg, 1918).—About 2 miles west of the Seaboard Air Line Railway station at **Gumberry**, at about the middle of the first curve west of the station, at the edge of pine woods, on level ground, at the top of a rise, 10 feet above the track, and 15.71 meters (51.5 feet) north of the north rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is directly across the track at the top of the bank 27.90 meters (91.5 feet) from the station in azimuth 337° 17′. The elevation of the station mark is 44.452 meters (145.840 feet) and of the reference mark 44.716 meters (146.706 feet).

Cil (Northampton County, M. Steinberg, 1918).—About 1 mile east of the Seaboard Air Line Railway station at **Gumberry** on the first curve east of the station, at the bottom of a ditch, 4 feet below the track, about 20 yards east of a whistle post, 200 yards west of a road crossing, 100 yards west of a new white house, and 4.22 meters (13.8 feet) south of the south rail. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track, 18.88 meters (61.9 feet) from the station in azimuth 196° 49′. The elevation of the station mark is 42.420 meters (139.173 feet) and of the reference mark 42.821 meters (140.489 feet).

Cik (Northampton County, M. Steinberg, 1918).—About 1 mile west of the Seaboard Air Line Railway station at **Seaboard**, 100 yards west of milepost 70, on top of a 5-foot rise, 2 feet north of a line of telegraph poles, directly across a field from a tobacco barn on the opposite side of the track, and 8.64 meters (28.3 feet) south of the south rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark

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is directly across the track on top of a bank 20.50 meters (67.3 feet) from the station in azimuth 143° 54′. The elevation of the station mark is 45.073 meters (147.877 feet) and of the reference mark 44.194 meters (144.993 feet).

Cig (Northampton County, M. Steinberg, 1918, 1919).—About 880 yards west of the Seaboard Air Line Railway Station at **Seaboard**, at the beginning of the first curve west of the station, at the top of a slope leading from the track, on ground about 1 foot lower than the track, about 30 yards west of the most westerly negro house on the opposite side of the track, 200 yards west of a road crossing, 50 yards east of a switch target, and 5.77 meters (18.9 feet) south of the south rail of the main track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track 2 yards from the road and 78.329 meters (256.98 feet) from the station in azimuth 221° 41′. The elevation of the station mark is 39.097 meters (128.271 feet) and of the reference mark 37.559 meters (123.225 feet).

Cid (Northampton County, M. Steinberg, 1918).—About ¼ mile east of the Seaboard Air Line Railway station at **Seaboard**, at about the middle of the first curve east of the station, in a clump of pine trees, 10 yards south of a wagon road which runs parallel to the track, about 60 yards southeast of a negro house and about the same distance southwest from another negro house both on the opposite side of the wagon road, and 11.72 meters (38.5 feet) north of the north rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the south face of the chimney of a new house, 54.461 meters (178.68 feet) from the station in azimuth 106° 31′. The elevation of the station mark is 37.699 meters (123.684 feet) and of the reference mark 38.782 meters (127.237 feet).

Cib (Northampton County, M. Steinberg, 1918).—About 1½ miles east of the Seaboard Air Line Railway station at **Seaboard**, about 650 yards east of milepost 68, across a ditch, about 3 feet higher than the track, 60 yards west of a negro house, directly across the track from a small barn, and 6.53 meters (21.4 feet) south of the south rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track, toward the negro house, and 38.438 meters (126.11 feet) from the station in azimuth 215° 04′. The elevation of the station mark 36.442 meters (119.560 feet) and of the reference mark 36.490 meters (119.718 feet.

Cia (Northampton County, M. Steinberg, 1918).—About 2 miles east of the Seaboard Air Line Railway station at **Seaboard**, 165 yards east of milepost 67, at the bottom of a 5-foot fill, and 4.65 meters (15.3 feet) north of the north rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track, 25.738 meters (84.44 feet) from the station in azimuth 282° 44′. The elevation of the station mark is 29.422 meters (96.529 feet) and of the reference mark 31.234 meters (102.474 feet).

Cra (Northampton County, M. Steinberg, 1918).—About 2½ miles east of the Seaboard Air Line Railway station at **Seaboard**, about 900 yards west of milepost 66, at the top edge of a fill, about 125 yards east of a country road leading to Stancell farm, and 2.45 meters (8.0 feet) south of the south rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, toward the road crossing, and 114.57 meters (375.9 feet) from the station in azimuth 66° 51′. The elevation of the station mark is 32.210 meters (105.676 feet) and of the reference mark 32.555 meters (106.808 feet).

Cet (Northampton County, M. Steinberg, 1918).—About 2½ miles west of the Seaboard Air Line Railway station at **Margarets**, 525 yards east of milepost 66, on level ground at the top of a rise, 10 feet above the track, 260 yards east of an overhead bridge, and 9.73 meters (31.9 feet) south of the south rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is directly across the track from the station, on top of the bank, and 25.72 meters (84.4 feet) from the station in azimuth 175° 57′.

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The elevation of the station mark is 34.342 meters (112.670 feet) and of the reference mark 33.896 meters (111.207 feet).

Cer (Northampton County, M. Steinberg, 1918).—About 2¼ miles west of the Seaboard Air Line Railway station at **Margarets**, 67 rail lengths west of milepost 65, 6 telegraph poles west of a section house at a road crossing, 35 yards west of a whistle post, on level ground at the foot of a cut about 1 foot lower than the track and 4.105 meters (13.47 feet) south of the south rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, toward the section house, and 82.23 meters (269.8 feet) from the sation in azimuth 227° 38′. The elevation of the station mark is 29.669 meters (97.339 feet) and of the reference mark 29.265 meters (96.014 feet).

Cep (Northampton County, M. Steinberg, 1918; 1919).—About 1¾ miles west of the Seaboard Air Line Railway station at **Margarets**, 140 yards east of milepost 65, 535 yards east of a road crossing, on the opposite side of a ditch from the track, on level ground at the top of a small rise, 3 feet higher than the track, and 12.665 meters (41.55 feet) north of the north rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track from the station, 28.845 meters (94.64 feet) from the station in azimuth 301° 36′. The elevation of the station mark is 26.222 meters (86.030 feet) and of the reference mark 25.808 meters (84.672 feet).

Cel (Northampton County, M. Steinberg, 1918).—About 1½ miles west of the Seaboard Air Line Railway station at **Margarets**, about 700 yards east of milepost 65, at the edge of the woods, on level ground about 3 feet lower than the track, and 13.64 meters (44.8 feet) north of the north rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is across the track from the station 4 yards east of the largest pine and 34.415 meters (112.91 feet) from the station in azimuth 339° 12′. The elevation of the station mark is 22.084 meters (72.454 feet) and of the reference mark 21.983 meters (72.123 feet).

Cef (Northampton County, M. Steinberg, 1918).—About 1 mile west of the Seaboard Air Line Railway station at **Margarets**, at the beginning of the first curve west of the station, at the top of a fill, and 1.8 meters (6 feet) north of the north rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the fourth step from the top of a culvert under the track. It is 23.72 meters (77.8 feet) from the station in azimuth 76° 56′. The elevation of the station mark is 20.428 meters (67.021 feet) and of the reference mark 17.081 meters (56.040 feet).

Ced (Northampton County, M. Steinberg, 1918).—About 100 yards west of the Seaboard Air Line Railway station at **Margarets**, 15 yards east of the most westerly switch target, 25 yards east of a road crossing, and 4.16 meters (13.6 feet) south of the south rail of the main track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is the U. S. Geological Survey primary traverse station No. 4, an iron post stamped "Prim. Trav. Sta. No. 4, 1918," about 2 yards north of the road and 8.369 meters (27.46 feet) from the station in azimuth 35° 42′. The elevation of the station mark is 15.899 meters (52.162 feet) and of the reference mark 16.453 meters (53.980 feet).

Caz (Northampton County, M. Steinberg, 1918; 1919).—About ¼ mile east of the Seaboard Air Line Railway station at **Margarets**, about 380 yards west of the railroad water tank, about 100 yards east of a small group of negro cabins, and 6.345 meters (20.82 feet) north of the north rail. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet in the south face of the southwest post of the water tank, 379.71 meters (1,245.8 feet) from the station in azimuth 250° 09′. The elevation of the station mark is 14.822 meters (48.629 feet) and of the reference mark 14.269 meters (46.814 feet).

Care (Northampton County, M. Steinberg, 1918).—About 2½ miles east of the Seaboard Air Line Railway station at **Margarets**, on the second curve east of the station, on the south side of the track, 320 yards west of the west end of the trestle

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over a river, at the border of the woods, at the foot of a slope leading from the track, 15 feet below the track, and about 8 yards east of a fence running perpendicular to the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is at the edge of a cornfield on the other side of the fence 15.94 meters (52.3 feet) from the station in azimuth 28° 09′. The elevation of the station mark is 11.425 meters (37.484 feet) and of the reference mark 12.314 meters (40.400 feet).

Bench mark **Y 11**.—About 3 miles west of **Branchville**, Southampton County, Va., on the Seaboard Air Line Railway, at milepost 60, on the west abutment of the bridge over the Meherrin River, 8 inches from the west foot of the bridge, and 4 feet south of the track, in the granite capstone. The highest point in a deep square cut. (12.776 meters, or 41.916 feet.)

Bench mark **X 11**.—About 2¾ miles west of **Branchville**, Southampton County, Va., on the Seaboard Air Line Railway, at mileage 59.7, 100 feet east of a switch block, at the west end of a bridge over a creek, on the top of the second granites step 8 feet south of the track. The highest point of a square cut. (12.344 meters, or 40.499 feet.)

Ceda (Southampton County, Va., M. Steinberg, 1918).—About 1½ miles west of the Seaboard Air Line Railway station at **Branchville**, 23¼ telegraph poles west of milepost 58, 2.95 meters (9.7 feet) south of the south rail, directly in front of the east end of the house occupied by Robert Oderby, and 15 yards east of a road leading to it. The underground mark is a nail in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of the chimney of Oderby's house, 75.53 meters (247.8 feet) from the station in azimuth 331° 35′. The elevation of the station mark is 13.340 meters (43.766 feet) and of the reference mark 14.657 meters (48.087 feet).

Bench mark No. 5 (U. S. G. S.).—At **Branchville**, Southampton County, Va., at the southeast corner of the Seaboard Air Line Railway depot, in line with the east fence, and 2 feet south of the wall. An iron post stamped "No. 5, 1918." (13.308 meters, or 43.661 feet.)

Cay (Southampton County, Va., M. Steinberg, 1918).—About ½ mile east of the Seaboard Air Line Railway station at **Branchville**, at about the middle of the first curve east of the station, 10.42 meters (34.2 feet) north of the north rail, 10 yards south of the right-of-way fence, and 135 yards east of a culvert under the track. The underground mark is a nail in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the west face of the chimney of a negro dwelling, 106.53 meters (349.5 feet) from the station in azimuth 221° 37′. The elevation of the station mark is 11.327 meters (37.162 feet) and of the reference mark 12.808 meters (42.021 feet).

Boykins (Southampton County, Va., M. Steinberg, 1918).—About 175 yards west of the Seaboard Air Line Railway station at **Boykins**, 15.56 meters (51.0 feet) south of the south rail of the main track, nearly due south of a point midway between the third and fourth switch targets west of the railway station, 3 yards southwest of the fifth telegraph pole west of the station, 2 yards south of a road running parallel to the track, and 1 yard north of a fence line. The underground mark is a nail in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the southwest corner of a new brick building on the opposite side of the track, 53.21 meters (174.6 feet) from the station in azimuth 198° 32′. The elevation of the station mark is 11.427 meters (37.490 feet) and of the reference mark 11.848 meters (38.871 feet).

Caw (Southampton County, Va., M. Steinberg, 1918; 1919).—About 220 yards east of the Seaboard Air Line Railway station at **Boykins**, 65 yards east of milepost 54, 65 yards west of a railroad water tank, 4.523 meters (14.84 feet) south of the south rail, 2 yards west of the east end of a brick warehouse, 10 yards north of the warehouse, and 4 yards east of the most easterly switch target at Boykins. The underground mark is a nail in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the northwest corner of the brick warehouse, 31.50 meters (103.3 feet) from the station in azimuth 31° 49′. The elevation of the station mark is 10.880 meters (35.695 feet) and of the reference mark 11.520 meters (37.795 feet).

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Cat (Southampton County, Va., M. Steinberg, 1918).—About 1 mile east of the Seaboard Air Line Railway station at **Boykins**, 130 yards east of milepost 53, 2.01 meters (6.6 feet) north of the north rail, at the top edge of the slope leading down from the track. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the opposite side of the track and 34.40 meters (112.9 feet) from the station in azimuth 20° 50′. The elevation of the station mark is 16.856 meters (55.302 feet) and of the reference mark 16.365 meters (53.691 feet).

Cas (Southampton County, Va., M. Steinberg, 1918; 1919).—About 1⅛ miles east of the Seaboard Air Line Railway station at **Boykins**, about 980 yards west of milepost 52, 1.660 meters (5.45 feet) north of the north rail, at the edge of a slope leading from the track, and at the same level as the track. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 22.899 meters (75.13 feet) from the station in azimuth 216° 16′. The elevation of the station mark is 18.619 meters (61.086 feet) and of the reference mark 19.502 meters (63.983 feet).

Cap (Southampton County, Va., M. Steinberg, 1918).—About 2 miles east of the Seaboard Air Line Railway station at **Boykins**, about 100 yards east of milepost 52, 5.860 meters (19.23 feet) south of the south rail, 25 yards east of a country road, and 200 yards west of the only house in the vicinity. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 20.805 meters (68.26 feet) from the station in azimuth 130° 04′. The elevation of the station mark is 23.972 meters (78.648 feet) and of the reference mark 25.596 meters (83.976 feet).

Can (Southampton County, Va., M. Steinberg, 1918).—About 2 miles west of the Seaboard Air Line Railway station at **Newsoms**, 567 feet west of milepost 51, 5.71 meters (18.7 feet) south of the south rail, on top of a rise about 10 feet above the track, and 5½ telegraph poles east of a whistle post. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 8.182 meters (26.84 feet) from the station in azimuth 320° 20′. The elevation of the station mark is 30.953 meters (101.552 feet) and of the reference mark 29.932 meters (98.202 feet).

Cam (Southampton County, Va., M. Steinberg, 1918).—About 220 yards west of the Seaboard Air Line Railway station at **Newsoms**, about 45 yards west of a whistle post, 80 yards east of a house, 13.440 meters (44.09 feet) north of the north rail, 2 yards north of a road running parallel to the track, and 12 yards west of a culvert under the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the north face of a culvert 11.815 meters (38.76 feet) from the station in azimuth 301° 13′. The elevation of the station mark is 27.228 meters (89.331 feet) and of the reference mark 27.222 meters (89.311 feet).

Newsoms (Southampton County, Va., M. Steinberg, 1918).—About 135 yards east of the Seaboard Air Line Railway station at **Newsoms**, about 30 yards east milepost 49, 6.053 meters (19.86 feet) north of the north rail, and 5 yards south of a road running parallel to the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 22.710 meters (74.51 feet) from the station in azimuth 185° 45′. The elevation of the station mark is 28.106 meters (92.211 feet) and of the reference mark 28.544 meters (93.648 feet).

Bench mark 92 (U. S. G. S.).—About 1 mile east of **Newsoms**, Southampton County, Va., on the Seaboard Air Line Railway, 700 feet north of milepost 48, north of a road crossing and west of the track. An iron post stamped "92, 1918." (28.234 meters, or 92.631 feet.)

Cal (Southampton County, Va., M. Steinberg, 1918).—About 2½ miles east of the Seaboard Air Line Railway station at **Newsoms**, at a point known as Gum Crossing, 4.085 meters (13.40 feet) south of the south rail, 10 yards east of a road crossing, 25 yards north of the only house in the vicinity, and about 165 yards east of the site of an old sawmill. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark

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is 24.915 meters (81.74 feet) from the station in azimuth 108° 18′. The elevation of the station mark is 27.416 meters (89.947 feet) and of the reference mark 27.593 meters (90.528 feet).

Buck (Southampton County, Va., M. Steinberg, 1918).—About 1½ mile west of the Seaboard Air Line Railway station at **Hand**, 4¾ telegraph poles west of milepost 45, 13.2 meters (43 feet) north of the north rail, 2 yards north of a road running parallel to the track, and about ¼ mile west of a house near the cross road. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 26.345 meters (86.43 feet) from the station in azimuth 66° 21′. The elevation of the station mark is 17.332 meters (56.863 feet) and of the reference mark 16.428 meters (53.898 feet).

Bench mark 9 P (U. S. G. S.). At **Hand**, Southampton County, Va., southeast of the southeast corner of the Seaboard Air Line Railway depot, at the corner of a fence about 50 feet south of the track. An iron post stamped "35′ 1918." (10.654 meters, or 34.954 feet.)

Mack (Southampton County, Va., J. S. Bilby, 1918).—About ½ mile east of the Seaboard Air Line Railway station at **Hand**, 6¾ telegraph poles west of milepost 43, in a cotton field, 21.475 meters (70.46 feet) south of the south rail, 58 yards west of the west side of a house, and directly across the field from the smaller of two barns belonging to the same house. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 13.625 meters (44.70 feet) from the station in azimuth 194° 18′. The elevation of the station mark is 9.181 meters (30.121 feet) and of the reference mark 9.038 meters (29.652 feet).

Cab (Southampton County, Va., J. S. Bilby, 1918).—At the freight station at **Delawares**, on the Seaboard Air Line Railway, ¾ mile east of the passenger station, 4⅓ telegraph poles west of mile post 41, 3.595 meters (11.8 feet) south of the south rail, 5 yards east of a crossroad, and 17 yards east of the east side of the freight depot. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 13.18 meters (43.2 feet) from the station in azimuth 14° 37′. The elevation of the station mark is 7.967 meters (26.138 feet) and of the reference mark 7.978 meters (26.174 feet).

Bench mark **U 10**.—About 4 miles west of **Franklin**, Southampton County, Va., on the Seaboard Air Line Railway, on the third culvert beyond the city, in the second stone step at the southeast quarter of the culvert. A square cut. (7.465 meters, or 24.491 feet.)

Louis (Southampton County, Va., J. S. Bilby, 1918).—About ½ mile west of the Seaboard Air Line Railway station at **Franklin**, on the first curve west of the station, 6.305 meters (20.69 feet) south of the south rail, on top of a small rise, 3 feet above the track, directly across the track from a white water tank in the yard of a large yellow house owned by Mr. Pace, 65 yards west of a whistle post, and 15 yards west of the west side of a negro cabin. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 23.920 meters (78.48 feet) from the station in azimuth 245° 23′. The elevation of the station mark is 8.409 meters (27.589 feet) and of the reference mark 8.838 meters (28.996 feet).

Franklin (Southampton County, Va., J. S. Bilby, 1918).—About 190 yards west of the Seaboard Air Line Railway station at **Franklin**, 10.225 meters (33.55 feet) south of the south rail of the main track, on the side of a slope, 3 feet below the track, 25 yards west of the west side of the Franklin Peanut Co. factory, and directly across the track from a large bell mounted on a steel scaffold. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 12.045 meters (39.52 feet) from the station in azimuth 73° 08′. The elevation of the station mark is 4.485 meters (14.715 feet) and of the reference mark 5.267 meters (17.280 feet).

Bench mark **P 10**.—At **Franklin**, Southampton County, Va., on the Seaboard Air Line Railway, on the southwest side of Main Street, at the southeast corner of the new post-office building, in the south face of the brickwork, 10 inches from

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the corner and 4 feet above the ground. A brass disk. (7.380 meters or 24.213 feet.)

Bench mark **O 10**.—At **Franklin**, Southampton County, Va., on the Seaboard Air Line Railway, on the northeast side of Main Street and the west side of Second Avenue, in the southeast corner of the large brick building of the W. T. Pace Hardware Co., in the center of the column on the south face, about 4 feet above the pavement. A brass disk. (6.957 meters, or 22.825 feet.)

Bench mark **N 10**.—At **Franklin**, Southampton County, Va., in the southwest corner of the Seaboard Air Line Railway depot, 4½ feet east of the corner and 4 feet above the ground. A brass disk. (7.114 meters, or 23.340 feet.)

Bench mark **M 10**.—At **Franklin**, Southampton County, Va., on the Seaboard Air Line Railway, about ⅛ mile east of the depot, on the coping at the northeast corner of the bridge over Blackwater Creek. A brass disk. (5.380 meters, or 17.651 feet.)

Small (Isle of Wight County, Va., J. S. Bilby, 1918).—About 1 mile east of the railway station at **Franklin**, on the Seaboard Air Line Railway, 135 yards south of milepost 36, 7.71 meters (25.3 feet) north of the north rail, and 25 yards east of the first negro cabin east of the trestle of the Southern Railway. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 15.852 meters (52.01 feet) from the station in azimuth 225° 53′. The elevation of the station mark is 9.455 meters (31.020 feet) and of the reference mark 9.348 meters (30.669 feet.)

Low (Isle of Wight County, Va., J. S. Bilby, 1918).—About 1½ miles east of the Seaboard Air Line Railway station at **Franklin**, at about the middle of the first curve east of the station, 7.70 meters (25.3 feet) north of the north rail, 2 yards south of the right-of-way fence, 15 yards west of a whistle post, and about 135 yards west of a road crossing leading to a house on the south side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 16.935 meters (55.56 feet) from the station in azimuth 59° 27′. The elevation of the station mark is 8.666 meters (28.432 feet) and of the reference mark 8.381 meters (27.497 feet).

Burnt (Isle of Wight County, Va., J. S. Bilby, 1918).—About 2 miles east of the Seaboard Air Line Railway station at **Franklin**, about 55 yards west of milepost 35, 12.34 meters (40.5 feet) north of the north rail, and about 25 yards south of a road running parallel to the track. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 27.095 meters (88.89 feet) from the station in azimuth 335° 39′. The elevation of the station mark is 10.235 meters (33.579 feet) and of the reference mark 9.887 meters (32.438 feet).

Carrs (Isle of Wight County, Va., J. S. Bilby, 1918).—About ½ mile east of the Seaboard Air Line Railway station at **Carrsville**, at the beginning of the first curve east of the station, 7.305 meters (23.97 feet) north of the north rail, 2 yards south of the right-of-way fence, directly across a field from a large barn, and 60 yards west of a crossroad. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 8.254 meters (27.08 feet) from the station in azimuth 83° 00′. The elevation of the station mark is 24.955 meters (81.873 feet) and of the reference mark 25.066 meters (82.237 feet).

Center (Isle of Wight County, Va., J. S. Bilby, 1918).—About 1 mile east of the Seaboard Air Line Railway station at **Carrsville**, at approximately the middle of the first curve east of the station, 120 yards west of milepost 30, 8.758 meters (28.73 feet) north of the north rail, and 3 feet south of the right-of-way fence. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in note 1*a* and 11*a*. The reference mark is 22.80 meters (74.8 feet) from the station in azimuth 357° 59′. The elevation of the station mark is 25.647 meters (84.144 feet) and of the reference mark 25.590 meters (83.957 feet).

Hill (Isle of Wight County, Va., J. S. Bilby, 1918; 1919).—About 1½ miles east of the Seaboard Air Line Railway station at **Carrsville**, 13¾ telegraph poles west of milepost 29, 9.940 meters (32.61 feet) north of the north rail, 2 feet south of the right-of-way fence, and 50 yards east of a crossroad. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference

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marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 25.565 meters (83.87 feet) from the station in azimuth 12° 56′. The elevation of the station mark is 24.250 meters (79.560 feet) and of the reference mark 24.137 meters (79.189 feet.)

Purvis (Nansemond County, Va., J. S. Bilby, 1918).—About 1 mile west of the Seaboard Air Line Railway station at **Purvis**, 3⅔ telegraph poles east of milepost 27, 5.460 meters (17.91 feet) south of the south rail, and on level ground at the same elevation as the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 20.725 meters (68.00 feet) from the station in azimuth 184° 46′. The elevation of the station mark is 24.482 meters (80.321 feet) and of the reference mark 24.402 meters (80.059 feet).

Kilby (Nansemond County, Va., J. S. Bilby, 1918).—About 2¾ miles west of Suffolk and 2¾ telegraph poles west of the railway station at **Kilby**, about midway between the tracks of the Virginian Railway and those of the Seaboard Air Line Railway, 6 yards south of a fence dividing the railway property, and on ground about 12 feet higher than the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 16.625 meters (54.54 feet) from the station in azimuth 105° 20′. The elevation of the station mark is 22.210 meters (72.867 feet) and of the reference mark 22.147 meters (72.661 feet).

Church (Nansemond County, Va., J. S. Bilby, 1918; 1919).—About 1 mile west of the Virginian Railway station at **Suffolk**, on the first curve west of the station, on top of a bank, 10 feet above and 15 yards north of the track, directly in line with a line of telegraph poles, on line between a church spire and the city standpipe across the track, 190 yards west of the railway water tank, and 25 yards south of the most southerly of a group of negro cabins around a negro church. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 16.435 meters (53.92 feet) from the station in azimuth 240° 12′. The elevation of the station mark is 12.921 meters (42.392 feet) and of the reference mark 13.262 meters (43.510 feet).

Bench mark **T 9**.—At **Suffolk**, Nansemond County, Va., on the Seaboard Air Line and the Virginian Railways, in the southeast corner of the brick depot, 8 inches west of the corner and 3 feet above the ground. A brass disk. (11.014 meters, or 36.135 feet.)

Suffolk (Nansemond County, Va., J. S. Bilby, 1918; 1919).—About 220 yards east of the union railway station of the Seaboard Air Line and the Virginian Railways at **Suffolk**, on the Seaboard Air Line Railway, west of the Pinner St. viaduct (which crosses both railways), 40 yards from the west line of the bridge, on top of an embankment, about 15 feet higher than the track, 6 yards from the south rail, and 1 yard north of a house fence. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is under the third span of the bridge, 38.77 meters (127.2 feet) from the station in azimuth 258° 02′. The elevation of the station mark is 13.701 meters (44.951 feet) and of the reference mark 13.547 meters (44.445 feet).

Bench mark **Q 9**.—About 1¼ miles east of **Suffolk**, Nansemond County, Va., on the Seaboard Air Line Railway, on a stone on the west end of the north side of the bridge over Tringle Creek. A square cut. (6.660 meters, or 21.850 feet.)

Shade (Nansemond County, Va., J. S. Bilby, 1918; 1919).—About ⅝ mile east of the railway station at **Magnolia**, about midway between the tracks of the Seaboard Air Line Railway and those of the Virginian Railways, directly across the track from a negro dwelling which sets back in a large yard, on the south side of the Virginian Railway track, 16.25 meters (53.3 feet) from the south rail, 4 meters (13 feet) from the north rail of the Seaboard Air Line track, and about 9 yards east of a crossroad leading to the above-mentioned dwelling. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 30.77 meters (101.0 feet) from the station in azimuth 345° 49′. The elevation of the station mark is 6.780 meters (22.244 feet) and of the reference mark 6.866 meters (22.526 feet).

Algren (Norfolk County, Va., J. S. Bilby, 1918; 1919).—About 8 miles east of **Suffolk**, on the Virginian Railway, 14¾ telegraph poles east of milepost 16.

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155 yards west of a block-signal tower known as Algren and located at the intersection of the Virginian and the Seaboard Air Line Railways, 10.92 meters (35.8 feet) north of the north rail, about 20 yards west of a semaphore signal, and on level ground at about the same elevation as the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 23.34 meters (76.6 feet) from the station in azimuth 333° 04′. The elevation of the station mark is 6.479 meters (21.257 feet) and of the reference mark 6.352 meters (20.840 feet).

Sunray (Norfolk County, Va., J. S. Bilby, 1918).—About 80 yards east of the railway station at **Sunray**, on the Virginian Railway, 18 yards east of a crossroad, 3.690 meters (12.11 feet) north of the north rail, at the same elevation as the track, and midway between the track and the ditch. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 25.57 meters (83.9 feet) from the station in azimuth 260° 09′. The elevation of the station mark is 6.428 meters (21.089 feet) and of the reference mark 5.484 meters (17.992 feet).

Wood (Norfolk County, Va., J. S. Bilby, 1918).—About 5 miles west of **Portsmouth**, 40 yards west of the tenth telegraph pole west of milepost 10, 9.228 meters (30.28 feet) south of the south rail, across a small stream and about 2 feet lower than the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 14.750 meters (48.39 feet) from the station in azimuth 281° 54′. The elevation of the station mark is 4.794 meters (15.728 feet) and of the reference mark 4.811 meters (15.784 feet).

Bench mark **E 9**.—About 2 miles west of **Portsmouth**, Norfolk County, Va., on the Virginian Railway, 380 feet west of the Gilmerton Street car line, on the top of the southwest pier supporting the water tank. The southeast corner of an iron plate, marked by a cold chisel. (2.710 meters, or 8.891 feet.)

Bench mark **D 9**.—About 2 miles west of **Portsmouth**, Norfolk County, Va., on the Virginian Railway, 360 feet west of the Gilmerton Street car line crossing, in the north face of the northeast foundation pier of a cement water tank, 28 feet south of the track and 28 inches above the ground. A brass disk. (2.593 meters, or 8.507 feet.)

Bench mark **C 9**.—At **Portsmouth**, Norfolk County, Va., in the northeast quarter of the crossing of the Gilmerton Street car line and the Belt Line Railway, on top of a sewer wall. The southwest corner of the cast iron coping, marked by a cold chisel. (1.466 meters, or 4.810 feet.)

Creek (Norfolk County Va., J. S. Bilby, 1918.)—About 330 yards west of the Southern Branch of the Elizabeth River on the Virginian Railway, directly across the track from the seventh telegraph pole west of the drawbridge over the river, 16.23 meters (53.2 feet) north of the north rail, and about 65 yards south of the shore line of Paradise Creek. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 36.000 meters (118.11 feet) from the station in azimuth 261° 44′. The elevation of the station mark is 4.079 meters (13.383 feet) and of the reference mark 4.222 meters (13.852 feet.)

Porter (Norfolk County, Va., J. S. Bilby, 1918).—About 2 miles south of **Portsmouth**, on the west side of the Southern Branch of the Elizabeth River, about 450 yards from the shore of the river, about 330 yards north of the drawbridge of the Virginian Railway, about 200 yards north of the shore of Paradise Creek, and almost due north of the first indentation on the north shore west of the river. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 15.316 meters (50.25 feet) from the station in azimuth 296° 42′.

Paradise (U. S. E.) (Norfolk County, Va., J. B. Boutelle, 1912; 1918).—On the west side of the Southern Branch of the Elizabeth River, on the extreme end of the point on the north side of the mouth of Paradise Creek. The land back of the station has been filled in up to within about 50 yards of the station; between this and the station the ground is marshy. The station is marked by a drill hole in the top of a stone 9 by 6 inches square and projecting about 10

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inches above the ground. It is about 5 yards west of the high-water mark but is overflowed at extreme high water.

Baugh (Norfolk County, Va., H. A. Seran, 1913; 1918).—On the west side of the Southern Branch of the Elizabeth River, just south of the drawbridge of the Norfolk and Portsmouth Belt Line Railroad, and in the grounds of the Baugh Brothers Fertilizer Works. The station is the small ball on the top of the water tank. This tank was built very nearly over station Dick, which was destroyed when the tank was built.

Wilson (Norfolk County, Va., J. B. Boutelle, 1912; 1918).—On the east side of the Southern Branch of the Elizabeth River, a short distance south of the Norfolk and Portsmouth Belt Line Railroad bridge, on the northwest side of the platform surrounding the base of the water tank of the James G. Wilson Manufacturing Co. The station is marked by a drill hole in the center of a copper triangle, 3 inches on a side, screwed to the floor of the platform. The triangle is also stamped with the letters "C. & G. S." and the date, 1912.

Poco (Norfolk County, Va., J. B. Boutelle, 1912).—On the east side of the Southern Branch of the Elizabeth River, a short distance north of the Virginian Railway bridge. The station is the finial on the top of the large water tank of the Pocomoke Guano Co.

Bench mark **B 9**.—At **Portsmouth**, Norfolk County, Va., at the northeast corner of Naval Place and Seventh Street, opposite the entrance to the navy yard, on the center of the curbstone, 8 feet west of a fire plug and 17 feet east of the east curb of Seventh Street. A square cut. (2.240 meters, or 7.349 feet.)

Bench mark **A 9**.—At **Portsmouth**, Norfolk County, Va., in the navy yard, at the south end of the street running along the west side of building No. 72, on the northwest sounding quarter, on the granite coping of Dry Dock No. 3, 6½ inches north of the guard chain and 56 feet in a direct line from the gauge staff at the head of the dock. A brass disk. (1.916 meters, or 6.286 feet.)

Tidal bench mark No. 3 (Navy bench mark).—At **Portsmouth**, Norfolk County, Va., in the Navy Yard, at the east end of Dry Dock No. 1, above the mitre sill on the south stone wall. The horizontal line indicating the 28-foot mark, made by a copper rod. (1.306 meters, or 4.285 feet.)

Tidal bench mark No. 2 (Navy bench mark).—At **Portsmouth**, Norfolk County, Va., in the Navy Yard, on the north stone wall of the east fence of Dry Dock No. 1. The horizontal line passing through the number 28, made by a copper rod. (1.281 meters, or 4.203 feet.)

Tidal bench mark No. 5 (Norfolk Navy Yard principal bench mark).—At **Portsmouth**, Norfolk County, Va., in the navy yard, at the west end in the south quarter of Dry Dock No. 1, on the center of the rounding nose of the granite coping, 6 feet north of the north side of the granite steps on the south side of Lock No. 1 and 8 feet east of the top line of these steps. An outlined square. (1.876 meters, or 6.155 feet.)

Supplementary points.

Colon (Lee County, C. L. Garner, 1918).—At the first curve of the Seaboard Air Line Railway south of **Colon**, in the cultivated field of a railroad section foreman, about 50 yards southwest of a dwelling house, and at the intersection of the tangents of the east rails from north and south. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track from the station, on the edge of a shallow cut, 35 meters (115 feet) from the station in azimuth 316° 08′. The elevation of the station mark is 105.487 meters, or 346.085 feet.

Allenby A (Lee County, C. L. Garner, 1918).—About 300 yards south of an overhead railroad bridge crossing the Seaboard Air Line Railway at the first curve north of **Colon** railroad station, also the first curve north of milepost 195, at the edge of a small thicket, at the intersection of the tangents to the east rail from the south and the west rail from the north, and 19.93 meters (65.4 feet) from the rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on a bank on the opposite side of the track, about 3 yards from a telephone pole, about 20 yards south of a whistling post, and 29.41 meters (96.5 feet) from the station in azimuth 152° 00′.

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Allenby B (Lee County, C. L. Garner, 1918).—About ½ mile north of **Colon** railroad station, at the second curve north of the station, at the intersection of the west rail from the south and the west rail from the north, about 100 yards north of the Norfolk Southern Railroad overhead crossing, and 2.670 meters (8.76 feet) west of the west rail. The station is marked by a nail in a 2 by 4 inch stake which is set in concrete.

Allenby C (Lee County, C. L. Garner, 1918).—About ¾ mile north of the **Colon** railway station, at the third curve north of Colon, at the intersection of the west rail from the south and the east rail from the north, about 150 yards south of milepost 194, and 2.312 meters (7.59 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 12.565 meters (41.22 feet) from the station in azimuth 328° 28′. The elevation of the station mark is 81.978 meters, or 268.956 feet.

Allenby D (Lee County, C. L. Garner, 1918).—About ½ mile south of the station of the Seaboard Air Line Railway at **Osgood**, at the point of intersection of the second curve south of Osgood, about 200 yards north of milepost 194, 100 yards north of signboard "Colon," and 1.120 meters (3.67 feet) east of the east rail. The station is marked by a nail in a 2 by 4 inch stake which is set in concrete. There is no reference mark.

Allenby E (Lee County, C. L. Garner, 1918).—About 300 yards south of Osgood station, on the Seaboard Air Line Railway right of way, at first curve south of **Osgood**, at the intersection of the tangents to the east rail from the south and the west rail from the north, about 50 yards south of a concrete culvert, and 9.85 meters (32.3 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*a*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on land belonging to F. R. Snipes, 32.231 meters (105.74 feet) from the station in azimuth 322° 54′. The elevation of the station mark is 73.189 meters, or 240.121 feet.

Fetner (Wake County, M. Steinberg, 1918).—About 165 yards north of the Seaboard Air Line Railway station at **Cary**, about 4 yards east of the east rail, on top of a small cut, 1 yard north of a highway, and 20 yards south of a large white house on the same side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, across the highway, at the corner of a chicken yard, and 32.61 meters (107.0 feet) from the station in azimuth 13° 25′. The elevation of the station mark is 152.714 meters, or 501.029 feet.

Dod (Wake County, M. Steinberg, 1918).—About ¾ mile north of the Seaboard Air Line Railway station at **Cary**, on the line of the left rail tangent toward Raleigh of the northbound track, 16.8 meters (55 feet) west of the west rail of the southbound track, in a field at the top of a cut, and about 105 yards north of a road crossing. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, 10 yards from the track, and 41.67 meters (136.7 feet) from the station in azimuth 76° 15′. The elevation of the station mark is 154.044 meters, or 505.393 feet.

Thompson (Wake County, M. Steinberg, 1918).—About 4½ miles south of the railway station at **Raleigh**, on the Seaboard Air Line Railway, 44 meters (144 feet) south of milepost 162, at the north end of a 3-mile tangent, 13.62 meters (44.7 feet) east of the east rail, and 4 yards north of a highway. The underground mark is a nail set in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is on the same side of the track, midway between the track and the highway, and 47.11 meters (154.6 feet) from the station in azimuth 264° 09′. The elevation of the station mark is 144.848 meters, or 475.222 feet.

Method (Wake County, M. Steinberg, 1918).—About 1½ miles south of the depot at **Raleigh**, on the Seaboard Air Line Railway, at the end of the first long tangent south of the depot, on the line of the left rail of the northbound track toward Raleigh, about 140 yards east of the brick building of a power plant, directly across the track from a large telegraph wire standard, 10 yards west of a small negro cabin, on top of a small cut, and 8.56 meters (28.1 feet) east of the east rail of the northbound track. The underground mark is a nail set in concrete,

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as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the southeast corner of the east face of the brick building of a power house, and 136.8 meters (449 feet) from the station in azimuth 139° 21′. The elevation of the station mark is 127.691 meters, or 418.933 feet.

Southern (Wake County, M. Steinberg, 1918).—At **Raleigh,** about 100 yards east of the intersection of the tracks of the Southern and the Seaboard Air Line Railways, 3.60 meters (11.8 feet) north of the track of the Southern Railway, 20 yards southeast of the Raleigh Viaduct bridge, 15 yards east of the Southern Railway semaphore on the same side of the track, and 50 yards east of the water tank of the Southern Railway. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the base of a pier under the bridge, 18.94 meters (62.1 feet) from the station in azimuth 45° 16′. The elevation of the station mark is 96.277 meters, or 315.869 feet.

East (Wake County, M. Steinberg, 1918).—About 1 mile south of the railway station at **Raleigh,** on the Seaboard Air Line Railway, on the first curve south of a railroad trestle, on the line of the right rail tangent toward the trestle, about 30 yards south of the track, on top of a hill in front of a house occupied by W. J. Ellington, and 20 yards west of the house. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in the west face of the southwest pier under the house occupied by Ellington, and 17.7 meters (58 feet) from the station in azimuth 193° 52′. The elevation of the station mark is 88.083 meters, or 288.986 feet.

Raleigh longitude (Wake County, B. A. Gould, 1853; 1918).—At Raleigh, in the southeast corner of the Capitol Grounds, 58.67 meters (192.5 feet) east and 66.94 meters (219.6 feet) south of the center of the Capitol Building. The station is marked by two granite posts set firmly in the ground, the dimensions of one being 18 by 18 inches and the other 10 by 10 inches, each being 5 feet in length.

Millbrook (Wake County, M. Steinberg, 1918).—At **Millbrook** on the Seaboard Air Line Railway, 25 yards north of the railway station, 10 yards west of the west rail, on top of a 6-foot cut, and about 75 yards south of a large yellow house on the same side of the track. The underground mark is a nail set in concrete, as described in note 7*c*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the east face of a pier under the southeast corner of the above mentioned house and 78.40 meters (257.2 feet) from the station in azimuth 170° 00′. The elevation of the station mark is 97.025 meters, or 318.323 feet.

Doc (Wake County, M. Steinberg, 1918).—About $^1/_5$ mile north of the Seaboard Air Line Railway station at **Neuse,** on the first curve north of the station, on the line of the right rail tangent toward the station, 120 yards south of milepost 147, on top of a small rise at the beginning of a cut, 120 yards north of a switch target, and 5.5 meters (18 feet) west of the west rail. The underground mark is a nail in concrete, as described in note 7*c*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*a*. The reference mark is 15 yards west of the track and 18.0 meters (59 feet) from the station in azimuth 55° 15′. The elevation of the station mark is 84.583 meters, or 277.503 feet.

Primary traverse station No. 4 (U. S. G. S.) (Northampton County, M. Steinberg, 1918).—See description of Ced, page 70.

Primary traverse station No. 14 (U. S. G. S.) (Southampton County Va., M. Steinberg, 1918).—At **Boykins,** about 800 feet west of the Seaboard Air Line Railway station, 50 feet south of the south rail of the Seaboard Air Line main line track, and 30 feet north of the north rail of the Roanoke and Tar River Branch. The station mark is an iron post stamped "Prim. Tra. Sta. No. 14, 1918." The elevation of the station mark is 11.727 meters (38.474 feet).

Primary traverse station No. 7 P (U. S. G. S.) (Southampton County, Va., J. S. Bilby, 1918).—At **Franklin,** in the northwest corner of the crossing at High Street, 35 feet north of the Seaboard Air Line Railway track, and 3 feet west of the west side of the walk. The station mark is an iron post stamped "Prim. Trav. Sta. No. 7, 1918 P." The elevation of the station mark is 6.485 meters (21.276 feet).

Primary traverse station No. 5 P (U. S. G. S.) (Nansemond County, Va., J. S. Bilby, 1918).—At **Suffolk,** on the northeast corner of Maine and Milne Streets, in the yard of the courthouse, at the southwest corner of the county

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clerk's office. The station is marked by an iron post stamped "Prim. Trav. Sta. No. 5P, 1918." The elevation of the station mark is 9.579 meters (31.427 feet).

PRECISE TRAVERSE, SANFORD TO WILMINGTON, N. C.

Principal points and bench marks

For traverse stations and bench marks at Sanford, see pages 90, 91, 92, and 110.

Bench mark **R 23.**—At **Jonesboro,** Lee County, on the Atlantic Coast Line Railroad, in the west brick wall at the southwest corner of Watson's Merchandise Store about 2½ feet above the ground. A brass disk. (131.435 meters, or 431.216 feet.)

Bench mark **Q 23.**—About 2 miles north of **Swanns,** Lee county, on the Atlantic Coast Line Railroad, 15 feet west of the track, directly opposite a water tank, on a slight rise. A concrete post with disk in top. (98.378 meters, or 322.762 feet.)

Bench mark **P 23** —About 1 mile north of **Swanns,** Lee County, on the Atlantic Coast Line Railroad, on the southeast corner of the concrete abutment at the south end of a bridge over a creek. A brass disk. (84.932 meters, or 278.648 feet.)

Bench mark **V 23.**—At **Olivia,** Harnett County, on the Atlantic Coast Line Railroad, 200 feet north of the depot, 40 feet west of the main track, 10 feet west of a road and 40 feet north of the northeast corner of the post office. A concrete post with disk in top. (97.135 meters, or 318.684 feet.)

Spout Springs (Harnett County, M. Steinberg, 1918).—About ¾ mile north of Spout Springs depot, on the Atlantic Coast Line Railroad, about ½ mile east of the track, on a prominent hill which is covered with small oaks. It is reached by following the wagon road from the first crossing north of Spout Springs and is about 10 yards north of this road. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is on the opposite side of the road 20.51 meters (67.3 feet) from the station in azimuth 290° 28′.

Bench mark **J 23.**—At **Manchester,** Cumberland County, on the Atlantic Coast Line Railroad, 20 feet south of the depot and 25 feet west of the track, at the north side of a big tree. A concrete post with disk in top. (53.482 meters, or 175.466 feet.)

Prince (Cumberland County, M. Steinberg, 1918).—At Prince's Siding, Camp Bragg, on the Atlantic Coast Line Railroad, about 150 yards south of a highway crossing, 10 yards east of the road, on top of a deep cut, and about 30 yards west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is across the road 25.41 meters (83.4 feet) from the station in azimuth 278° 16′.

Camp (Cumberland County, M. Steinberg, 1918).—At the first curve south of **Camp Bragg** freight depot, on the Atlantic Coast Line Railroad, on the line of the left tangent, 15 yards east of the track, on top of a 10-foot cut and 5 yards east of the edge of same. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at the foot of telegraph pole 353, 12.80 meters (42.0 feet) from the station in azimuth 194° 13′. The elevation of the station mark is 88.896 meters, or 291.653 feet.

Lake (Cumberland County, M. Steinberg, 1918).—About 2¾ miles north of **Shaw** depot, on the Atlantic Coast Line Railroad, on the first curve north of the depot, on the line of the left tangent, 140 yards north of milepost 89, 20 yards east of a roadway, at the bottom of a fill, and 6 yards west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is 5 yards west of the road 24.44 meters (80.2 feet) from the station in azimuth 64° 03′. The elevation of the station mark is 75.114 meters, or 246.437 feet.

Bench mark **F 23.**—At **Shaw,** Cumberland County, on the Atlantic Coast Line Railroad, 10 feet south of the southeast corner of the depot and 20 feet east of the track. A concrete post with disk in top. (69.230 meters, or 227.132 feet.)

Shaw (Cumberland County, M. Steinberg, 1918).—About 1¼ miles south of **Shaw,** on the Atlantic Coast Line Railroad, 250 yards north of milepost 85

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and a road crossing, 125 yards south of a whistle post, on top of a 3-foot rise, and 8 yards west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is on the fence line 10.70 meters (35.1 feet) from the station in azimuth 110° 49′. The elevation of the station mark is 62.556 meters, or 205.236 feet.

Pine (Cumberland County, M. Steinberg, 1918).—About 2 miles north of Fayetteville, on the Atlantic Coast Line Railroad, nearly opposite the third curve north of the crossing of the main line and the Sanford Division, in pine woods on top of a hill, and about 300 yards east of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is 20.10 meters (65.9 feet) from the station in azimuth 79° 24′.

Fayetteville (Cumberland County, M. Steinberg, 1918).—At **Fayetteville**, on the Atlantic Coast Line Railroad, 100 yards east of the bridge over Cape Fear River, 10.2 meters (33.5 feet) west of a trestle over the creek, directly back of the Christian Ewing Plant, on the slope of a fill and about 3 feet from the bottom of same, 6 yards south of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is located in the southeast corner of a factory directly across the track, 32 meters (105 feet) from the station in azimuth 197° 08′. The elevation of the station mark is 23.807 meters or 78.107 feet.

Bench mark **C 23**.—At **Fayetteville**, Cumberland County, at the north end of the east face of the Armfield Co. Building on Hay Street, 3 feet above the ground. A brass disk. (32.563 meters, or 106.834 feet.)

Bench mark P. O. (U. S. G. S.).—At **Fayetteville**, Cumberland County, in the post-office building. An aluminum tablet. (32.681 meters, or 107.221 feet.)

Bench mark **D 23**.—At **Fayetteville**, Cumberland County, on the Atlantic Coast Line Railroad, at the south end of the east face of the switch tower at the crossing with the main line in the northern part of the city, about 3 feet above the ground. A brass disk. (31.140 meters, or 102.165 feet.)

Bench mark No. 40 (U. S. C. E.).—About 1½ miles east of **Fayetteville**, Cumberland County, on the Atlantic Coast Line Railroad, at the northeast abutment of the bridge over the Cape Fear River. A cross mark cut in the stone. (25.459 meters, or 83.527 feet.)

Vander (Cumberland County, M. Steinberg, 1918).—At **Vander**, on the Atlantic Coast Line Railroad, directly opposite the east end of the section house, 8 yards west of the west end of the section foreman's dwelling, and 6 yards north of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is northwest of the station, at the corner of an old store, and 20.18 meters (66.2 feet) from the station in azimuth 148° 18′. The elevation of the station mark is 45.947 meters, or 150.744 feet.

Bench mark **Z 22**.—About 2 miles west of **Stedman**, Cumberland County, on the Atlantic Coast Line Railroad, between mileposts 73 and 74, 35 feet west of a road crossing and 20 feet north of the track. A concrete post with disk in top. (41.463 meters, or 136.033 feet.)

Ville (Cumberland County, M. Steinberg, 1918).—About 1¼ miles west of **Autryville** depot, on the Atlantic Coast Line Railroad, on the second curve west of the depot, on the line of the right tangent from Autryville, 2 yards east of a road crossing, 90 yards west of a larger crossing, and 3 yards north of the north rail. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is on the opposite side of the track 22.06 meters (72.4 feet) from the station in azimuth 10° 05′. The elevation of the station mark is 38.694 meters, or 126.949 feet.

Autry (Cumberland County, M. Steinberg, 1918).—About 1 mile west of **Autryville**, on the Atlantic Coast Line Railroad, at the beginning of the first curve north of the depot, 80 yards east of milepost 69, at a small cut, and 4.55 meters (14.9 feet) north of the north rail. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is directly across the track 24.057 meters (78.93 feet) from the station in azimuth 35° 58′. The elevation of the station mark is 38.413 meters, or 126.027 feet.

Bench mark **V 22**.—At **Autryville**, Sampson County, on the Atlantic Coast Line Railroad, 65 feet east of the depot, 10 feet east of a road, 15 feet south of

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the track, 7 feet west of a water tank pier. A concrete post with disk in top. (33.029 meters, or 108.363 feet.)

Empie (Sampson County, M. Steinberg, 1918).—About ¾ mile east of **Autryville** depot, on the Atlantic Coast Line Railroad, 260 yards west of milepost 67, 260 yards west of a road crossing, 60 yards east of a whistle post, and 3 yards south of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at the corner of a hedge fence, on the opposite side of the track and road, 30.1 meters (98.8 feet) from the station in azimuth 187° 42′. The elevation of the station mark is 44.978 meters, or 147.565 feet.

Hayne (Sampson County, M. Steinberg, 1918).—At **Hayne**, on the Atlantic Coast Line Railroad, 50 yards east of the east end of the depot, 6 yards north of the north rail, 4 yards south of a road, and on top of a slight rise. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is on the opposite side of the road 28.5 meters (93.5 feet) from the station in azimuth 150° 02′. The elevation of the station mark is 46.526 meters, or 152.644 feet.

Bench mark **S 22**.—About 2¾ miles north of **Roseboro**, Sampson County, on the Atlantic Coast Line Railroad, 30 feet north of a road crossing and 30 feet east of the track. A concrete post with disk in top. (37.113 meters, or 121.762 feet.)

Roseboro (Sampson County, M. Steinberg, 1918).—About ¼ mile north of **Roseboro** depot, on the Atlantic Coast Line Railroad, on the first curve north of the depot, on the line of the left tangent toward the depot and of the left tangent toward Hayne, 60 yards northeast of the track, in the woods, and 30 yards east of a small road through the woods. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c* and 11*a*. The reference mark is on the west edge of the road 33.56 meters (110.1 feet) from the station in azimuth 109° 32′. The elevation of the station mark is 40.520 meters, or 132.939 feet.

Bench mark **P 22**.—At **Roseboro**, Sampson County, on the Atlantic Coast Line Railroad, 65 feet west of the main track, at the north end of the east face of the Coharie Bank Building, 1 foot above the ground. A brass disk. (41.323 meters, or 135.574 feet.)

Bench mark **Q 22**.—At **Roseboro**, Sampson County, on the Atlantic Coast Line Railroad, at the north end of the east face of A. M. Hall's store, 2 feet above the ground. A brass disk. (41.684 meters, or 136.758 feet.)

Bench mark **O 22**.—At **Mints**, Sampson County, on the Atlantic Coast Line Railroad, 1 foot south of the depot and 3 feet east of its southwest corner, 45 feet west of the track. A concrete post with disk in top. (43.300 meters, or 142.060 feet.)

Mentz (Sampson County, M. Steinberg, 1918).—About ¾ mile south of **Mints** depot, on the Atlantic Coast Line Railroad, on the first curve south of the depot on the line of the right tangent toward the depot, 100 yards north of the railroad water tank, 40 yards southeast of a negro dwelling on the same side of the track, and 10 yards west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is set at the foot of a pine tree 20.36 meters (66.8 feet) from the station in azimuth 46° 31′. The elevation of the station mark is 37.442 meters, or 122.841 feet.

Bench mark **M 22**.—At **Parkersburg**, Sampson County, on the Atlantic Coast Line Railroad, 1½ feet north of the foundation of the depot platform and 30 feet east of the main track. A concrete post with disk in top. (36.075 meters, or 118.356 feet.)

Garland (Sampson County, M. Steinberg, 1918).—At **Garland**, on the Atlantic Coast Line Railroad, directly across the track from the depot, 13 yards north of the south end of the depot platform, 9 yards west of the road, and 4.414 meters (14.5 feet) from the east rail. The station and underground marks are bronze tablets set in concrete, as described in notes 1*a* and 7*c*. The reference mark is a bronze tablet set in the south face of the Bank of Garland Building, 2 feet from the west end and 2 feet above ground, 41.36 meters (135.7 feet) from the station in azimuth 169° 09′. The elevation of the station mark is 41.595 meters, or 136.466 feet.

Bench mark **K 22**.—About 2¾ miles south of **Garland**, Sampson County, on the Atlantic Coast Line Railroad, in the forks of a road about 70 feet west of

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the track, near the southeast corner of an old storehouse. A concrete post with disk in top. (31.349 meters, or 102.851 feet.)

Bench mark **J 22.**—At **Tomahawk,** Sampson County, on the Atlantic Coast Line Railroad, 3 feet south of the depot platform and 45 feet west of the main track. A concrete post with disk in top. (30.352 meters, or 99.580 feet.)

Kerr (Sampson County, M. Steinberg, 1918).—About ¾ mile north of **Kerr** depot, on the Atlantic Coast Line Railroad, on the first curve north of the depot, on the left tangent toward the depot, 600 yards south of milepost 37, 150 yards north of the station whistle post, 100 yards south of a road crossing, 8 yards east of the track, and about midway between the track and a wagon road. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at the foot of a large pine to the northeast, 21.8 meters (71.5 feet) from the station in azimuth 196° 08′. The elevation of the station mark is 27.904 meters, or 91.548 feet.

Bench mark **H 22.**—At **Kerr,** Sampson County, on the Atlantic Coast Line Railroad, about 500 feet south of the depot, in the brick chimney on the north side of I. V. Peterson's house. A brass disk. (27.757 meters, or 91.066 feet.)

Moores (Sampson County, M. Steinberg, 1918).—About 2 miles south of **Kerr** depot, on the Atlantic Coast Line Railroad, about 275 yards south of Moore's siding, 10 yards east of the track, and 3 yards north of the first road crossing north of the siding. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is on the opposite side of the road, 15 yards east of the track, 16.75 meters (55.0 feet) from the station in azimuth 320° 40′. The elevation of the station mark is 22.936 meters, or 75.249 feet.

Black River (Sampson County, M. Steinberg, 1918).—At the first curve west of the bridge over Black River, on the Atlantic Coast Line Railroad, on the line of the left tangent toward the bridge, in a small clearing in the woods, 90 yards west of the wagon road. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is in range with the bridge 25.4 meters (83.3 feet) from the station in azimuth 234° 25′. The elevation of the station mark is 19.657 meters, or 64.491 feet.

Ivanhoe (Sampson County, M. Steinberg, 1918).—About ¾ mile north of **Ivanhoe** depot, on the Atlantic Coast Line Railroad, on the first curve north of the depot, on the line of the left tangent toward the depot and on the line of the right tangent looking through Black River bridge. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is to the west 26 meters (85.3 feet) from the station in azimuth 53° 09′. The elevation of the station mark is 8.907 meters, or 29.222 feet.

Bench mark **D 22.**—At **Ivanhoe**, Sampson County, on the Atlantic Coast Line Railroad, directly opposite the depot and 7 feet east of the track. A concrete post with disk in top. (9.852 meters, or 32.323 feet.)

Corbet (Pender County, M. Steinberg, 1918).—About 5½ miles north of **Atkinson,** on the Atlantic Coast Line Railroad, 680 yards north of milepost 29, and 2.5 meters (8.2 feet) west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is 28.18 meters (92.5 feet) from the station in azimuth 47° 42′. The elevation of the station mark is 24.614 meters, or 80.754 feet.

Atkinson (Pender County, M. Steinberg, 1918).—About ¾ mile north of **Atkinson,** on the Atlantic Coast Line Railroad, 150 yards south of milepost 25, 7.33 meters (24.1 feet) east of the east rail, directly across the track from a small greenhouse, 6 yards north and 8 yards west of a fence corner on grounds owned by W. T. Vick. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at a fence corner 13.55 meters (44.5 feet) from the station in azimuth 255° 52′. The elevation of the station mark is 20.862 meters, or 68.445 feet.

Bench mark **A 22.**—At **Atkinson,** Pender County, on the Atlantic Coast Line Railroad, directly opposite the depot and 70 feet east of the track, in the west face of Mallard's brick store. A brass disk. (19.802 meters, or 64.967 feet.)

Bench mark **Z 21.**—At **Rooks,** Pender County, on the Atlantic Coast Line Railroad, 35 feet north of the depot and 30 feet west of the track. A concrete post with disk in top. (18.376 meters, or 60.289 feet.)

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Denneys (Pender County, M. Steinberg, 1918).—About 3 miles south of **Rooks**, on the Atlantic Coast Line Railroad, on the first curve south of the depot and on the line of the left tangent toward same, in pine woods, 65 yards west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is about 35 yards west of the track 25.8 meters (84.6 feet) from the station in azimuth 218° 18′. The elevation of the station mark is 8.794 meters, or 28.852 feet.

Currie (Pender County, M. Steinberg, 1918).—About ¼ mile North of **Currie** depot, on the Atlantic Coast Line Railroad, on the first curve north of the depot and on the left tangent toward same, on the east side of the track among the trees and 30 yards from the rail. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is 23.16 meters (76.0 feet) from the station in azimuth 321° 29′. The elevation of the station mark is 10.205 meters, or 33.481 feet.

Montague (Pender County, M. Steinberg, 1918).—About 1 mile south of **Currie** depot, on the Atlantic Coast Line Railroad, on the first curve south of the depot and on the line of the right tangent toward the same, on level ground at the edge of woods, and 25 yards east of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at the foot of a large pine tree 13.95 meters (45.8 feet) from the station in azimuth 157° 56′. The elevation of the station mark is 11.063 meters, or 36.296 feet.

Bench mark **V 21**.—At **Montague**, Pender County, on the Atlantic Coast Line Railroad, directly opposite the depot and 15 feet west of the track. A concrete post with disk in top. (11.880 meters, or 38.976 feet).

Huggins (Pender County, M. Steinberg, 1918).—About 4 miles north of **Richards** depot, on the Atlantic Coast Line Railroad, 550 yards south of milepost 13, 200 yards north of a spur track, and about 5 yards west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is on the same side of the track 25.4 meters (83.3 feet) from the station in azimuth 84° 56′. The elevation of the station mark is 18.642 meters, or 61.161 feet.

Richards (Pender County, M. Steinberg, 1918).—About 9¼ miles north of **Wilmington** depot, on the Atlantic Coast Line Railroad, 8 yards east of the track, and south of the car siding. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is about 35 yards east of the track 24.5 meters (80.4 feet) from the station in azimuth 183° 54′. The elevation of the station mark is 11.521 meters, or 37.798 feet.

Dru (New Hanover County, M. Steinberg, 1918).—About 1½ miles north of **Yadkin Junction** on the Atlantic Coast Line Railroad, on the line of the right tangent toward Yadkin Junction, 20 yards south of milepost 3, on top of a small rise, 15 yards east of the east rail. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at the foot of a large tree, 40 yards east of the track, 15.9 meters (52.2 feet) from the station in azimuth 304° 21′. The elevation of the station mark is 9.116 meters, or 29.908 feet.

Yadkin (New Hanover County, M. Steinberg, 1918).—About ¾ mile west of Hilton Bridge, on the Atlantic Coast Line Railroad, at the old Atlantic Coast Line roadbed, 140 yards east of milepost 362, 170 yards west of the switch leading to the Sanford Division, 5 yards south of the south rail and on ground about 3 feet lower. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is about 12 yards south of the track and 29 meters (95 feet) from the station in azimuth 85° 14′. The elevation of the station mark is 1.205 meters (3.953 feet).

Bridge (New Hanover County, M. Steinberg, 1918).—At **Wilmington**, on the Atlantic Coast Line Railroad, at the east end of Hilton Bridge over Northeast River, 1.5 meters (4.9 feet) north of the north rail, and 1 yard east of the east end of the bridge. The station mark is a bronze tablet in the top face of the stone abutment. The reference mark is a U. S. Engineer's mark on the opposite side of the track in azimuth 327° 14′ from the station. The elevation of the station mark is 3.598 meters (11.804 feet) and of the reference mark 3.691 meters (12.110 feet).

Union (New Hanover County, M. Steinberg, 1918; 1921).—At **Wilmington**, at the northeast corner of Red Cross and Front Streets, on top of the general offices of the Atlantic Coast Line Railroad, on the topmost roof, about one-

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third of the way over from the east side, and 7 meters (23 feet) northeast of the flagpole. The station is marked by a bronze tablet set in the concrete roof. The reference mark is an arrow chiseled in the top of the south parapet, 4 meters (13 feet) from the east end, and 6.78 meters (22.2 feet) from the station in azimuth 356° 49′.

Bench mark **No. 8.**—At **Wilmington,** New Hanover County, at the north end of the west face of the post-office building. A brass disk. (10.619 meters, or 34.839 feet.)

Bench mark **No. 11.**—At **Wilmington,** New Hanover County, in the west wall of the new Federal Building. A brass disk. (2.428 meters, or 7.966 feet.)

Bench mark **No. 12.**—At **Wilmington,** New Hanover County, in the southeast corner of the American Bank and Trust Co.'s Building at Front and Market Streets. A brass disk. (5.497 meters, or 18.035 feet.)

Bench mark **O 21.**—At **Wilmington,** New Hanover County, at the east end of the south face of the Atlantic Coast Line Railroad depot, 3½ feet above the sidewalk on Front Street. A brass disk. (9.254 meters, or 30.361 feet.)

Supplementary points.

Spout Springs K. (Lee County, M. Steinberg, 1918)—At Swanns, on the Atlantic Coast Line Railroad, 60 yards north of a switch target. The station is marked by a file scratch on the west rail.

Spout Springs J. (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, in a deep cut at the first hill north of **Olivia.** The station is marked by a file scratch on the west rail.

Spout Springs I. (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve south of Olivia, on line of the left tangent toward Olivia, and 4 feet west of the track. The station is marked by a nail in a stake 2 by 4 inches in size.

Spout Springs H. (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve south of Olivia, and 1 yard west of the track. The station is marked by a nail in a wooden stake 2 by 4 inches in size.

Spout Springs G. (Harnett County, M. Steinberg, 1918).—About 2½ miles south of Pineview, on the Atlantic Coast Line Railroad, 125 yards south of milepost 102 in a deep cut. The station is marked by a file scratch on the east rail.

Dum (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the third curve north of **Pineview** depot and on the line of the left tangent to same, on top of a small cut, 10 yards west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is 20.8 meters (68.2 feet) from the station in azimuth 139° 59′. The elevation of the station mark is 98.209 meters, or 322.207 feet.

Dul (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the second curve north of **Pineview** and on the line of the right tangent from same, 140 yards south of milepost 106, and 12 yards east of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is 15 yards east of the track, 18.5 meters (60.7 feet) from the station in azimuth 321° 06′. The elevation of the station mark is 85.159 meters, or 279.392 feet.

Pineview (Harnett County, M. Steinberg, 1918).—About 60 yards north of the road crossing at **Pineview,** on the Atlantic Coast Line Railroad, on the line of the left tangent from Pineview, at the bottom of a cut, and about 2 yards east of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at the road crossing, 52.3 meters (171.6 feet) from the station in azimuth 346° 06′. The elevation of the station mark is 97.708 meters, or 320.564 feet.

Spout Springs F (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve south of Pineview, and 30 yards south of a whistle post. The station is marked by a nail in a wooden stake 2 by 4 inches in size projecting 2 feet above the ground.

Spout Springs E (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the second curve south of Pineview, on the line of the left tangent to Pineview, 5 yards east of the track, and at the foot of a cut. The station is marked by a nail in a wooden stake 2 by 4 inches in size, projecting 2 feet above the ground.

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Spout Springs D (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the reverse curve north of Spout Springs, 50 yards east of the beginning of a deep cut, and 3 feet east of the track. The station is marked by a nail in a wooden stake 2 by 4 inches in size projecting 18 inches above the ground.

Spout Springs C (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, halfway around the reverse curve north of Spout Springs. The station is marked by a nail in a wooden stake 2 by 4 inches in size nailed to a crosstie.

Spout Springs B (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve north of Spout Springs, 30 yards west of the track, and 25 yards south of a road crossing. The station is marked by a wooden stake 2 by 4 inches in size projecting 2 feet above the ground.

Spout Springs A (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve north of Spout Springs, on the right tangent to Spout Springs, on top of a cut, and 15 yards west of the track. The station is marked by a nail in a wooden stake.

Prince F′ (Harnett County, M. Steinberg, 1918).—About 1 mile north of Spout Springs, on the Atlantic Coast Line Railroad, 130 yards north of a wagon-road crossing on top of a hill. The station is marked by a file scratch on the east rail.

Prince F (Harnett County, M. Steinberg, 1918).—About ¾ mile north of Spout Springs, on the Atlantic Coast Line Railroad, 2 yards south of the first wagon-road crossing north of Spout Springs. The station is marked by a file scratch on the east rail.

Prince G (Harnett County, M. Steinberg, 1918).—About ¾ mile north of Spout Springs, 300 yards east of the Atlantic Coast Line Railroad, and halfway up a prominent hill. The station is marked by a nail in a wooden stake 2 by 4 inches in size.

Prince E (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve south of Spout Springs, on the line of the right tangent to Spout Springs, at the bottom of a cut, and 3 yards east of the track. The station is marked by a nail in a wooden stake 2 by 4 inches in size projecting 2 feet above the ground.

Duf (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, at the south end of the first curve south of **Spout Springs**, on the line of the left tangent from Spout Springs, 40 yards south of a whistle post, 6 yards east of the track, and on top of a small ditch. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at the edge of a wood 12.74 meters (41.8 feet) from the station in azimuth 218° 13′. The elevation of the station mark is 101.739 meters, or 333.789 feet.

Dud (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the second curve south of Spout Springs and on the left tangent from Spout Springs, at the top of a fill, 20 yards east of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is in the woods 13.2 meters (43.3 feet) from the station in azimuth 213° 02′.

Duc (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the second curve north of **Overhills** depot, on the line of the left tangent to Overhills, near the bottom of a fill, and 4 yards west of the track. The station, underground, and reference marks are bronze tablets set in concrete as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at the foot of a pine tree, 16.98 meters (55.7 feet) from the station in azimuth 357° 05′. The elevation of the station mark is 83.707 meters, or 274.629 feet.

Dub (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve north of **Overhills** depot and on the line of the right tangent toward Overhills, in the edge of a wood at the top of a cut and about 20 yards east of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is 15.95 meters (52.3 feet) from the station in azimuth 227° 28′. The elevation of the station mark is 72.202 meters, or 236.883 feet.

Prince D (Harnett County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, at the north end of the curve at Overhills, on the line of the left tangent looking south, and 20 yards west of the track. The station is marked by a nail in a wooden stake 2 by 4 inches in size projecting 2½ feet above the ground.

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Overhills (Harnett County, M. Steinberg, 1918.—At **Overhills**, on the Atlantic Coast Line Railroad, 50 yards south of milepost 97, and about 5 feet west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is at a fence corner on the opposite side of the track 43.65 meters (143.2 feet) from the station in azimuth 235° 15′. The elevation of the station mark is 60.207 meters, or 197.529 feet.

Manchester (Cumberland County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve north of **Manchester** depot, on the line of the left tangent to the depot, 25 yards east of the track, and 3 yards west of a wire fence. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is on the same side of the track 17.56 meters (57.6 feet) from the station in azimuth 146° 48′. The elevation of the station mark is 60.600 meters, or 198.818 feet.

Bragg (Cumberland County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve south of **Manchester** depot, on the line of the right tangent to Manchester, on a fill 1 yard west of the track. The station, underground, and reference marks are bronze tablets set in concrete, as described in notes 1*a*, 7*c*, and 11*a*. The reference mark is under a tree 21.5 meters (70.5 feet) from the station in azimuth 295° 45′. The elevation of the station mark is 63.665 meters, or 208.874 feet.

Prince C. (Cumberland County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, at the south end of the first curve south of Manchester, on the line of the right tangent looking north, 50 yards north of milepost 93, and 12 yards west of the track. The station is marked by a nail in a wooden stake 2 by 4 inches in size projecting 2½ feet above the ground.

Prince B (Cumberland County, M. Steinberg, 1918).—On the Atlantic Coast Line Railroad, on the first curve north of Prince's Siding, Camp Bragg, on the line of the left tangent looking south, 2 yards north of a whistle post, and 2 yards west of the track. The station is marked by a nail in a wooden stake 2 by 4 inches in size projecting 2 feet above the ground.

Prince A (Cumberland County, M. Steinberg, 1918).—At Prince's Siding, Camp Bragg, on the Atlantic Coast Line Railroad, 40 yards north of the road crossing, and 4 yards east of the track. The station is marked by a nail in a wooden stake which projects 18 inches above the ground.

Fayetteville J (Cumberland County, M. Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad, on the third curve north of Hay Street, on the line of the left tangent to Fayetteville, 6 yards east of the track, and on the side of a cut. The station is marked by a nail in a cedar post 1 foot above ground.

Fayetteville I (Cumberland County, M. Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad, on the first curve north of the main track crossing, on the line of the left tangent to Fayetteville, and 8 feet east of the track. The station is marked by a nail in a 2 by 4 inch wooden stake projecting 18 inches above the ground.

Fayetteville H (Cumberland County, M. Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad, on the rail of the northernmost switch track on the first curve north of Hay Street, on the line of the right tangent looking toward Hay Street, and on the right tangent looking east. The station is marked by a file scratch on the rail.

Fayetteville G (Cumberland County, M. Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad, 10 yards north of Hay Street, midway between the main track and a side track. The station mark is a nail in a wooden stake 2 by 4 inches in size projecting 8 inches above ground.

Fayetteville E (Cumberland County, M. Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad, about 160 yards south of Hay Street, on the side track opposite a brick warehouse. The station is marked by a file scratch on the rail.

Fayetteville D (Cumberland County, M. Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad, at the corner of Maxwett and Mumford Streets, 10 yards west of a switch target and 4 feet south of the track. The station mark is an iron bolt in the road.

Fayetteville C (Cumberland County, M. Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad, on the first curve east of Fayetteville depot, on the line of the right tangent looking west, 50 yards east of a cotton mill, 9 yards south of the track, and 2 feet north of a road. The station is marked by a nail in a wooden stake 2 by 4 inches in size which projects 2 feet above the ground.

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Fayetteville B (Cumberland County, M. Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad, on the first curve west of Cape Fear River, on the line of the left tangent toward same, 50 yards west of a road crossing, and 2.5 meters (8.2 feet) north of the track. The station is marked by a nail in a wooden stake 2 by 4 inches in size projecting 2 feet above the ground.

Fayetteville A (Cumberland County, M Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad, 25 yards east of the bridge over Cape Fear River, and 1.25 meters (4.1 feet) north of the track. The station is marked by a nail in a wooden stake 2 by 4 inches in size projecting 2 feet above ground.

Primary traverse station No. 17 (U. S. G. S.) (Cumberland County, M. Steinberg, 1918).—About ½ mile southeast of **Manchester**, on the east side of the Atlantic Coast Line Railroad, 820 feet south of milepost 94, 60 feet south of a road crossing at a section tool house, near a section house and opposite a switch, and 20 feet east of the track. The station mark is an iron post stamped "Prim. Trav. Sta. No. 17, 1918, Mac. Elev. 190 feet." The elevation of the station mark is 58.048 meters (190.446 feet).

Primary traverse station No. 18 (U. S. G. S.) (Cumberland County, M. Steinberg, 1918.)—About 2½ miles southeast of **Manchester**, on the Atlantic Coast Line Railroad, about 50 feet northeast of a road crossing, on a bank about 8 feet above the track. The station mark is an iron post stamped "Prim. Trav. Sta. No. 18, 1918, Mac. Elev. 266 feet."

Primary traverse station No. 4 (U. S. G. S.) (Cumberland County, M. Steinberg, 1918).—At **Fayetteville**, 14.14 meters (46.4 feet) east from the southeast corner of the Atlantic Coast Line Railroad station, in line with the south end of the building, 0.76 meter (2.5 feet) north of a concrete sidewalk. The station mark is an iron post stamped "Prim. Trav. Sta. No. 4, 1918, Elev. 102 feet." The elevation of the station mark is 31.283 meters (102.634 feet).

Fayetteville F (Cumberland County), M. Steinberg, 1918).—At Fayetteville, on the Atlantic Coast Line Railroad on the east rail of the side track at Hay Street crossing, in line with the middle of the sidewalk on the north side of the street. The station is marked by a file scratch on the rail.

Primary traverse station No. 3 (U. S. G. S.) (Cumberland County, M. Steinberg, 1918).—About 1¼ miles west of **Vander**, on the south side of the Atlantic Coast Line Railroad, 45 feet west of a road crossing at a store, 300 feet east of milepost 77, and 20 feet south of the track. The station mark is an iron post stamped "Prim. Trav. Sta. No. 3, 1918, Mac." The elevation of the station mark is 38.838 meters (127.421 feet).

Primary traverse station No. 2 (U. S. G. S.) (Cumberland County, M. Steinberg, 1918).—At **Stedman**, across the track and directly opposite the west end of the Atlantic Coast Line Railroad station, and 25 feet south of the track. The station mark is an iron post stamped "Prim. Trav. Sta. No. 2, 1918, Mac." The elevation of the station mark is 39.270 meters (128.838 feet).

Primary traverse station No. 1 (U. S. G. S.) (Sampson County, M. Steinberg, 1918).—At **Hayne**, 40 feet west of the Atlantic Coast Line Railroad station, and 20 feet south of the track. The station mark is an iron post stamped "Prim. Trav. Sta. No. 1, 1918, Mac." The elevation of the station mark is 45.903 meters (150.600 feet).

Primary traverse station No. 3 (U. S. G. S.) (Brunswick County, M. Steinberg, 1918).—At **Navassa**, 15 feet south of the Atlantic Coast Line Railroad station. The station mark is an iron post stamped "Prim. Trav. Sta. No. 3." The elevation of the station mark is 5.681 meters (18.638 feet).

PRECISE TRAVERSE, SANFORD TO OSBORNE, N. C.

Principal points.

Carr (Richmond County, C. L. Garner, 1918).—About 2½ miles north of Hoffman, on the right of way of the Seaboard Air Line Railway, about 165 yards north of the point of intersection of tangents of the second curve north of Hoffman, 380 yards north of milepost 237, on the edge of the cut of the old roadbed which is just east of the present roadbed, and about 25 yards east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track from the station, on the edge of a cut, 9.92 meters (32.6 feet) west of the west rail, and about 35 meters (115 feet) from the station in azimuth

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148° 07′. The azimuth from the station to the water tank at Southern Pines is 218° 34′.

Hoffman (Richmond County, C. L. Garner, 1918).—About ½ mile north of Hoffman, on the right of way of the Seaboard Air Line Railway, at the intersection of the tangents to the west rails of the first curve north of Hoffman, about 450 yards north of milepost 239, 30 yards north of a wagon road crossing, 3 yards east of the edge of a dirt road running north from Hoffman, and 10.34 meters (33.92 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on a ridge midway between the railroad and the dirt road, 7.38 meters (24.2 feet) west of the west rail, and 21.87 meters (71.8 feet) from the station in azimuth 253° 06′. The azimuth from the station to the semaphore signal at Hoffman is 56° 11′. The elevation of the station mark is 128.508 meters, or 421.613 feet.

Broadacre (Richmond County, C. L. Garner, 1918).—About 1 mile south of Hoffman near the Seaboard Air Line Railway, on the first curve south of **Hoffman**, at the intersection of the prolongation of the tangents to the east rail to the south and the west rail to the north, in the edge of a cultivated field, about 40 yards west of a public road, and 50 yards west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the east edge of a public road running south from Hoffman 28.40 meters (93.2 feet) from the station in azimuth 297° 05′. The azimuth from the station to milepost 240, about 200 yards distant, is 241° 08′. The azimuth to the semaphore signal at Hoffman is 235° 49′. The elevation of the station mark is 131.188 meters, or 430.406 feet.

Marston (Richmond County, C. L. Garner, 1918).—At the intersection of the tangents to the east rails of the main-line track of the Seaboard Air Line Railway, at the first curve north of Marston railway station, near milepost 242, in the middle of a dirt road which runs parallel to the railroad, and about 75 yards east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 60 yards east of the east rail, 28.20 meters (92.5 feet) from the station in azimuth 125° 30′.

Cognac (Richmond County, C. L. Garner, 1918).—On the Seaboard Air Line Railway, at the intersection of the tangents to the east rail of the first curve north of milepost 245, and about 100 yards west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete as described in notes 1*a* and 11*c*. The reference mark is about 65 yards west of the west rail, about 1 yard west of a 10-inch oak tree, and 24.14 meters (79.2 feet) from the station in azimuth 311° 07′.

Oise (Richmond County, C. L. Garner, 1918).—On the Seaboard Air Line Railway right of way, at the first curve north of milepost 247, at the intersection of the tangents to the west rail from the south and the east rail from the north of the southbound track, in the middle of an old roadbed which is about 20 yards east of the present roadbed, and about 30 yards east of the east rail of the southbound track. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is in the old roadbed 20.19 meters (66.2 feet) from the station in azimuth 193° 05′.

Ainse (Richmond County, C. L. Garner, 1918).—On the right of way of the Seaboard Air Line Railway, at the first curve north of milepost 248, at the intersection of the prolongation of the tangents to the east rail from the south and the west rail from the north of the southbound track, about 165 yards south of the point where the northbound and southbound tracks become parallel, on a fill, about 18 yards east of the east rail of the southbound track, and 4 yards west of the west rail of the northbound track. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark. The elevation of the station mark is 122.654 meters, or 402.407 feet.

Vesle (Richmond County, C. L. Garner, 1918).—On the Seaboard Air Line Railway, about 900 yards north of milepost 250, 8.66 meters (28.4 feet) west

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of the west rail of the main-line southbound track, on the highest point of the west side of a cut, and about 60 yards north of a wagon road which crosses the railroad. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 10 yards north of a telephone pole, on the bank of a cut, about 10 feet above the track, 10 yards west of the west rail, and 17.19 meters (56.4 feet) from the station in azimuth 64° 55′.

Rockingham (Richmond County, C. L. Garner, 1918).—About 2 miles north of Hamlet, on the Seaboard Air Line Railway, at the first curve south of milepost 251, at the intersection of the tangents to the east rails of the main-line southbound track, and 27.04 meters (88.7 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 8 yards south of a telephone pole, 9.61 meters (31.5 feet) west of the west rail of the southbound track, and 20.84 meters (68.4 feet) from the station in azimuth 346° 26′. Other azimuths from the station are: To the city water tank at Hamlet, 44° 30′ 33″; to the Seaboard Air Line Railway tank at Hamlet, 24° 45′ 33″. The elevation of the station mark is 119.182 meters, or 391.016 feet.

Hamlet (Richmond County, C. L. Garner, 1918).—At **Hamlet**, approximately in the middle of Main Street, about 15 yards east of the intersection of Main and Entwistle Streets, and about 8 yards south of the edge of the city water tank. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is the center pipe of the city water tank 13.94 meters (45.7 feet) from the station in azimuth 217° 20′. The azimuth from the station to the water tank of the Seaboard Air Line Railway is 293° 21′. The elevation of the station mark is 109.252 meters, or 358.438 feet.

Light (Richmond County, C. L. Garner, 1918).—About 1½ miles north of Osborne, on the west side of the Seaboard Air Line Railway, about 40 yards west of the west rail, at the first curve south of milepost 258, and in the edge of a cultivated field. The curve is in a deep cut which has a spring in the west bank. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Osborne (Marlboro County, S. C., C. L. Garner, 1918).—About ½ mile west of the main line of the Seaboard Air Line Railway, opposite the first curve south of **Osborne** and the first curve north of milepost 231, and on the highest point of a hill covered with a second growth of oak. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 19.89 meters (65.3 feet) from the station in azimuth 228° 49′.

Supplementary points and bench marks.

Debeney A (Lee County, C. L. Garner, 1918).—About ½ mile south of the railway station at Colon, on the Seaboard Air Line Railway, 110 yards north of milepost 196. The station is marked by a file mark on the east rail of the main track. There is no reference mark.

Debeney (Lee County, C. L. Garner, 1918).—About 1½ miles south of Colon on the Seaboard Air Line Railway, at the point of intersection of the tangents to the east rails at the second curve north of Sanford or the first curve north of milepost 197, and 5.76 meters (18.9 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track in a mound of concrete, on the edge of a washed-out gully, 13.16 meters (43.2 feet) west of the west rail, and 18.92 meters (62.1 feet) from the station in azimuth 286° 13′.

Brook (Lee County, C. L. Garner, 1918).—About ½ mile north of **Sanford** on the right of way of the Seaboard Air Line Railway, at the first curve north of Sanford, at the intersection of the tangents to the east rails, on the edge of a small brook that passes under the railroad, and 11.31 meters (37.1 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as

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described in notes 1*a* and 11*c*. The reference mark is about 2 yards north of a telephone pole, and 27.07 meters (88.81 feet) from the station in azimuth 30° 32′. The azimuth from the station to a tall water tank at Sanford is 358° 35′. The elevation of the station mark is 102.608 meters, or 336.640 feet.

H 11.—At **Sanford,** Lee County, on the southeast corner of the Seaboard Air Line Railway passenger depot, 100 feet west of the track. A brass disk. (112.994 meters, or 370.714 feet.)

I 11.—At **Sanford,** Lee County, on the southeast corner of the Bank of Sanford on Moore Street. A brass disk. (114.568 meters, or 375.879 feet.)

Lee (Lee County, C. L. Garner, 1918).—About 100 yards south of the railroad station at Sanford, on the right of way of the Seaboard Air Line Railway, about 30 yards north of milepost 199, directly opposite the crossing of the Seaboard Air Line Railway and the Atlantic & Yadkin Railway, and 4.01 meters (13.2 feet) west of the frog point made by the west rail of the Seaboard Air Line Railway and the south rail of the Atlantic & Yadkin Railway. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a bronze tablet set in the concrete sidewalk opposite the Sanford Supply Co. building, about 1 yard north of a telephone pole, and 17.60 meters (57.74 feet) from the station in azimuth 49° 03′. The azimuth from the station to the tall steel water tank at Sanford is 163° 22′.

Sanford C (Lee County, C. L. Garner, 1918).—About ½ mile south of the railroad station at Sanford, on the Seaboard Air Line Railway, at the intersection of the prolongation of the east rail from the south and the west rail from the north, at the first curve south of Sanford, and 1.052 meters (3.45 feet) east of the east rail. The station is marked by a nail in a 2 by 4 inch stake which is set in concrete.

G 11.—About 1¼ miles south of **Sanford,** Lee County, on the Seaboard Air Line Railway, ¼ mile south of milepost 200, in the northeast quarter of a road crossing, 25 feet north of the road and 35 feet east of the track. A concrete post with disk in top. (111.476 meters, or 365.734 feet.)

Sanford B (Lee County, C. L. Garner, 1918).—About 1½ miles south of Sanford, on the right of way of the Seaboard Air Line Railway, at the intersection of the tangents to the east rails of the second curve south of Sanford, also the second curve south of milepost 200, in the old roadbed of the railroad, and 12.07 meters (39.6 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is in the old roadbed 17.75 meters (58.2 feet) from the station in azimuth 236° 52′. The azimuth from the station to a tall black steel water tank at Sanford is 178° 39′.

Sanford A (Lee County, C. L. Garner, 1918).—About 2 miles south of Sanford, on the Seaboard Air Line Railway, at the intersection of the tangents to the east rails of the first curve south of milepost 201, about 25 meters (82 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 7 yards west of the west rail and 18.67 meters (61.3 feet) from the station in azimuth 239° 21′.

Troy (Lee County, C. L. Garner, 1918; 1919).—About 2¾ miles south of Sanford, on the Seaboard Air Line Railway, at the first curve north of milepost 202, at the intersection of the prolongation of the tangents to the east rails, in a cotton field, about 8 yards east of a wagon road, and about 20 yards south of another wagon road which crosses the Seaboard Air Line Railway by an overhead bridge. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 4 yards south of the wagon road which crosses the railway by an overhead bridge about 2 yards south of the bridge and 34.53 meters (113.3 feet) from the station in azimuth 126° 59′.

Fismes (Lee County, C. L. Garner, 1918; 1919).—About 4 miles south of Sanford, on the right of way of the Seaboard Air Line Railway, at the curve opposite milepost 203, at the intersection of the prolongation of the tangents to the east rails, and 6.40 meters (21.0 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track, 3.5

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meters (11 feet) above the rail, 10.5 meters (34 feet) west of the west rail, and 19.52 meters (64.0 feet) from the station in azimuth 124° 08′. The station mark was reported destroyed in 1919.

F 11.—About 4¾ miles south of **Sanford**, Lee County, on the Seaboard Air Line Railway, ¼ mile north of milepost 204, in the northwest quarter of a road crossing, 35 feet north of the road and 25 feet west of the track. A concrete post with disk in top. (110.682 meters, or 363.129 feet.)

Lennon (Lee County, C. L. Garner, 1918).—About 2½ miles north of Lemon Springs, on the right of way of the Seaboard Air Line Railway, on the fourth curve north of Lemon Springs, or the first curve north of milepost 204, at the intersection of the tangents to the east rails from north and south, on the side of the slope of a cut, and 11.59 meters (38.0 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad from the station, about 2 feet north of a telephone pole, about 6 yards east of the east rail, and 23.57 meters (77.33 feet) from the station in azimuth 309° 33′.

Gum (Lee County, C. L. Garner, 1918).—About 2 miles north of Lemon Springs, on the Seaboard Air Line Railway, on the curve at milepost 204 or the third curve north of Lemon Springs, on the intersection of the tangents to the west rail from the south and the east rail from the north, in the edge of a swamp, and about 25 yards west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 15 yards west of the west rail, about 1 yard south of a small oak tree, and 30.03 meters (98.52 feet) from the station in azimuth 341° 47′.

Alfair (Lee County, C. L. Garner, 1918).—About 1 mile north of Lemon Springs, on the right of way of the Seaboard Air Line Railway, at the second curve north of Lemon Springs, at the intersection of the tangents to the east rail from the north and the west rail from the south, and 35 meters (115 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track, 1 yard north of the sign board "Lemon Springs," 4.46 meters (14.6 feet) west of the west rail, and 38.92 meters (127.69 feet) from the station in azimuth 133° 11′.

Mangin (Lee County, C. L. Garner, 1918).—About ¾ mile north of **Lemon Springs**, on the right of way of the Seaboard Air Line Railway, at the first curve north of Lemon Springs and the first north of milepost 205, at the intersection of the tangents to the west rails from north and south, about 4 yards west of the edge of a cut, and 7.96 meters (26.1 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad from the station, 3 yards south of a wagon-road crossing, about 10 yards east of the east rail, and 32.10 meters (105.3 feet) from the station in azimuth 328° 34′.

E 11.—At **Lemon Springs**, Lee County, on the Seaboard Air Line Railway, ½ mile north of milepost 206, 80 feet northwest of the depot, in the southwest quarter of a road crossing, 35 feet south of the road, and 35 feet west of the track. A concrete post with disk in top. (119.825 meters, or 393.126 feet.)

Reeves (Lee County, C. L. Garner, 1918; 1919).—About 150 yards south of the railroad station at **Lemon Springs**, about 25 meters (82 feet) east of the east rail of the Seaboard Air Line Railway, at the intersection of the prolongation of the tangents to the west rails at the first curve south of Lemon Springs, at the first curve south of milepost 206, and in a cotton field. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track from the station, about 5 yards west of the west rail, and 25.0 meters (82 feet) from the station in azimuth 108° 08′. The elevation of the station mark is 118.406 meters, or 388.470 feet.

Lemon C (Lee County, C. L. Garner, 1918; 1919).—About ½ mile south of **Lemon Springs**, on the right of way of the Seaboard Air Line Railway, at the first curve south of milepost 206, at the intersection of the tangents to the west rail, at the bottom of a fill, about 2 yards below the track and 8 yards west of the west rail. The underground mark is a copper nail set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete,

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as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad, about 30 yards east of the east rail and 37 meters (121.4 feet) from the station in azimuth 302° 14′. The elevation of the station mark is 112.842 meters, or 370.216 feet.

Lemon B (Lee County, C. L. Garner, 1918).—About 1 mile south of **Lemon Springs**, on the right of way of the Seaboard Air Line Railway, at the third curve south of Lemon Springs, which is the first curve north of milepost 207, at the intersection of the tangents to the west rails from north and south, and 1.68 meters (5.5 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track, 16 meters (52.5 feet) east of the east rail, on the right of way about 1 yard from a barbed wire fence and 20.37 meters (66.83 feet) from the station in azimuth 275° 36′. The elevation of the station mark is 121.218 meters, or 397.696 feet.

Lemon A (Lee County, C. L. Garner, 1918; 1919).—About 1½ miles south of **Lemon Springs**, on the right of way of the Seaboard Air Line Railway, at the highest point of the grade running south out of Lemon Springs, on the edge of a cut, about 2 yards above the track and 6.01 meters (19.7 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad, about 3 yards north of a telegraph pole, 15.5 meters (51 feet) east of the east rail, and 22.84 meters (74.9 feet) from the station in azimuth 327° 10′.

Morrison (Lee County, C. L. Garner, 1918; 1919).—About 2½ miles south of **Lemon Springs**, on the right of way of the Seaboard Air Line Railway, at the first curve south of milepost 209, at the intersection of the prolongation of the tangents to the west rail from the south and the east rail from the north, and 19.05 meters (62.5 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad 27.04 meters (88.7 feet) from the station in azimuth 126° 16′.

D 11.—About 2 miles south of **Lemon Springs**, Lee County, on the Seaboard Air Line Railway, ½ mile south of milepost 207, in the southwest quarter of a road crossing, 15 feet south of the road and 25 feet west of the track. A concrete post with disk in top. (125.592 meters, or 412.046 feet.)

Mihiel (Lee County, C. L. Garner, 1918; 1919).—About 3 miles south of **Lemon Springs**, on the right of way of the Seaboard Air Line Railway, at the intersection of the prolongation of the tangents to the west rail, at the bottom of a fill, and 4.90 meters (16.1 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad about 15 yards east of the east rail and 23.72 meters (77.8 feet) from the station in azimuth 306° 38′. The elevation of the station mark is 104.033 meters, or 341.315 feet.

C 11.—About 2¼ miles north of Cameron, Moore County, on the Seaboard Air Line Railway, 165 feet south of milepost 209 and 25 feet west of the track. A concrete post with disk in top. (106.723 meters, or 350.140 feet.)

Huron (Moore County, C. L. Garner, 1918).—About ½ mile north of station **Cameron** on the Seaboard Air Line Railway, at the second curve north of Cameron, or the first curve south of milepost 210, 160 yards from the point of tangency at the north end of the curve, on the prolongation of the tangent to the west rail from the north, about 25 yards east of the east rail, in the edge of a swamp, about 3 yards east of a large pine tree and 3 yards north of a large sycamore tree. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 3 yards east of the railroad right of way, in a group of oak trees, 15 yards east of the east rail of the railroad track, and 30.63 meters (100.5 feet) from the station in azimuth 219° 02′. The elevation of the station mark is 95.260 meters, or 312.532 feet.

Cameron (Moore County, C. L. Garner, 1918).—About ⅛ mile north of Cameron, on the side of a hill, in a cultivated field about 10 yards northeast of the summit of the hill, on the prolongation of the tangent to the east rail from

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the south, about 190 yards north of the point of tangency of the first curve north of Cameron or the curve at milepost 211, and about 80 yards west of the west rail of the Seaboard Air Line Railway The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is in a field, about 1 yard north of a peach tree, and 16.66 meters (54.66 feet) from the station in azimuth 50° 24′.

B 11.—At **Cameron**, Moore County, on the Seaboard Air Line Railway, 80 feet east of the depot, in the northeast quarter of a road crossing, 20 feet north of the road and 33 feet east of the track. A concrete post with disk in top. (92.802 meters, or 304.468 feet.)

Hayes (Moore County, C. L. Garner, 1918).—About 1 mile south of **Cameron**, on the right of way of the Seaboard Air Line Railway, at the first curve south of Cameron, or the first curve south of milepost 212, at the intersection of the tangents to the east rails from the north and south, about 1 yard west of the old roadbed and 16.75 meters (55.0 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the ridge between the old and present roadbeds of the railroad, about 8 yards west of the west rail and 11.41 meters (37.44 feet) from the station in azimuth 242° 28′. The elevation of the reference mark is 90.263 meters, or 296.138 feet.

Hamilton (Moore County, C. L. Garner, 1918; 1919).—About 1⅝ miles south of **Cameron**, on the right of way of the Seaboard Air Line Railway, at the first curve north of milepost 213, at the intersection of the tangents to the east rail from the north and the west rail from the south, at the edge of the old roadbed, and 4.62 meters (15.2 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track, on the bank, about 2 yards above the rail, 8.50 meters (27.9 feet) west of the west rail, and 27.60 meters (90.6 feet) from the station in azimuth 154° 10′. The elevation of the station mark is 88.230 meters, or 289.468 feet.

Newton (Moore County, C. L. Garner, 1918).—About 2 miles north of **Vass**, on the right of way of the Seaboard Air Line Railway, at the third curve north of Vass or the first curve south of milepost 214, at the intersection of the prolongation of the east rail from the south and the west rail from the north, in the middle of the old roadbed, and 8.86 meters (29.1 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is in the middle of the old roadbed, about 10 yards west of the west rail, and 27.23 meters (89.3 feet) from station in azimuth 12° 27′.

Z 10.—About 2 miles north of **Vass**, Moore County, on the Seaboard Air Line Railway, ¼ mile north of milepost 215 and about 65 feet west of the track. A concrete post with disk in top. (87.162 meters, or 285.964 feet.)

Mt. Vernon (Moore County, C. L. Garner, 1918).—About 1½ miles north of **Vass**, on the right of way of the Seaboard Air Line Railway, at the intersection of the prolongation of the tangents to the west rail from the south and the east rail from the north of the second curve north of Vass and opposite milepost 215, in the old railroad roadbed, east of the present roadbed, and 7.11 meters (23.3 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is in the old roadbed, about 15 yards east of the east rail, and 28.47 meters (93.4 feet) from the station in azimuth 196° 05′. The elevation of the station mark is 90.254 meters, or 296.108 feet.

Ailette (Moore County, C. L. Garner, 1918).—About 1 mile north of **Vass**, on the Seaboard Air Line Railway right of way, at the intersection of the west rail tangents, 23.72 meters (77.8 feet) east of the east rail, and about 9 yards west of a wagon road which runs north from Vass. The underground mark is a copper bolt in a block of concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 15 yards east of the east rail, 3 yards east of a telephone pole, and 24.66 meters (80.9 feet) from the station in azimuth 30° 28′. The azimuth from the station to a white steeple, shingle roof, at Vass is 46° 42′.

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Y 10.—About ¼ mile south of **Vass**, Moore County, on the Seaboard Air Line Railway, 300 feet north of milepost 217 and 165 feet west of the track, in the southeast corner of the front extension of the Vass Cotton Mill Co. A brass disk. (87.610 meters, or 287.434 feet.)

Vass (Moore County, C. L. Garner, 1918).—About ½ mile south of the Seaboard Air Line Railway station at **Vass**, at the first curve south of milepost 217, at the intersection of the tangents to the east rail from the south and the west rail from the north, 20 meters (66 feet) east of the east rail, and at the bottom of a fill about 6 yards below the rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 24.5 meters (80 feet) east of the east rail, on the edge of the bank of a borrow pit, about 1 yard south of a 6-inch oak stump 2½ feet high, and 23.90 meters (78.4 feet) from the station in azimuth 244° 49′. The water tank at Vass Cotton Mill is in azimuth 199° 06′ from the station. The elevation of the station mark is 80.651 meters, or 264.602 feet.

Lakeview A (Moore County, C. L. Garner, 1918; 1919).—About 80 yards south of Lakeview, on the Seaboard Air Line Railway, at the first curve south of the railway station, on the prolongation of the east rail tangent from the north, and 5.07 meters (16.6 feet) east of the east rail. The station is marked by a bronze tablet set in concrete, as described in note 1*a*.

Guynemer A (Moore County, C. L. Garner, 1918.)—About ¼ mile south of the Seaboard Air Line Railway station at Lakeview, at the second curve north of milepost 219, on the prolongation of the east rail tangent from the south, about 100 yards from the point of tangency, on the bank of a cut, about 2 yards above the rail, and 12.50 meters (41.0 feet) west of the west rail. The station is marked by a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

X 10.—About ½ mile south of **Lakeview**, Moore County, on the Seaboard Air Line Railway, 700 feet north of milepost 219 and 33 feet east of the track. A concrete post with disk in top. (85.879 meters, or 281.755 feet).

Guynemer (Moore County, C. L. Garner, 1918).—About ½ mile south of **Lakeview**, on the right of way of the Seaboard Air Line Railway, about 40 yards north of milepost 219, at the intersection of the west rail tangent from the south and the east rail tangent from the north, on the bank of a cut, about 2 yards above the rail, and 10.5 meters (34 feet) east of the east rail. The underground mark is a copper bolt in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark. The elevation of the station mark is 90.822 meters, or 297.972 feet.

Lakeview (Moore County, C. L. Garner, 1918).—About ⅛ mile south of **Lakeview**, a little east of the right of way of the Seaboard Air Line Railway, about 100 yards east of the railroad at the first curve south of Lakeview, in a scrub oak thicket, and 100 yards northwest of the highest point of a small hill. The underground mark is a copper bolt set in concrete, according to note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 80 yards from the highest point of the hill 15.13 meters (49.6 feet) from the station in azimuth 0° 21′. A water tank, green with a black roof, at Lakeview is in azimuth 197° 57′ from the station.

Fonck (Moore County, C. L. Garner, 1918).—About 2½ miles north of the Seaboard Air Line Railway station at **Niagara**, at the intersection of the east rail tangent from the south and the west rail tangent from the north, on the second curve south of milepost 219, the first curve north of milepost 220, on top of a cut, and about 13 yards west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. The reference mark is a piece of railroad rail embedded in concrete about 22 yards west of the west rail and 17.90 meters (58.7 feet) from the station in azimuth 219° 44′. The elevation of the station mark is 101.848 meters, or 334.146 feet.

Delaware (Moore County, C. L. Garner, 1918).—About 1½ miles north of **Niagara**, on the Seaboard Air Line Railway, at the intersection of the east rail tangents, on the curve between mileposts 220 and 221, and 4.0 meters (13.1 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track, 11.05 meters (36.3 feet) east of the east rail, 3 yards south of a

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telephone pole, and 17.61 meters (57.8 feet) from the station in azimuth 289° 34′. The elevation of the station mark is 104.296 meters, or 342.178 feet.

Niagara D (Moore County, C. L. Garner, 1918).—About ¾ mile north of **Niagara**, on the Seaboard Air Line Railway right of way, at the first curve south of milepost 221, on the prolongation of the east rail tangent from the north, about 50 yards from the point of tangency and 2.20 meters (7.2 feet) east of the east rail. The station is marked by a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Niagara C (Moore County, C. L. Garner, 1918).—About ½ mile north of the Seaboard Air Line Railway station at Niagara, on the prolongation of the east rail tangent from the south, about 100 yards from the point of tangency, at the second curve north of Niagara, and 12.37 meters (40.6 feet) east of the east rail. The underground mark is a copper bolt set in concrete, according to note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track, 7.90 meters (25.9 feet) west of the west rail, and 23.58 meters (77.4 feet) from the station in azimuth 170° 57′.

Niagara (Moore County, C. L. Garner, 1918).—About ⅛ mile east of Niagara, on the summit of a hill, in a peach orchard owned by James Swett, about 20 yards east of the west edge of the orchard and about 325 yards southwest of the house of James Swett. The underground mark is a copper bolt set in concrete, according to note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is in the west edge of the peach orchard, near a scrub thicket, and 32.50 meters (106.6 feet) from the station in azimuth 78° 36′. The water tank at Niagara is in azimuth 69° 30′ from the station.

Niagara B (Moore County, C. L. Garner, 1918).—About ¼ mile north of Niagara, on the Seaboard Air Line Railway, on the prolongation of the east rail tangent from the north, on the first curve north of milepost 222, about 55 yards from the point of tangency at Niagara, and about 5 yards west of the west rail. The station mark is a nail in a 2 by 4 inch stake set in concrete. There is no reference mark. The water tank at Niagara is in azimuth 30° 27′ from the station.

W 10.—At **Niagara**, Moore County, on the Seaboard Air Line Railway, 130 feet north of the depot and ¼ mile north of milepost 222, in the northwest quarter of a road crossing, 15 feet north of the road, and 16 feet west of the track. A concrete post with disk in top. (122.752 meters, or 402.729 feet.)

Niagara A (Moore County, C. L. Garner, 1918).—About 20 yards south of the Seaboard Air Line Railway station at **Niagara**, on the prolongation of the west rail tangent from the south, about 100 yards from the point of tangency, and 8.46 meters (27.8 feet) west of the west rail. The underground mark is a copper bolt set in concrete, according to note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. Azimuths from the station are as follows: To the water tank at Niagara, 325° 36′; to the southeast corner of the station house, Niagara, 218° 01′. The elevation of the station mark is 122.882 meters, or 403.155 feet.

Foch E (Moore County, C. L. Garner, 1918).—About ⅛ mile south of **Niagara**, at the first curve south of the depot, at the intersection of the west rail tangent from the north and the east rail tangent from the south, 10.54 meters (34.6 feet) east of the east rail of the Seaboard Air Line Railway, and about 1 yard south of the first wagon road crossing south of Niagara. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and underground marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 25 yards east of the east rail, in the northwest corner of a vineyard, about 2 feet from the corner post, and 25.30 meters (83.0 feet) from the station in azimuth 295° 24′. Other azimuths from the station are: To the water tank at Southern Pines, 34° 05′; to the water tank at Niagara, 209° 41′. The elevation of the station mark is 121.241 meters, or 397.772 feet.

V 10.—At **Manley**, Moore County, on the Seaboard Air Line Railway, 80 feet north of the depot, ½ mile south of milepost 223, in the northeast quarter of a road crossing, 35 feet north of the road, and 20 feet east of the track. A concrete post with disk in top. (135.504 meters, or 444.566 feet.)

Foch D (Moore County, C. L. Garner, 1918; 1919).—About 1 mile north of the Seaboard Air Line Railway station at **Southern Pines**, at the curve opposite milepost 224, on the prolongation of the east rail tangent from the north, about 80 yards south of the point of tangency, and 6.84 meters (22.4 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described

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in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track, about 3 yards north of a telephone pole, 17.29 meters (56.7 feet) west of the west rail, and 20.03 meters (65.7 feet) from the station in azimuth 162° 49′. The elevation of the station mark is 142.717 meters, or 468.231 feet.

Foch C (Moore County, C. L. Garner, 1918).—About ¾ mile north of Southern Pines, on the right of way of the Seaboard Air Line Railway, at the second curve north of Southern Pines, on the prolongation of the west rail tangent from the south, about 100 yards from the point of tangency, in a railroad ditch, about 1 yard below the rail, and 8.58 meters (28.1 feet) east of the east rail. The station is marked by a bronze tablet set in concrete, as decribed in note 1*a*. There is no reference mark.

Foch B (Moore County, C. L. Garner, 1918).—About ¼ mile north of the Seaboard Air Line Railway station at **Southern Pines** at the intersection of the west rail tangents, on top of a cut, about 15 yards east of a dirt road running north from Southern Pines, and 16.77 meters (55.0 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 55 yards west of the west rail, 1 yard west of the west edge of the dirt road, and 23.68 meters (77.7 feet) from the station in azimuth 137° 47′. The azimuth from the station to the railroad water tank at Southern Pines is 53° 32′. The elevation of the station mark is 150.009 meters, or 492.155 feet.

T 10.—At **Southern Pines**, Moore County, on the Seaboard Air Line Railway, 300 feet southeast of the depot and 130 feet east of the track, on the east side of a street parallel to the track, in the northwest corner of the brick building owned by Thomas S. Burgess. A brass disk. (157.404 meters, or 516.416 feet.)

Foch A (Moore County, C. L. Garner, 1918).—About 15 yards south of the Seaboard Air Line Railway station at **Southern Pines**, about 10 yards north of milepost 225, and 1.42 meters (4.7 feet) west of the west trail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 28.46 meters (93.4 feet) from the station in azimuth 142° 27′. The elevation of the station mark is 156.174 meters (512.381 feet) and of the reference mark 157.295 meters (516.059 feet).

Quentin E (Moore County, C. L. Garner, 1918; 1919).—About ½ mile south of the Seaboard Air Line Railway station at Southern Pines, at the first curve south of milepost 225, at the intersection of the tangents of the east rail from the south and the west rail from the north, on a bank about 2 yards above the rail, and 16.93 meters (55.5 feet) west of the west rail. The underground mark is a copper bolt set in concrete, according to note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 11.7 meters (38 feet) east of the east rail and 30.42 meters (90.8 feet) from the station in azimuth 297° 56′. The Congregational Church steeple at Southern Pines is in azimuth 224° 11′ from the station.

Quentin D (Moore County, C. L. Garner, 1918).—About 1 mile south of the Seaboard Air Line Railway station at Southern Pines, at the second curve south of the railway station, on the prolongation of the tangent to the east rail from the north, about 165 yards south of the point of tangency, on the bank of the railroad cut, about 3 yards above the rail, 4 yards from the edge of the cut, ½ yard west of a line of telegraph poles, and 17 meters (56 feet) east of the east rail. The underground mark is a copper bolt set in concrete, according to note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Quentin C (Moore County, C. L. Garner, 1918).—About 1⅜ miles south of the Seaboard Air Line Railway station at **Southern Pines**, about 80 yards north of the signboard marked "Southern Pines," about 800 yards north of mile-post 227, at the third curve north of Aberdeen, about 4.5 yards above the railroad track, and 15.27 meters (50.1 feet) west of the west rail. The station is marked by a 2 by 4 inch stake set in concrete. The reference mark is a bronze tablet set in concrete, as described in note 11*c*, and is about 250 meters (820 feet) from the station in azimuth 29° 39′. The elevation of the reference mark is 134.138 meters, or 440.084 feet.

Quentin B (Moore County, C. L. Garner, 1918).—About 1⅝ miles south of the Seaboard Air Line Railway station at **Southern Pines**, about 550 yards north of milepost 227, 190 yards south of the signboard marked "Southern

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Pines," on the prolongation of the tangent to the east rail, at the south end of the third curve north of Aberdeen, and 10.755 meters (35.29 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 11.967 meters (39.26) feet from the station in azimuth 190° 40′. The elevation of the station mark is 133.581 meters (438.257 feet) and of the reference mark 134.138 meters (440.084 feet).

Quentin A (Moore County, C. L. Garner, 1918).—At the north end of the second curve north of the Seaboard Air Line Railway station at Aberdeen, on the prolongation of the tangent to the east rail, about 190 yards south of milepost 227, and 4.415 meters (14.48 feet) east of the east rail. The station is marked by a 2 by 4 inch stake set in concrete.

Quentin (Moore County, C. L. Garner, 1918).—About 1½ miles north of the Seaboard Air Line Railway station at **Aberdeen**, on the prolongation of the west rail from the south, about 200 yards from the point of tangency of the first curve north of Aberdeen, or the first curve north of milepost 227, and 10.52 meters (34.5 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad from the station, on the edge of a bank near a cut, 11.29 meters (37.0 feet) west of the west rail, and 23.40 meters (76.8 feet) from the station in azimuth 128° 14′. The azimuth from the station to the railroad water tank at Aberdeen is 40° 31′.

Aberdeen (Moore County, C. L. Garner, 1918).—About 300 yards north of **Aberdeen**, on the Seaboard Air Line Railway, on the prolongation of the tangent to the west rail from the south, about 200 yards north of the point of tangency of the first curve north of Aberdeen, on the edge of Sycamore Street, and 14.69 meters (48.2 feet) west of the west rail. The underground mark is a glass bottle set in concrete, as described in note 7*d*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of Sycamore Street, about 2 yards east of a garage, and 17.16 meters (56.3 feet) from the station in azimuth 54° 15′. The azimuth from the station to the semaphore at Aberdeen is 30° 28′ and to the center of a water tank about 40 yards away is 229° 34′. The elevation of the station mark is 103.117 meters, or 338.310 feet.

R 10.—At **Aberdeen**, Moore County, on the Seaboard Air Line Railway, 115 feet west of the northwest corner of the depot and 165 feet west of the track, in the northeast corner of a building on the main street. A brass disk. (103.569 meters, or 339.793 feet.)

Q 10.—At **Aberdeen**, Moore County, on the Seaboard Air Line Railway, 165 feet south of the depot, ¼ mile north of milepost 229 and 50 feet west of the main track. A concrete post with disk in top. (103.488 meters, or 339.527 feet.)

Griffin (Moore County, C. L. Garner, 1918).—About 1 mile south of **Aberdeen**, on the Seaboard Air Line Railway, on the first curve south of Aberdeen or south of milepost 230, at the intersection of the tangents to the west rails, and 8.78 meters (28.8 feet) east of the east rail. The underground mark is a glass bottle set in concrete, as described in note 7*d*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track from the station, on top of the bank opposite a small cut, 8.44 meters (27.7 feet) west of the west rail, and 34.31 meters (112.6 feet) from the station in azimuth 184° 19′. The elevation of the station mark is 95.105 meters, or 312.024 feet.

P 10.—About 1¼ miles north of **Pinebluff**, Moore County, on the Seaboard Line Railway, ½ mile south of milepost 230 and 50 feet east of the main track. A concrete post with disk in top. (95.351 meters, or 312.831 feet.)

Pond A (Moore County, C. L. Garner, 1918).—About ¼ mile north of the Seaboard Air Line Railway station at **Pinebluff**, on the prolongation of the tangent to the west rail from the north, about 165 yards from the point of tangency of the second curve north of Pinebluff, on the first curve south of milepost 231, about 30 yards from the edge of a pond, and 25 meters (82 feet) west of the west rail. The underground mark is a glass bottle set in concrete, as described in note 7*d*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad from the station, about 8 yards east of the east rail of the railroad track, on the top of a bank near a deep cut, and 33.07 meters

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(108.5 feet) from the station in azimuth 307° 31′ The elevation of the station mark is 93.835 meters, or 307.857 feet.

Keyser A (Moore County, C. L. Garner, 1918).—About 200 yards north of Pinebluff, on the Seaboard Air Line Railway, on the prolongation of the tangent to the west rail from the south, about 165 yards from the point of tangency of the first curve north of Pinebluff and the first curve north of milepost 232, about 20 yards from the edge of a pond, and 12.8 meters (42.0 feet) west of the west rail. The underground mark is a glass bottle set in concrete, as described in note 7*d*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad from the station, about 3 yards south of a telephone pole, 10.6 meters (34.8 feet) east of the east rail, and 25.1 meters (82.3 feet) from the station in azimuth 274° 40′.

Keyser (Moore County, C. L. Garner, 1918).—About ½ mile north of **Keyser**, on the right of way of the Seaboard Air Line Railway, at the intersection of the tangents to the east rail from the south and the west rail from the north of the first curve north of Keyser or the first curve north of milepost 233, and 16.12 meters (52.9 feet) east of the east rail. The underground mark is a glass bottle set in concrete, as described in note 7*d*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad from the station, 10.64 meters (34.9 feet) west of the west rail, and 36.15 meters (118.6 feet) from the station in azimuth 70° 08′. Other azimuths from the station are as follows: To the railway water tank at Keyser, 31° 45′; to the semaphore signal, 32° 27′. The elevation of the station mark is 95.526 meters, or 313.405 feet.

Pond (Moore County, C. L. Garner, 1918).—About ¼ mile north of **Pinebluff**, on the side of a hill east of the first curve of the Seaboard Air Line Railway north of Pinebluff, on the first curve south of milepost 231, about 20 yards from the edge of a cultivated field, and about 200 yards east of the east rail of the railroad track. The underground mark is a glass bottle set in concrete, as described in note 7*d*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 125 yards east of the east rail, in a cultivated field on the side of the same hill, and 29.95 meters (98.3 feet) from the station in azimuth 122° 57′.

Erie (Moore County, C. L. Garner, 1918).—About 1 mile south of **Keyser**, on the right of way of the Seaboard Air Line Railway, at the first curve south of Keyser, at the intersection of the tangents to the east rail from the north and the west rail from the south, and 1.18 meters (3.9 feet) east of the east rail. The underground mark is a glass bottle set in concrete, as described in note 7*d*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track from the station, 10.34 meters (33.9 feet) west of the west rail, 5 yards east of a 10-inch oak tree, and 31.85 meters (104.5 feet) from the station in azimuth 190° 01′.

N 10.—At **Keyser**, Moore County, on the Seaboard Air Line Railway, 15 feet south of milepost 235, and 13 feet west of the main track. A concrete post with disk in top. (84.955 meters, or 278.723 feet.)

O 10.—At **Keyser**, Moore County, on the Seaboard Air Line Railway, 100 feet northeast of the depot, 15 feet north of milepost 233, in the southeast quarter of a wagon road crossing, 15 feet south of the road, and 33 feet east of the main track. A concrete post with disk in top. (90.232 meters, or 296.036 feet.)

Ratle (Moore County, C. L. Garner, 1918).—About 1½ miles south of the Seaboard Air Line Railway station at **Keyser**, at the intersection of the tangents to the west rails of the second curve south of Keyser or the first curve south of milepost 235, and 5.00 meters (16.4 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is about 30 yards east of the east rail, 2 yards south of a telegraph pole, and 22.70 meters (74.5 feet) from the station in azimuth 199° 19′. The elevation of the station mark is 85.637 meters, or 280.961 feet.

Alexander (Richmond County, C. L. Garner, 1918).—About 3½ miles north of **Hoffman**, on the right of way of the Seaboard Air Line Railway, at the first curve north of milepost 236, at the intersection of the prolongation of the tangents to the east rail from the south and the west rail from the north, and 9.87 meters (32.4 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze

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tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the track from the station, 10.33 meters (33.9 feet) east of the east rail, and 22.34 meters (73.3 feet) from the station in azimuth 335° 07′. The elevation of the station mark is 96.019 meters, or 315.022 feet.

Richmond (Richmond County, C. L. Garner, 1918).—About 3¼ miles north of **Hoffman**, on the right of way of the Seaboard Air Line Railway, at the curve opposite milepost 236, about 200 yards south of the milepost, at the intersection of the tangents to the east rail from the north and the west rail from the south, and 35 meters (115 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark. The elevation of the station mark is 103.024 meters, or 338.005 feet.

Carr A (Richmond County, C. L. Garner, 1918).—About 3 miles north of **Hoffman**, on the right of way of the Seaboard Air Line Railway, at the intersection of the tangents to the west rails from north and south, at the second curve north of milepost 237 and the third curve north of Hoffman, and 17.5 meters (57 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark. The elevation of the station mark is 105.896 meters, or 347.427 feet.

Hoffman A (Richmond County, C. L. Garner, 1918).—About 2½ miles north of **Hoffman**, on the right of way of the Seaboard Air Line Railway, at the intersection of the tangents to the west rails of the second curve north of Hoffman, about 250 yards north of milepost 237, and 4.16 meters (13.6 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the opposite side of the railroad from the station, on the edge of the west side of a cut, 9.92 meters (32.6 feet) west of the west rail, and 15.35 meters (50.4 feet) from the station in azimuth 156° 42′. The elevation of the station mark is 114.652 meters, or 376.154 feet.

M 10.—About 2¼ miles north of **Hoffman**, Richmond County, on the Seaboard Air Line Railway, 200 feet north of milepost 237, in the northeast quarter of a wagon road crossing, 35 feet north of the road, and 33 feet east of the track. A concrete post with disk in top. (117.198 meters, or 384.507 feet.)

L 10.—At **Hoffman**, Richmond County, on the Seaboard Air Line Railway, 165 feet northeast of the depot, ¼ mile south of milepost 239, in the southeast quarter of a wagon road crossing, 35 feet south of the road, and 10 feet east of the main track. A concrete post with disk in top. (130.618 meters, or 428.536 feet.)

K 10.—At **Broadacre**, Richmond County, on the Seaboard Air Line Railway, 165 feet north of the depot, 50 feet south of milepost 241, 130 feet north of a farm warehouse, in the northeast quarter of a wagon road crossing, 35 feet north of the road, and 33 feet east of the track. A concrete post with disk in top. (128.481 meters, or 421.525 feet.)

J 10.—At **Marston**, Richmond County, on the Seaboard Air Line Railway, 35 feet north of the passenger depot, 65 feet south of milepost 243, and 33 feet east of the track. A concrete post with disk in top. (131.451 meters, or 431.269 feet.)

I 10.—At **Cognac**, Richmond County, on the Seaboard Air Line Railway, 500 feet north of milepost 246, 35 feet north of the depot, and 33 feet west of the track. A concrete post with disk in top. (122.005 meters, or 400.278 feet.)

H 10.—About 1¾ miles south of **Cognac**, Richmond County, on the Seaboard Air Line Railway, ½ mile north of milepost 248, in the northeast quarter of a wagon road crossing, 25 feet north of the road, and 33 feet east of the track. A concrete post with disk in top. (123.805 meters, or 406.184 feet.)

G 10.—About 3½ miles north of **Hamlet**, Richmond County, on the Seaboard Air Line Railway, ¼ mile north of milepost 250, in the northeast quarter of a wagon road crossing, 25 feet north of the road, and 35 feet east of the track. A concrete post with disk in top. (131.768 meters, or 432.309 feet.)

F 10.—About 1½ miles north of **Hamlet**, Richmond County, on the Seaboard Air Line Railway, about ¼ mile north of milepost 252, and 35 feet west of the track. A concrete post with disk in top. (117.018 meters, or 383.917 feet.)

Hamlet F (Richmond County, C. L. Garner, 1918).—About 1 mile north of Hamlet railway station on the Seaboard Air Line Railway, on the prolongation of the tangent to the west rail from the south, 6 yards south of the point of

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tangency, 5 telephone poles north of milepost 252, and 4.59 meters (15.1 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 8.92 meters (29.3 feet) from the rail and 13.76 meters (45.1 feet) from the station.

Hamlet E (Richmond County, C. L. Garner, 1918).—About ½ mile north of the Seaboard Air Line Railway station at Hamlet, on the prolongation of the tangent to the west rail to the north, about 300 yards north of the railroad coal elevator in the Seaboard Air Line Railway yards, 1.31 meters (4.3 feet) east of the east rail, 1.44 meters (4.7 feet) east of the main-line rail, on the second sidetrack east of the ice plant. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Hamlet D (Richmond County, C. L. Garner, 1918).—At Hamlet, at the intersection of the east curb line of Raleigh Street with the south curb of the last cross street running east and west, at the corner of a picket fence, and about 200 yards south of the Hamlet ice plant. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*.

D 10.—At **Hamlet**, Richmond County, about 250 feet south of the Seaboard Air Line Railway depot, 80 feet west of the track at the main street crossing, in the northeast corner of the Terminal Hotel building. A brass disk. (96.754 meters, or 317.434 feet.)

E 10.—At **Hamlet**, Richmond County, on the Seaboard Air Line Railway, 820 feet north of the crossing of the main line with the branch to Wilmington, and 165 feet west of the main line, in the northeast corner of the building occupied by the Bagwell Real Estate Co. A brass disk. (101.189 meters, or 331.984 feet.)

Hamlet C (Richmond County, C. L. Garner, 1918).—At Hamlet, about 1.5 meters (5 feet) south of the south rail of the main line of the Wilmington-Charlotte division of the Seaboard Air Line Railway, and on line with the east curb of Raleigh Street. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, described in note 1*a*.

Hamlet B (Richmond County, C. L. Garner, 1918).—At Hamlet, 15 yards east of the railway station, near the crossing of the two divisions of the Seaboard Air Line Railway, 1.859 meters (6.10 feet) west of the west rail of the Savannah-Norfolk main line, and about 1.5 meters (5 feet) south of the south rail of the Wilmington-Charlotte main line. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 2.286 meters (7.50 feet) from the station.

Hamlet A (Richmond County, C. L. Garner, 1918).—About 400 yards south of the railway station at Hamlet, on the Seaboard Air Line Railway, at a cut opposite an elevated switch light, 1 telephone pole north of milepost 253, and 6.40 meters (21.0 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 9.10 meters (29.9 feet) from the east rail and 12.527 meters (41.10 feet) from the station in azimuth 204° 56′. The azimuth from the station to the flagstaff on the Seaboard Hotel at Hamlet is 228° 11′.

Light I (Richmond County, C. L. Garner, 1918).—About 1¾ miles south of the Seaboard Air Line Railway station at Hamlet, 3 telegraph poles north of milepost 255, about 50 yards north of the point of tangency, on the bank of a cut, 5 feet from the edge of the cut, and 5.85 meters (19.2 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The azimuth from the station to the reference mark is 4° 00′.

Light J (Richmond County, C. L. Garner, 1918).—About 1½ miles south of the Seaboard Air Line Railway station at Hamlet, about 190 yards north of traverse station Light I, and between the railroad tracks. The station is marked by a 2 by 4 inch stake set in a mass of concrete.

C 10.—About 2 miles south of **Hamlet**, Richmond County, on the Seaboard Air Line Railway, ¼ mile north of milepost 256, and 25 feet west of the track. A concrete post with disk in top. (85.019 meters, or 278.933 feet.)

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Light H. (Richmond County, C. L. Garner, 1918).—About 2½ miles south of the Seaboard Air Line Railway station at Hamlet, about ½ mile south of a railway crossing, at a cut about 30 yards north of a block signal, and 6.08 meters (19.9 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 62.30 meters (204.4 feet) from the rail and 16.73 meters (54.9 feet) from the station in azimuth 224° 13′.

Light G. (Richmond County, C. L. Garner, 1918).—About 4 miles south of the Seaboard Air Line Railway station at **Hamlet**, about 50 yards south of milepost 257, at the intersection of tangents to the west rail to the south and the east rail to the north, and 15.61 meters (51.2 feet) from the rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 24.31 meters (79.8 feet) from the rail and 23.28 meters (76.4 feet) from the station in azimuth 255° 47′.

Light F. (Richmond County, C. L. Garner, 1918).—About 4 miles south of the Seaboard Air Line Railway station at **Hamlet**, 7 telegraph poles south of milepost 257, in a deep cut, and 0.380 meter (1.25 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Light D. (Richmond County, C. L. Garner, 1918).—About 4 miles north of the Seaboard Air Line Railway station at **Osborne**, 11 telegraph poles south of milepost 257, in a deep cut, and 1.95 meters (6.4 feet) south of the south rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Light C. (Richmond County, C. L. Garner, 1918).—About 2½ miles north of the Seaboard Air Line Railway station at **Osborne**, on the prolongation of the tangent to the east rail to the north, 130 yards north of the point of tangency, 14 telephone poles south of milepost 257, and 34.06 meters (111.7 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 9.153 meters (30.03 feet) from the rail and 75.90 meters (249.0 feet) from the station in azimuth 1° 21′.

B 10. About 2¼ miles north of **Osborne**, Richmond County, on the Seaboard Air Line Railway, 20 feet due south of milepost 258, and 8 feet west of the track. A concrete post with disk in top. (83.143 meters, or 272.778 feet.)

Light E. (Richmond County, C. L. Garner, 1918).—About 3 miles north of the railway station at **Osborne**, on the Seaboard Air Line Railway, 12.055 meters (39.55 feet) north of station Light F and about 7 yards above it, and 12.93 meters (42.4 feet) from the rail. The above distances are inclined measurements. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station is marked by a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Light B. (Richmond County, C. L. Garner, 1918).—About 2 miles north of **Osborne**, on the right of way of the Seaboard Air Line Railway, near the north end of the first curve south of milepost 258, on the prolongation of the tangent to the east rail and 100 yards south of the point of tangency, and 9.80 meters (32.2 feet) east of the east rail. The station is marked by a nail in a 2 by 4 inch stake set in a mass of concrete. There is no reference mark.

Light A. (Richmond County, C. L. Garner, 1918).—About 2 miles north of **Osborne**, on the right of way of the Seaboard Air Line Railway, at the south end of the first curve south of milepost 258, on the prolongation of the tangent to the west rail from the south, about 165 yards north of the point of tangency, and 14.95 meters (49.0 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is on the bank, about 10 yards above the rail, 20 yards east of the east rail, and 16.17 meters (53.1 feet) from the station in azimuth 233° 52′.

Osborne I. (Richmond County, C. L. Garner, 1918).—On the west rail of the Seaboard Air Line Railway track, about one-half mile south of milepost 258, in a big cut containing a spring, and about 25 yards south of the spring. The station is marked by a file cut on the rail. There is no reference mark.

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Osborne H. (Richmond County, C. L. Garner, 1918).—About 1½ miles north of the Seaboard Air Line Railway station at **Osborne**, on the prolongation of the tangent to the west rail from the north, about 25 yards south of the point of tangency, 0.35 meters (1.15 feet) west of the west rail, and 10 telephone poles from milepost 259. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Osborne G. (Richmond County, C. L. Garner, 1918).—About 1½ miles north of the Seaboard Air Line Railway station at **Osborne**, on the prolongation of the tangent to the east rail to the north, about 100 yards northwest of the point of tangency, 5 telephone poles northwest of milepost 259, and 5.22 meters (17.1 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Osborne F (Richmond County, C. L. Garner, 1918).—About 1 mile north of the Seaboard Air Line Railway station at Osborne, at the intersection of the tangents to the west rail to the south and the east rail to the north, 25 telephone poles north of milepost 260, and 10.83 meters (35.5 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 7.75 meters (25.4 feet) from the rail and 20.58 meters (67.5 feet) from the station in azimuth 29° 12′.

Osborne E (Richmond County, C. L. Garner, 1918).—About ¾ mile north of the Seaboard Air Line Railway station at Osborne, on the prolongation of the tangent to the west rail to the north, 60 yards west of the point of tangency, 15 telegraph poles north of milepost 260, and 2.70 meters (8.9 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station is marked by a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Osborne D (Richmond County, C. L. Garner, 1918).—About ½ mile north of the Seaboard Air Line Railway station at Osborne, on the prolongation of the tangent to the east rail to the north, 125 yards north of the point of tangency, 10 telegraph poles north of milepost 260, and 12.28 meters (40.3 feet) west of the west rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 22.06 meters (72.4 feet) from the rail and 14.26 meters (46.8 feet) from the station in azimuth 133° 49′.

Osborne C (Richmond County, C. L. Garner, 1918).—About 500 yards north of the Seaboard Air Line Railway station at Osborne, on the prolongation of the tangent to the west rail to the south, 30 yards south of the point of tangency, 3 telegraph poles north of milepost 260, and 0.38 meter (1.25 feet) from the rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

Osborne B (Richmond County, C. L. Garner, 1918).—About 300 yards north of the Seaboard Air Line Railway station at Osborne, 60 yards north of the point of tangency of the east rail, 1 telegraph pole south of milepost 260, and 3.26 meters (10.7 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station and reference marks are bronze tablets set in concrete, as described in notes 1*a* and 11*c*. The reference mark is 11.72 meters (38.5 feet) from the rail and 17.79 meters (58.4 feet) from the station in azimuth 69° 03′.

A 10.—At **Osborne**, Richmond County, on the Seaboard Air Line Railway, 80 feet east of the track, in the northwest face of Mr. Coggin's brick store. A brass disk. (68.991 meters, or 226.348 feet.)

Osborne A (Marlboro County, S. C., C. L. Garner, 1918).—About ½ mile south of the railroad station at Osborne, N. C., on the east side of the Seaboard Air Line Railway track, 55 yards south of the point of tangency of the east rail, 6 telegraph poles north of milepost 261, and 1.19 meters (3.9 feet) east of the east rail. The underground mark is a copper bolt set in concrete, as described in note 7*b*. The station mark is a bronze tablet set in concrete, as described in note 1*a*. There is no reference mark.

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DESCRIPTIONS AND ELEVATIONS OF PERMANENT BENCH MARKS.

PRECISE LEVELING, MOREHEAD CITY, N. C., TO BRUNSWICK, GA. (PART).

[Leveling by the U. S. Geological Survey.]

This line is along the Norfolk Southern Railroad from Morehead City to Goldsboro, and thence over the Southern Railway to the south boundary of North Carolina.

7 M. C. (U. S. G. S.).—At **Morehead City,** Carteret County, on the Norfolk Southern Railroad, 8 feet east of the depot and 6 feet north of the track, 97 feet west of the bulkhead of the railroad company's wharf. An iron post stamped "7." (2.119 meters, or 6.952 feet.)

17 M. C. (U. S. G. S.).—At **Morehead City,** Carteret County, at the northwest corner of Eighth and Arendal Streets, in the southeast corner of a brick house owned by George Dees. A bronze tablet stamped "17." Reported destroyed, 1907. (5.168 meters, or 16.955 feet.)

18 M. C. (U. S. G. S.).—About 2 miles west of **Atlantic,** Carteret County, on the Norfolk Southern Railroad, 23 feet south of the track, at the southwest corner of M. D. Oglesby's freight platform. An iron post stamped "18." (5.662 meters, or 18.576 feet.)

28 M. C. (U. S. G. S.).—About 2¼ miles west of **Newport,** Carteret County, on the Norfolk Southern Railroad, 25 feet south of the track, in line with the telegraph poles. An iron post stamped "29." (8.592 meters, or 28.189 feet.)

26 M. C. (U. S. G. S.).—About 1¾ miles west of **Havelock,** Craven County, on the Norfolk Southern Railroad, 26 feet south of the track, in line with the telegraph poles. An iron post stamped "26." (8.125 meters, or 26.657 feet.)

25 M. C. (U. S. G. S.).—At **Riverdale,** Craven County, on the Norfolk Southern Railroad, 5 feet north of the track, at the mail catcher. An iron post stamped "25." (7.654 meters, or 25.111 feet.)

7 M. C. (U. S. G. S.).—About 1 mile south of **Newbern,** Craven County, on the Norfolk Southern Railroad, 2 feet from the north end of the west abutment of the Scott Creek trestle. A bronze tablet stamped "7." (2.203 meters, or 7.228 feet.)

16 M. C. (U. S. G. S.).—At **Newbern,** Craven County, on the Norfolk Southern Railroad, at the northwest corner of Broad and Craven Streets, in the corner stone at the northeast corner of the county courthouse. A bronze tablet stamped "16." (4.579 meters, or 15.023 feet.)

27 M. C. (U. S. G. S.).—About 3 miles east of **Clark,** Craven County, on the Norfolk Southern Railroad, ¾ mile west of milepost G 54 M 41, 30 feet south of the track, in line with the telegraph poles. An iron post stamped "27." (8.140 meters, or 26.706 feet.)

51 M. C. (U. S. G. S.).—About 1 mile west of **Tuscarora,** Craven County, on the Norfolk Southern Railroad, 30 feet south of the track, in line with the telegraph poles. An iron post stamped "51." (15.263 meters, or 50.075 feet.)

48 M. C. (U. S. G. S.).—At **Cove Creek,** Craven County, on the Norfolk Southern Railroad, 75 feet south of the track, and 4 feet northeast of the northeast corner of L. F. Taylor's store, on the west side of the Trenton Road. An iron post stamped "48." (14.339 meters, or 47.044 feet.)

64 M. C. (U. S. G. S.).—At **Dover,** Craven County, on the Norfolk Southern Railroad, 19 feet east of the main crossroad, and 77 feet south of the track. An iron post stamped "64." (19.236 meters, or 63.110 feet.)

48 M. C. (U. S. G. S.).—At **Kinston,** Lenoir County, on the Norfolk Southern Railroad, on the west end of the county courthouse, on the north face of the northwest corner of the portico. A bronze tablet stamped "48." (13.450 meters, or 44.127 feet.)

55 M. C. (U. S. G. S.).—At **Falling Creek,** Lenoir County, on the Norfolk Southern Railroad, 31 feet south of the main track, and on the west side of a road. An iron post stamped "55." (16.689 meters, or 54.754 feet.)

109 M. C. (U. S. G. S.).—At **Lagrange,** Lenoir County, on the Norfolk Southern Railroad, 31 feet south of the main track, at the southeast corner of the ticket office. An iron post stamped "109." (33.149 meters, or 108.756 feet.)

120 M. C. (U. S. G. S.).—About 4¼ miles west of **Bests,** Wayne County, on the Norfolk Southern Railroad, 30 feet west of the county road, and 30 feet south

of the track, in line with the telegraph poles. An iron post stamped "120." (36.325 meters, or 119.176 feet.)

111 A.—At **Goldsboro,** Wayne County, on the southwest corner of the city hall, in the granite water table 4 feet above the ground. A brass C. & G. S. disk. Established by W. E. Gehres, city engineer, from 111 M. C. which was destroyed in 1913. (35.136 meters, or 115.275 feet.)

136 M. C. (U. S. G. S.).—At **Rose,** Wayne County, on the Southern Railway, in line with the telegraph poles. An iron post stamped "136." (41.298 meters, or 135.492 feet.)

152 M. C. (U. S. G. S.).—At **Princeton,** Johnston County, on the Southern Railway, 23 feet north of the main track, at the east side of the depot platform. An iron post stamped "152." (46.214 meters, or 151.620 feet.)

178 M. C. (U. S. G. S.).—At **Selma,** Johnston County, on the Southern Railway, 158 feet south of the main track, and 128 feet west of the west building line of Webb Street, near the east end of a one-story brick store occupied by N. B. Snipe & Bro. A bronze tablet stamped "178." (54.204 meters, or 177.834 feet.)

229 M. C. (U. S. G. S.).—At **Wilsons Mills,** Johnston County, on the Southern Railway, at the north end of a 3 by 3 foot box culvert, in the coping over the west end. A copper bolt stamped "U. S. G. S. 229 Ft. B. M." (69.780 meters, or 228.937 feet.)

346 M. C. (U. S. G. S.).—At **Clayton,** Johnston County, on the Southern Railway, 162 feet south of the main track, on the front of the brick store of W. H. McCullers, sr., & Son, near the east corner. A bronze tablet stamped "346." (105.274 meters, or 345.386 feet.)

384 M. C. (U. S. G. S.).—At **Garner,** Wake County, on the Southern Railway, 25 feet north of the main track, and 12 feet west of the southwest corner of the ticket office. An iron post stamped "384." (116.830 meters, or 383.300 feet.)

363 M. C. (U. S. G. S.).—At **Raleigh,** Wake County, on the Southern Railway, on the corner stone of the State Capitol. A bronze tablet stamped "363." (110.665 meters, or 363.073 feet.)

For additional bench marks at Raleigh see pages 48, 78, and 79.

497 M. C. (U. S. G. S.).—At **Cary,** Wake County, on the Southern Railway, 22 feet south of the main track, and 3 feet east of the northeast corner of the depot. An iron post stamped "497." (151.297 meters, or 496.380 feet.)

For additional bench marks at Cary see pages 47, 48, and 78.

321 M. C. (U. S. G. S.).—About ½ mile west of **Morrisville,** Wake County, on the Southern Railway, 34 feet south of the track, and 27 feet east of a 6-inch hickory tree. An iron post stamped "321." (97.860 meters, or 321.062 feet.)

360 M. C. (U. S. G. S.).—About 2 miles west of **Nelson,** Durham County, on the Southern Railway, in a stone over the north end of a 3 by 3 foot box culvert. A copper bolt stamped "U. S. G. S. 360 Ft. B. M." (109.655 meters, or 359.760 feet.)

406 M. C. (U. S. G. S.).—At **Durham,** Durham County, on the Southern Railway, on the county courthouse, on the west side of the Main Street entrance. A bronze tablet stamped "406." (123.696 meters, or 405.826 feet.)

471 M. C. (U. S. G. S.).—At **University,** Orange County, on the Southern Railway, 2 feet north of the northwest corner of the depot. An iron post stamped "471." (143.622 meters, or 471.200 feet.)

549 M. C. (U. S. G. S.).—About 2½ miles south of **Robson,** Orange County, on the Southern Railway, 23 feet east of the track, and 2 feet south of the signpost at the road crossing. An iron post stamped "549." (167.352 meters, or 549.054 feet.)

503 M. C. (U. S. G. S.).—At **Chapel Hill,** Orange County, on the Southern Railway, at the University of North Carolina, in a stone tablet on the north side of Memorial Hall. A bronze tablet stamped "503." (153.144 meters, or 502.440 feet.)

543 M. C. (U. S. G. S.).—At **Hillsboro,** Orange County, on the Southern Railway, at the northwest corner of the county courthouse. A bronze tablet stamped "543." (165.555 meters, or 543.158 feet.)

667 M. C. (U. S. G. S.).—About ¼ mile west of **Efland,** Orange County, on the Southern Railway, 32 feet north of the track, in line with the telegraph poles. An iron post stamped "667." (203.161 meters, or 666.537 feet.)

678 M. C. (U. S. G. S.).—At **Mebane,** Alamance County, on the Southern Railway, 28 feet south of the main track, at the northeast corner of the depot. An iron post stamped "678." (206.506 meters, or 677.512 feet.)

642 M. C. (U. S. G. S.) —At **Graham,** Alamance County, on the Southern Railway, on the north front of the county courthouse, 2 feet west of the main doorway. A bronze tablet stamped "642." (195.602 meters, or 641.738 feet.)

721 M. C. (U. S. G. S.).—At **Gibsonville,** Guilford County, on the Southern Railway, 26 feet north of the main track, at the southeast corner of the ticket office. An iron post stamped "721." (219.638 meters, or 720.596 feet.)

744 M. C. (U. S. G. S.).—At **McLeansville,** Guilford County, on the Southern Railway, 95 feet south of the main track, near the northwest corner of a small store. An iron post stamped "744." (226.776 meters, or 744.014 feet.)

839 M. C. (U. S. G. S.).—At **Greensboro,** Guilford County, on the Southern Railway, at the northeast corner of the Federal Courthouse and Post Office. A bronze tablet stamped "839." (255.790 meters, or 839.204 feet.)

For additional bench marks at Greensboro see page 108.

813 M. C. (U. S. G. S.).—About 1½ miles south of **Pomona,** Guilford County, on the Southern Railway, 2 feet from the east end of the north back wall of bridge No. 290.7. A copper bolt stamped "U. S. G. S. 813 Ft. B. M." (247.772 meters, or 812.899 feet.)

793 M. C. (U. S. G. S.).—At **Jamestown,** Guilford County, on the Southern Railway, 185 feet south of the depot and 182 feet east of the main track, in a large bowlder. A copper bolt stamped "U. S. G. S. 793 Ft. B. M." (241.696 meters, or 792.964 feet.)

940 M. C. (U. S. G. S.).—At **High Point,** Guilford County, on the Southern Railway, 99 feet west of the main track, at the east corner of J. R. Flagg's drug store, in the brick front. A bronze tablet stamped "940." (286.358 meters, or 939.493 feet.)

852 M. C. (U. S. G. S.).—At **Thomasville,** Davidson County, on the Southern Railway, 28 feet east of the main track, at the southwest corner of the ticket office. An iron post stamped "852." (259.509 meters, or 851.406 feet.)

665 M. C. (U. S. G. S.).—About 1 mile west of **Lake** (formerly **Conrad**), Davidson County, on the Southern Railway, on the north back wall of bridge No. 315.9 over Rich Fork, on the coping at the east end. A copper bolt stamped "U. S. G. S. 665 Ft. B. M." (202.642 meters, or 664.835 feet.)

811 M. C. (U. S. G. S.).—At **Lexington,** Davidson County, on the Southern Railway, at the southeast corner of the county courthouse. A bronze tablet stamped "811." (246.921 meters, or 810.107 feet.)

630 M. C. (U. S. G. S.).—About ¾ mile south of **Linwood,** Davidson County, on the Southern Railway, on the coping at the east end of the south abutment of bridge No. 326.4. A copper bolt stamped "U. S. G. S. 630 Ft. B. M." (191.967 meters, or 629.812 feet.)

765 M. C. (U. S. G. S.).—At **Salisbury,** Rowan County, on the Southern Railway, at the southwest corner of the county courthouse. A bronze tablet stamped "765." (233.080 meters, or 764.697 feet.)

671 M. C. (U. S. G. S.).—About 3¾ miles west of **Majolica,** Rowan County, on the Southern Railway, at the bridge over Second Creek, on the southeast corner of the southeast pedestal block. A copper bolt stamped "U. S. G. S. 671 Ft. B. M." (204.252 meters, or 670.117 feet.)

790 M. C. (U. S. G. S.).—At **Cleveland,** Rowan County, on the Southern Railway, 20 feet north of the main track, at the southwest corner of the depot. An iron post stamped "790." (240.545 meters, or 789.188 feet.)

838 M. C. (U. S. G. S.).—At **Elmwood,** Iredell County, on the Southern Railway, 35 feet south of the main track, at the northeast corner of the depot. An iron post stamped "838." (255.144 meters, or 837.085 feet.)

926 M. C. (U. S. G. S.).—At **Statesville,** Iredell County, on the Southern Railway, on the southeast corner of the county courthouse. A bronze tablet stamped "926." (282.047 meters, or 925.349 feet.)

776 M. C. (U. S. G. S.).—About 800 feet west of the depot at **Eufola** (formerly **Plott**), Iredell County, on the Southern Railway, on the coping at the southeast end of the north abutment of the bridge. A copper bolt stamped "U. S. G. S. 776 Ft. B. M." (236.399 meters, or 775.586 feet.)

873 M. C. (U. S. G. S.).—At **Catawba,** Catawba County, on the Southern Railway, 437 feet south of the main track, on the east front of J. U. Long & Co.'s store, in the brickwork near the north corner. A bronze tablet stamped "873." (265.905 meters, or 872.390 feet.)

970 M. C. (U. S. G. S.).—At **Claremont**, Catawba County, on the Southern Railway, 30 feet south of the main track, at the northeast corner of the depot. An iron post stamped "U. S. G. S. 970 Ft. B. M." (295.369 meters, or 969.056 feet.)

996 M. C. (U. S. G. S.).—At **Newton**, Catawba County, on the Southern Railway, on the county courthouse, at the west end of the north portico. A bronze tablet stamped "996." (303.361 meters, or 995.277 feet.)

1164 M. C. (U. S. G. S.).—At **Hickory**, Catawba County, on the Southern Railway, 150 feet north of the main track, at the northeast corner of the First National Bank Building. A bronze tablet stamped "1164." 354.646 meters, or 1,163.534 feet.)

1087 M. C. (U. S. G. S.).—About 1 mile west of **Hildebran**, Burke County, on the Southern Railway, 3 feet from the east end of the coping on the north end of a culvert. A copper bolt stamped "U. S. G. S. 1087 Ft. B. M." (331.040 meters, or 1,086.087 feet.)

1193 M. C. (U. S. G. S.).—At **Connelly Springs**, Burke County, on the Southern Railway, 142 feet north of the main track, on the south front of James Hudson's brick store, near the east corner. A bronze tablet stamped "1193." (363.380 meters, or 1,192.189 feet.)

1193 M. C. (U. S. G. S.).—At **Drexel**, Burke County, on the Southern Railway, 500 feet east of milepost 74, and 15 feet north of the main track. An iron post stamped "1193." (363.335 meters, or 1,192.042 feet.)

1182 M. C. (U. S. G. S.).—At **Morganton**, Burke County, on the Southern Railway, on the county courthouse, on the extreme northwest corner of the north portico. A bronze tablet stamped "1182." (360.025 meters, or 1,181.182 feet.)

1215 M. C. (U. S. G. S.).—At **Glen Alpine**, Burke County, on the Southern Railway, 73 feet north of the main track, at the southeast corner of the brick basement of Hennessee & Co.'s store. A bronze tablet stamped "1215." (370.131 meters, or 1,214.338 feet.)

1091 M. C. (U. S. G. S.).—About ½ mile east of **Bridgewater**, Burke County, on the Southern Railway, on the bridge seat at the west end of the bridge over Muddy Creek, 3 feet south of the track. A copper bolt stamped "U. S. G. S. 1091 Ft. B. M." (332.212 meters, or 1,089.932 feet.)

1298 M. C. (U. S. G. S.).—At **Nebo**, McDowell County, on the Southern Railway, 134 feet north of the main track, 1 foot from the east front of J. D. Pitt's store, on the south basement wall. A bronze tablet stamped "1298." (395.320 meters, or 1,296.979 feet.)

1438 M. C. (U. S. G. S.).—At **Marion**, McDowell County, on the Southern Railway, on the west face of the county courthouse, at the south end of the portico. A bronze tablet stamped "1438." Reported destroyed, 1923. (438.065 meters, or 1,437.218 feet.)

1286 M. C. (U. S. G. S.).—At **Greenlees**, McDowell County, in the Southern Railway, 12 feet south of the main track, at the east end of the platform. An iron post stamped "1286." (391.602 meters, or 1,284.781 feet.)

1437 M. C. (U. S. G. S.).—At **Old Fort**, McDowell County, on the Southern Railway, 41 feet north of the main track, at the southwest corner of the ticket office. An iron post stamped "1437." (437.824 meters, or 1,436.428 feet.)

1829 M. C. (U. S. G. S.).—At **Round Knob**, McDowell County, on the Southern Railway, 9 feet south of the track, and 46 feet east of the entrance to the Round Knob Hotel, in the face of a solid rock. A bronze tablet stamped "1829." (557.329 meters, or 1,828.504 feet.)

2153 M. C. (U. S. G. S.).—At **Mud Cut**, McDowell County, on the Southern Railway, 293 feet east of the switch point, and 14 feet south of the main track. An iron post stamped "2153." (655.898 meters, or 2,151.892 feet.)

2522 M. C. (U. S. G. S.).—At **Swannanoa Tunnel**, McDowell County, about 3 miles east of **Black Mountain**, Buncombe County, on the Southern Railway, on the north side wall of the tunnel, 3 feet east of the west portal. A bronze tablet stamped "2522." (768.397 meters, or 2,520.982 feet.)

2222 M. C. (U. S. G. S.).—At **Swannanoa**, Buncombe County, on the Southern Railway, 51 feet south of the main track, on the west side of the ticket office. An iron pipe stamped "2222." (676.867 meters, or 2,220.688 feet.)

2057 M. C. (U. S. G. S.).—At **Azalea**, Buncombe County, on the Southern Railway, 60 feet west of the switch point, and 13 feet south of the main track, in the face of the rock. A bronze tablet stamped "2057." (626.748 meters, or 2,056.256 feet.)

1996 M. C. (U. S. G. S.).—At **Biltmore**, Buncombe County, on the Southern Railway, at the office of the Biltmore estate, in the bottom stone of the north-

west pillar of the porte-cochère. A bronze tablet stamped "1996." (607.990 meters, or 1,994.714 feet.)

1986 M. C. (**U. S. G. S.**).—At **Asheville** Buncombe County, on the Southern Railway, 505 feet east of milepost 141, and 19 feet north of the track, on the pedestal block of the northeast corner post of the train shed. A bronze tablet stamped "1986." (604.967 meters, or 1,984.796 feet.)

1924 M. C. (**U. S. G. S.**).—About 1 mile east of **Olivette**, Buncombe County, 400 feet east of the water tank, and 41 feet north of the main track, in a bowlder the volume of which is about 50 cubic yards. A copper bolt stamped "U. S. G. S. 1924 Ft. B. M." (586.193 meters, or 1,923.202 feet.)

1796 M. C. (**U. S. G. S.**).—At **Alexander**, Buncombe County, on the Southern Railway, 310 feet west of the depot, and 11 feet south of the main track, on the east side of the road crossing. A copper bolt stamped "U. S. G. S. 1796 Ft. B. M." (547.052 meters, or 1,794.786 feet.)

1729 M. C. (**U. S. G. S.**).—About 1 mile west of **Bailey**, Madison County, on the Southern Railway, 19 feet east of milepost 158, and 12 feet south of the main track, in the top of a solid rock. A copper bolt stamped "U. S. G. S. 1729 Ft. B. M." (526.828 meters, or 1,728.435 feet.)

1646 M. C. (**U. S. G. S.**).—At **Marshall**, Madison County, on the Southern Railway, on the county courthouse, on the southeast corner. A bronze tablet stamped "1646." (501.525 meters, or 1,645.420 feet.)

1529 M. C. (**U. S. G. S.**).—About ¼ mile west of **Barnard**, Madison County, on the Southern Railway, 140 feet west of milepost 171, and 6 feet north of the main track, in the solid rock. A copper bolt stamped "U. S. G. S. 1529 Ft. B. M." (465.922 meters, or 1,528.612 feet.)

1326 M. C. (**U. S. G. S.**).—At **Hot Springs**, Madison County, on the Southern Railway, at the southeast corner of the east abutment of the bridge over Spring Creek. A copper bolt stamped "U. S. G. S. 1326 Ft. B. M." (403.928 meters, or 1,325.220 feet.)

1259 M. C. (**U. S. G. S.**).—At **Paint Rock**, Madison County, on the Southern Railway, at the north end of the west abutment of the bridge over Grass Creek. A bronze tablet stamped "1259." (383.327 meters, or 1,257.632 feet.)

PRECISE LEVELING, GREENSBORO TO SANFORD, N. C.

For additional bench marks at Greensboro, see page 106.

P 11.—At **Greensboro**, Guilford County, in the southeast corner of the Union Station. A brass disk. (256.546 meters, or 841.685 feet.)

U. S. G. S. 818.—About ¼ mile west of **Greensboro**, Guilford County, on the Atlantic & Yadkin Railway, at the point where the Mount Airy division passes under the main line, in the northeast wing wall of the stone culvert. An aluminum tablet stamped "818—as reset in 1907." (249.615 meters, or 818.945 feet.)

Q 11.—About 2¼ miles south of **Greensboro**, Guilford County, on the Atlantic & Yadkin Railway, ⅛ mile north of milepost 72,325 feet northwest of the Armour Fertilizer plant, 35 feet south of a road crossing, and 15 feet east of the track. A concrete post with disk in top. (229.898 meters, or 754.257 feet.)

R 11.—About 5½ miles south of **Greensboro**, Guilford County, on the Atlantic & Yadkin Railway, 3 feet north of milepost 75, 25 feet north of a road crossing, and 20 feet west of the track. A concrete post with disk in top. (257.146 meters, or 843.653 feet.)

S 11.—At **Pleasant Garden**, Guilford County, on the Atlantic & Yadkin Railway, 25 feet south of the depot, ⅓ mile south of milepost 77, and 35 feet east of the track. A concrete post with disk in top. (254.653 meters, or 835.474 feet.)

T 11.—About 2¾ miles south of **Pleasant Garden**, Guilford County, on the Atlantic & Yadkin Railway, 410 feet south of milepost 80, 35 feet north of a road crossing, and 35 feet west of the track. A concrete post with disk in top. (245.494 meters, or 805.425 feet.)

U 11.—At **Climax**, Guilford County, on the Atlantic & Yadkin Railway, 35 feet north of the depot, ¼ mile south of milepost 82, and 50 feet east of the track. A concrete post with disk in top. (251.500 meters, or 825.130 feet.)

Triangulation station **Climax.**—About 1 mile east of **Climax**, on land owned by J. T. Ledbetter, about 5 yards east of a private road leading from the main Climax-Liberty highway to Ledbetter's house, about 200 yards north of the house, in the edge of pine woods, and on the opposite side of the road from a

cultivated field. The station, underground, and reference marks are as described in notes 1*a*, 7*d*, and 11*a* (see p. —). The reference mark is about 1 yard east of the road and 29.22 meters (95.9 feet) from the station in azimuth 169° 40′. The elevation of the station mark is 256.637 meters, or 841.983 feet.

V 11.—About 1¾ miles south of **Climax**, Guilford County, on the Atlantic & Yadkin Railway, 250 feet south of milepost 84, 25 feet north of a road crossing, and 35 feet east of the track. A concrete post with disk in top. (249.918 meters, or 819.939 feet.)

W 11.—At **Julian**, Randolph County, on the Atlantic & Yadkin Railway, 490 feet north of the depot, ½ mile north of milepost 86, 35 feet south of a road crossing, and 25 feet west of the track. A concrete post with disk in top. (235.596 meters, or 772.951 feet.)

X 11.—About 2 miles south of **Julian**, Randolph County, on the Atlantic & Yadkin Railway, ½ mile north of milepost 88, 25 feet south of a road crossing, and 25 feet west of the track. A concrete post with disk in top. (229.934 meters, or 754.375 feet.)

Y 11.—About 2 miles north of **Liberty**, Randolph County, on the Atlantic & Yadkin Railway, ⅛ mile north of milepost 91, 20 feet north of a road crossing, and 35 feet east of the track. A concrete post with disk in top. (226.874 meters, or 744.336 feet.)

Z 11.—At **Liberty**, Randolph County, on the Atlantic & Yadkin Railway, 200 feet east of the track, in the northwest corner of the Bank of Liberty. A brass disk. (241.100 meters, or 791.009 feet.)

A 12.—About 1¾ miles south of **Liberty**, Randolph County, on the Atlantic & Yadkin Railway, ⅛ mile north of milepost 95, 25 feet north of a road crossing, and 35 feet west of the track. A concrete post with disk in top. (214.083 meters, or 702.371 feet.)

B 12.—At **Staley**, Randolph County, on the Atlantic & Yadkin Railway, 50 feet north of the depot, 900 feet south of milepost 97, and 25 feet west of the track. A concrete post with disk in top. (221.278 meters, or 725.976 feet.)

C 12.—About 2¾ miles south of **Staley**, Randolph County, on the Atlantic & Yadkin Railway, 460 feet north of milepost 100, 25 feet south of a road crossing, and 25 feet west of the track. A concrete post with disk in top. (209.860 meters, or 688.516 feet.)

D 12.—About 2½ miles north of **Siler City**, Chatham County, on the Atlantic & Yadkin Railway, ⅛ mile south of milepost 102, 25 feet north of a road crossing, and 35 feet west of the track. A concrete post with disk in top. (193.573 meters, or 635.081 feet.)

E 12.—At **Siler City**, Chatham County, on the Atlantic & Yadkin Railway, 200 feet west of the track, in the southwest corner of the Gregson & Dorsett Wholesale Grocery Co.'s brick building on Pittsborough Street. A brass disk. (182.541 meters, or 598.887 feet.)

Triangulation station **Siler.**—About 2 miles west of **Siler City**, on land owned by R. H. Dixon, about 4 yards east of the property line running northeast and southwest, which divides the lands of R. H. Dixon and J. J. D. Heckman and 4.70 meters (15.4 feet) southwest of a cornerstone. The station, underground, and reference marks are as described in notes 1*a*, 7*d*, and 11*a*. The reference mark is about 40 yards from a fork of the roads and about 1 yard east of the left-hand road and 27.72 meters (90.9 feet) from the station in azimuth 355° 12′. The elevation of the station mark is 234.518 meters, or 769.414 feet.

F 12.—About 1¾ miles south of **Siler City**, Chatham County, on the Atlantic & Yadkin Railway, ½ mile south of milepost 106, 10 feet north of a road crossing, 3 feet north of the sign "Road Crossing," and 35 feet east of the track. A concrete post with disk in top. (188.012 meters, or 616.836 feet.)

G 12.—At **Ore Hill**, Chatham County, on the Atlantic & Yadkin Railroad, 40 feet south of the depot, ¼ mile south of milepost 109, and 40 feet east of the track. A concrete post with disk in top. (152.447 meters, or 500.153 feet.)

H 12.—At **Bonlee**, Chatham County, on the Atlantic & Yadkin Railway, 165 feet northeast of the depot, in the brick wall at the southwest corner of the Bonlee Bank & Trust Co. Building. A brass disk. (160.481 meters, or 526.511 feet.)

I 12.—At **Bear Creek**, Chatham County, on the Atlantic & Yadkin Railway, 500 feet south of the depot, and 165 feet west of the track, in the northeast corner of a brick building owned by C. B. Fitts. A brass disk. (144.316 meters, or 473.477 feet.)

B 24.—About 2 miles south of **Bear Creek**, Chatham County, on the Atlantic & Yadkin Railway, 15 feet north of a road crossing, and 15 feet west of the track. A concrete post with disk in top. (132.315 meters, or 434.103 feet.)

C 24.—At **Goldston**, Chatham County, on the Atlantic & Yadkin Railway, directly opposite the depot, in the southeast corner of E. C. Stinson's brick store. A brass disk. (129.494 meters, or 424.848 feet.)

A 24.—About 1 mile south of **Goldston**, Chatham County, on the Atlantic & Yadkin Railway, 25 feet west of the track, and 15 feet north of a road. A concrete post with disk in top. (111.146 meters, or 364.651 feet.)

Z 23.—At **Gulf**, Chatham County, on the Atlantic & Yadkin Railway, directly opposite the depot, in the southern corner of the junction with the Norfolk Southern Railroad. A concrete post with disk in top. (84.194 meters, or 276.226 feet.)

Y 23.—At **Cumnock**, Lee County, on the Atlantic & Yadkin Railway, about 35 feet north of the depot, and 25 feet west of the main track. A concrete post with disk in top. (79.038 meters, or 259.311 feet.)

X 23.—About 1¾ miles south of **Cumnock**, Lee County, on the Atlantic & Yadkin Railway, 20 feet west of the track, 25 feet north of a road crossing, at the south end of a deep rock cut. A concrete post with disk in top. (85.849 meters, or 281.656 feet.)

W 23.—About 2 miles north of **Sanford**, Lee County, on the Atlantic & Yadkin Railway, 410 feet south of milepost 128, and 20 feet west of the track, at the south end of a fill. A concrete post with disk in top. (89.901 meters, or 294.950 feet.)

For bench marks at Sanford see pages 90, 91, and 92.

DESCRIPTIONS AND ELEVATIONS OF SECONDARY BENCH MARKS.

NORFOLK, VA., TO MONCURE, N. C.

Temporary bench marks and elevation of rail in front of railroad depots, in Virginia, Gilmerton Street car line.

T. B. M. 1.—About 1 mile west of **Portsmouth**, Norfolk County, at a wide creek or bayou ¾ mile northeast of the Virginian Railway crossing, on the west side of a pile pier on the south side of the street-car line. The top of a ring bolt in a cap 1 foot square over the piling. (1.46 meters, or 4.79 feet.)

At the crossing of the Virginian Railway, Norfolk County, base of rail. (2.63 meters, or 8.63 feet.)

Virginian Railway.

T. B. M. 2.—About 3½ miles west of **Portsmouth**, Norfolk County, beyond a ditch on the north side of the track, in front of a small strip of woods. A twentypenny nail in a pine stump. (4.16 meters, or 13.65 feet.)

At **Sunray**, Norfolk County, base of rail. (6.32 meters, or 20.73 feet.)

T. B. M. 4.—About ⅔ mile west of **Sunray**, Norfolk County, 230 feet west of milepost 14, in the second telegraph pole east of a cabin, on the south side of the track. A lag screw. (5.69 meters, or 18.67 feet.)

At the crossing of the Seaboard Air Line Railway, Norfolk County, base of rail. (6.66 meters, or 21.85 feet.)

T. B. M. 5.—In Nansemond County, about ¾ mile west of the Seaboard Air Line Railway crossing, 500 feet east of board signs, on the north side of the track. A lag screw in a square post. (7.18 meters, or 23.56 feet.)

T. B. M. 6.—In Nansemond County, in the second telegraph pole west of milepost 17 from Norfolk, on the north side of the track. A lag screw. (7.25 meters, or 23.79 feet.)

T. B. M. 7.—In Nansemond County, about 1,000 feet east of milepost 18 from Norfolk, on the north side of the track just east of a heavy pine forest on the south side. A lag screw in a telegraph pole. (6.98 meters, or 22.90 feet.)

T. B. M. 8.—About 2½ miles east of **Magnolia**, Nansemond County, at the west edge of a pine grove on the south side of the track. A spike in a telegraph pole near a small lone pine tree. (6.69 meters, or 21.95 feet.)

T. B. M. 9.—About 1¼ miles east of **Magnolia**, Nansemond County, ½ mile east of a main-road crossing. A spike in a post on the north side of the track. (6.73 meters, or 22.08 feet.)

At **Magnolia**, Nansemond County, base of rail. (7.56 meters, or 24.80 feet.)

Seaboard Air Line Railway.

T. B. M. 10.—About ⅛ mile west of **Magnolia**, Nansemond County, on the north side of the track at the east edge of a woods. A bolt in a telegraph pole. (7.17 meters, or 23.52 feet.)

T. B. M. 11.—About 1½ miles east of **Suffolk**, Nansemond County, a lag screw in milepost 18 from Portsmouth. (11.39 meters, or 37.37 feet.)

T. B. M. 12.—About ¾ mile west of **Kilby**, Nansemond County, 150 feet east of a road crossing. A lag screw in a telephone pole. (19.50 meters, or 63.98 feet.)

T. B. M. 13.—About 1¾ miles west of **Kilby**, Nansemond County, 260 feet west of milepost 22, 50 feet east of a cattle guard, on the south side of the track. A lag screw in the south side of a telegraph pole. (21.63 meters, or 70.96 feet.)

T. B. M. 14.—About 2½ miles west of **Kilby**, Nansemond County, a spike in milepost 23. (22.59 meters, or 74.11 feet.)

T. B. M. 15.—About 3½ miles west of **Kilby**, Nansemond County, ⅛ mile east of milepost 24, on the south side of the track. A lag screw in the third telegraph pole west of a shaded dwelling place. (21.81 meters, or 71.55 feet.)

T. B. M. 16.—About 2¼ miles east of **Purvis**, Nansemond County, ⅛ mile west of milepost 24, 100 feet west of a road crossing, on the south side of the track. A lag screw in a telegraph pole. (23.26 meters, or 76.31 feet.)

At **Purvis**, Nansemond County, top of rail. (24.79 meters, or 81.33 feet.)

T. B. M. 18.—About ¾ mile west of **Purvis**, Nansemond County, 300 feet north of road crossing, in front of a large pile of sawdust. A spike in a whistle post. (24.72 meters, or 81.10 feet.)

T. B. M. 19.—About 2 miles south of **Purvis**, Nansemond County, 160 feet north of a road crossing between mileposts 28 and 29, on the north side of the track. A lag screw in a whistle post. (24.96 meters, or 81.89 feet.)

T. B. M. 20.—About 200 feet northwest of the depot at **Carrsville**, Isle of Wight County, a spike in a large stump. (22.00 meters, or 72.18 feet.)

T. B. M. 21.—About 4 miles east of **Franklin**, Southampton County, 150 feet east of milepost 33, on the south side of the track. A large screw bolt in a telegraph pole. (17.00 meters, or 55.77 feet.)

T. B. M. 22.—About 3½ miles east of **Franklin**, Southampton County, halfway between mileposts 33 and 34, 25 feet east of a whistle post, on the south side of the track. A spike in a pine stump. (15.03 meters, or 49.31 feet.)

T. B. M. 23.—About 3 miles east of **Franklin**, Southampton County, west of milepost 34, on the south side of the track and a short distance east of a crossing. A lag screw in a telegraph pole. (11.64 meters, or 38.19 feet.)

T. B. M. 24.—About 1¼ miles west of **Franklin**, Southampton County, in the fourth telegraph pole west of a road crossing, on the south side of the center of a pine woods. A lag screw. (9.13 meters, or 29.95 feet.)

T. B. M. 25.—About 3 miles west of **Franklin**, Southampton County, in milepost 40. A lag screw. (9.42 meters, or 30.91 feet.)

U. S. G. S. T. B. M. 25.4.—At **Delawares**, Southampton County, in the southeast quarter of the first road crossing. A spike in a washer in an old cedar tree. (8.04 meters, or 26.38 feet.)

At **Delawares**, Southampton County, top of rail. (5.50 meters, or 18.04 feet.)

U. S. G. S. T. B. M. 18.4.—At **Delawares**, Southampton County, in the northeast quarter of a road crossing, where there is a church on either side of the track. A spike in the base of a large live oak tree. (5.80 meters, or 19.03 feet.)

T. B. M. 26.—About ½ mile west of **Delawares**, Southampton County, in the center of the first cut from the depot, on the south side of the track. A spike in the third telegraph pole west of a farm house. (8.50 meters, or 27.89 feet.)

At **Hand**, Southampton County, top of rail. (10.43 meters, or 34.22 feet.)

T. B. M. 27.—About ¾ mile east of **Newsoms**, Southampton County, on the south side of the track, in the second telegraph pole west of a cattle guard. A lag screw. (28.30 meters, or 92.85 feet.)

U. S. G. S. T. B. M. 91.3.—At **Newsoms**, Southampton County, 100 feet east of the depot, and 30 feet north of the main track. A spike over a washer in the root of a large tree. (28.00 meters, or 91.86 feet.)

At **Newsoms**, Southampton County, top of rail. (28.52 meters, or 93.57 feet.)

T. B. M. 28.—About 1½ miles west of **Newsoms**, Southampton County, ⅛ mile west of milepost 50, at a point where the road forks to the south. A lag screw in a telegraph pole. (28.63 meters, or 93.93 feet.)

At **Boykins**, Southampton County, top of rail. (11.65 meters, or 38.22 feet.)

T. B. M. 28a.—About 2 miles west of **Boykins,** Southampton County, 400 feet east of milepost 56, on the south side of the track, between a wagon road and the railroad. A lag screw in a telegraph pole. (13.24 meters, or 43.44 feet.)

U. S. G. S. T. B. M. 42.9.—About 1½ miles west of **Boykins,** Southampton County, ¼ mile west of milepost 55, at a road crossing. A spike in a telegraph pole. (13.23 meters, or 43.41 feet.)

At **Branchville,** Southampton County, top of rail. (13.30 meters, or 43.64 feet.)

In North Carolina.

At **Margarets,** Northampton County, top of rail. (15.87 meters, or 52.07 feet.)

At **Seaboard,** Northampton County, top of rail. (39.18 meters, or 128.54 feet.)

T. B. M. 30.—About 1¾ miles west of **Seaboard,** Northampton County, ¼ mile east of milepost 71, 200 feet west of a lone twin white oak south of the track. A spike in a pole above a gate. (43.16 meters, or 141.60 feet.)

At **Gumberry,** Northampton County, top of rail. (40.09 meters, or 131.53 feet.)

T. B. M. 32.—About 1 mile west of **Gumberry,** Northampton County, on the north side of the track. A lag screw in a whistle post. (43.93 meters, or 144.13 feet.)

T. B. M. 33.—About 1 mile west of **Garysburg,** Northampton County, 65 feet west of a large twin pine tree, on the south side of the track. A lag screw in an oak whistle post. (34.14 meters, or 112.01 feet.)

At **Roanoke Junction,** Halifax County, top of rail. (50.74 meters, or 166.47 feet.)

At **Thelma,** Halifax County, top of rail. (68.62 meters, or 225.13 feet.)

T. B. M. 34.—About 3 miles east of **Littleton,** Halifax County, ¼ mile west of milepost 95, at a road crossing where a road running west along the north side of the track crosses and joins a road on the south side. A lag screw in the crossing signpost. (96.81 meters, or 317.62 feet.)

At **Littleton,** Halifax County, top of rail. (117.73 meters, or 386.25 feet.)

At **Vaughan,** Warren County, top of rail. (107.59 meters, or 352.98 feet.)

T. B. M. 35.—At **Macon,** Warren County, on the water tank in the eastern edge of the town, in the end of a sleeper at the southeast corner of the foundation. A lag screw. (116.78 meters, or 383.14 feet.)

At **Macon,** Warren County, top of rail. (116.20 meters, or 381.23 feet.)

At **Warren Plains,** Warren County, top of rail. (139.16 meters, or 456.56 feet.)

T. B. M. 37.—About ½ mile west of **Warren Plains,** Warren County, in the crossing post in the northeast quarter of a main road crossing, 8 feet from the north rail. A lag screw. (136.99 meters, or 449.44 feet.)

At **Norlina,** Warren County, top of rail. (133.53 meters, or 438.09 feet.)

T. B. M. 38.—About 2 miles west of **Norlina,** Warren County, in the northwest quarter of the first crossing east of **Ridgeway.** A lag screw in the crossing post. (129.85 meters, or 426.02 feet.)

T. B. M. 39.—About 1¾ miles west of **Manson,** Warren County, at milepost 105, in top of west post supporting the extra rail. The head of a ten-penny nail. (142.24 meters, or 466.67 feet.)

T. B. M. 40.—About 2½ miles west of **Manson,** Warren County, ¼ mile east of milepost 106, 250 feet east of a new barn, at the west edge of pine trees. A lag screw in a telegraph pole. (140.32 meters, or 460.37 feet.)

T. B. M. 39 A.—At **Greystone,** Vance County, a railroad spike in a telephone pole opposite the south end of the depot. (151.70 meters, or 497.70 feet.)

T. B. M. 40 A.—About ½ mile south of **Greystone,** Vance County, a railroad spike in a telephone pole at the north end of a long fill. (150.65 meters, or 494.26 feet.)

At **Henderson,** Vance County, top of rail. (155.65 meters, or 510.66 feet.)

T. B. M. 41.—About 1¼ miles south of **Henderson,** Vance County, a nail in the top of an extra rail support 62 feet south of milepost 115. (153.60 meters, or 503.94 feet.)

T. B. M. 42.—About 1¾ miles south of **Henderson,** Vance County, a railroad spike in the yard limit post. (155.78 meters, or 511.09 feet.)

T. B. M. 43.—About 2½ miles south of **Henderson,** Vance County, a railroad spike in a crossing sign, 15 feet north of the crossing, and 45 feet east of Franklinton road. (154.56 meters, or 507.09 feet.)

T. B. M. 44.—About 3 miles south of **Henderson**, Vance County, a railroad spike in a telephone pole 500 feet south of a road crossing. (154.59 meters, or 507.18 feet.)

T. B. M. 45.—About ¼ mile north of **Gill**, Vance County, a railroad spike in the third telephone pole south of the siding switch. (153.99 meters, or 505.22 feet.)

T. B. M. 46.—About 750 feet south of the depot at **Gill**, Vance County, a railroad spike in a telephone pole east of the track. (148.44 meters, or 487.01 feet.)

T. B. M. 49.—About 1 mile north of **Kittrell**, Vance County, a railroad spike in the north end of the extra rail support at milepost 120. (133.74 meters, or 438.78 feet.)

At **Kittrell**, Vance County, top of rail. (129.00 meters, or 423.23 feet.)

T. B. M. 51.—A railroad spike in the eighth telephone pole south of the depot at **Kittrell**, Vance County, east of the track, and 8 feet north of the road crossing. (129.05 meters, or 423.39 feet.)

T. B. M. 52.—About 1 mile south of **Kittrell**, Vance County, a railroad spike in the root of a sweet-gum tree, 52 feet west of the track, and 200 feet north of a switch. (124.70 meters, or 409.12 feet.)

T. B. M. 55.—Near **Franklinton**, Franklin County, a square mark on the top of the concrete abutment at the south end of the Tar River Railroad bridge, east of the track, and 2 inches from the south end of the wall. (91.58 meters, or 300.46 feet.)

At **Franklinton**, Franklin County, top of rail. (128.42 meters, or 421.32 feet.)

T. B. M. 60.—About 3 miles south of **Franklinton**, Franklin County, a railroad spike in the third telephone pole south of a farm crossing, east of the track. (128.07 meters, or 420.18 feet.)

T. B. M. 61.—About 1,900 feet north of the depot at **Youngsville**, Franklin County, a railroad spike in the sixth telephone pole south of milepost 136. (137.32 meters, or 450.52 feet.)

At **Youngsville.** Franklin County, top of rail. (137.39 meters, or 450.75 feet.)

T. B. M. 62.—About 400 feet south of the depot at **Youngsville**, Franklin County, a railroad spike in the first telephone pole south of the street crossing, east of the track. (136.28 meters, or 447.11 feet.)

T. B. M. 63.—About 2,000 feet south of the depot at **Youngsville**, Franklin County, a railroad spike in a telephone pole east of the track, and opposite a railroad switch. (133.64 meters, or 438.45 feet.)

At **Wake Forest**, Wake County, top of rail. (122.11 meters, or 400.62 feet.)

T. B. M. 68.—About 2 miles south of **Wake Forest**, Wake County, a railroad spike in a telephone pole 250 feet north of milepost 144, east of the track. (91.53 meters, or 300.29 feet.)

T. B. M. 70.—About 3 miles south of **Wake Forest**, Wake County, a railroad spike in the south end of the extra rail support at milepost 145. (81.99 meters, or 269.00 feet.)

At **Neuse**, Wake County, top of rail. (85.68 meters, or 281.10 feet.)

T. B. M. 74.—About 1,400 feet south of the depot at **Neuse**, Wake County, a railroad spike in the first telephone pole north of a switch. (84.58 meters, or 277.49 feet.)

T. B. M. 75.—About ½ mile south of **Neuse**, Wake County, a railroad spike in a telephone pole 500 feet north of milepost 148, east of the track. (83.60 meters, or 274.28 feet.)

T. B. M. 76.—About 3 miles north of **Millbrook**, Wake County, a railroad spike in a road crossing post. (87.19 meters, or 286.06 feet.)

T. B. M. 79.—About 1⅛ miles north of **Millbrook**, Wake County, a railroad spike in a telephone pole 600 feet north of milepost 150, east of the track. (99.98 meters, or 328.02 feet.)

T. B. M. 80.—About ½ mile north of **Millbrook**, Wake County, a railroad spike in the first telephone post north of a farm crossing, east of the track. (94.91 meters, or 311.38 feet.)

At **Millbrook**, Wake County, top of rail. (95.48 meters, or 313.25 feet.)

T. B. M. 83.—About 1⅛ miles south of **Millbrook**, Wake County, a railroad spike in a telephone pole 300 feet north of a road crossing, east of the track. (89.04 meters, or 292.13 feet.)

T. B. M. 84.—About 1¾ miles south of **Millbrook**, Wake County, a railroad spike in the south end of an extra rail support at milepost 153. (85.67 meters, or 281.07 feet.)

T. B. M. 87.—About 2 miles north of **Raleigh**, Wake County, a railroad spike in a telephone pole 50 feet south of milepost 155, east of the track. (75.57 meters, or 247.93 feet.)

T. B. M. 89.—About 1 mile north of **Raleigh**, Wake County, a railroad spike in a telephone pole 700 feet south of a cotton mill, on east side of track. (89.02 meters, or 292.06 feet.)

T. B. M. 90.—About ½ mile north of **Raleigh**, Wake County, a railroad spike in the northeast corner of the sand house in the Johnson Street yards. (96.17 meters, or 315.52 feet.)

T. B. M. 94.—At **Raleigh**, Wake County, a cross mark on the southeast corner of the south abutment of the Southern Railway bridge over South Street. (92.36 meters, or 303.02 feet.)

T. B. M. 91.—About ¾ mile west of **Raleigh**, Wake County, a railroad spike in a telephone pole, east of the track and opposite the south end of the State Penitentiary. (103.18 meters, or 338.52 feet.)

T. B. M. 92.—About $1\frac{1}{5}$ miles west of **Raleigh**, Wake County, a cross cut in the foundation of a semaphore 150 feet west of a road crossing. (110.70 meters, or 363.19 feet.)

T. B. M. 93.—About 2¼ miles west of **Raleigh**, Wake County, a railroad spike in the north end of the extra rail support at milepost 159. (122.26 meters, or 401.11 feet.)

T. B. M. 96.—At **Method**, Wake County, a railroad spike in milepost 160. (136.15 meters, or 446.69 feet.)

T. B. M. 98.—About 1 mile west of **Method**, Wake County, a railroad spike in a road-crossing post. (149.95 meters, or 491.96 feet.)

T. B. M. 99.—About 2½ miles east of **Cary**, Wake County, a railroad spike in a telephone pole 500 feet west of a road crossing. (143.93 meters, or 472.21 feet.)

T. B. M. 100.—About 2 miles east of **Cary**, Wake County, a railroad spike in the west end of the extra rail support at milepost 163, 50 feet west of a road crossing. (147.72 meters, or 484.64 feet.)

T. B. M. 101.—About 1¾ miles east of **Cary**, Wake County, a railroad spike in a telephone pole 50 feet west of a road crossing. (150.26 meters, or 492.98 feet.)

T. B. M. 102.—About 1¼ miles east of **Cary**, Wake County, a railroad spike in a telephone pole 200 feet west of a road crossing. (150.78 meters, or 494.68 feet.)

T. B. M. 103.—About ½ mile east of **Cary**, Wake County, a cross mark in the concrete foundation of a semaphore. (150.63 meters, or 494.19 feet.)

At **Cary**, Wake County, top of rail. (151.63 meters, or 497.47 feet.)

T. B. M. 104.—About 1½ miles south of **Cary**, Wake County, a railroad spike in the first telephone pole south of a road crossing. (141.33 meters, or 463.68 feet.)

T. B. M. 105.—About 2 miles south of **Cary**, Wake County, a railroad spike in the first telephone pole south of a farm crossing. (135.02 meters, or 442.98 feet.)

T. B. M. 106.—About 2¾ miles north of **Apex**, Wake County, a railroad spike in a road-crossing sign. (135.04 meters, or 443.04 feet.)

T. B. M. 107.—About 1½ miles north of **Apex**, Wake County, a railroad spike in a telephone pole 300 feet north of a whistle post. (132.12 meters, or 433.46 feet.)

T. B. M. 109.—About ½ mile north of **Apex**, Wake County, a railroad spike in a telephone pole about 700 feet south of the section house. (146.94 meters, or 482.09 feet.)

At **Apex**, Wake County, top of rail. (153.63 meters, or 504.03 feet.)

T. B. M. 110.—About ⅓ mile south of **Apex**, Wake County, a railroad spike in a telephone pole, in the northeast corner made by the crossing of two highways. (151.18 meters, or 496.00 feet.)

T. B. M. 111.—About 2 miles south of **Apex**, Wake County, a railroad spike in the north end of the extra rail support at milepost 173. (130.92 meters, or 429.53 feet.)

T. B. M. 113.—About 2⅓ miles north of **Newhill**, Wake County, a railroad spike in the second telephone pole south of a road crossing. (117.52 meters, or 385.56 feet.)

T. B. M. 114.—About 1¾ miles north of **Newhill**, Wake County, a railroad spike in the telephone pole at the top of a cut, west of the track. (111.51 meters, or 365.85 feet.)

T. B. M. 116.—About ⅓ mile north of **Newhill**, Wake County, a railroad spike in the south end of the extra rail support at milepost 177. (104.05 meters, or 341.37 feet.)

At **Newhill**, Wake County, top of rail. (102.72 meters, or 337.01 feet.)

T. B. M. 117.—In the second telephone pole south of the depot at **Newhill**, Wake County, a railroad spike. (102.01 meters, or 334.68 feet.)

T. B. M. 119.—About 1¾ miles south of **Newhill**, Wake County, and 1½ 1½ miles north of **Bonsal**, in the first telephone pole north of a road crossing, on the east side of the track. A railroad spike. (99.02 meters, or 324.87 feet.)

T. B. M. 120.—About 1 mile north of **Bonsal**, Wake County, a railroad spike in the north end of the extra rail support at milepost 179. (97.10 meters, or 318.57 feet.)

T. B. M. 121.—About 2,000 feet north of the depot at **Bonsal**, Wake County, a railroad spike in a telephone pole at the south end of a cut and west of the track. (95.23 meters, or 312.43 feet.)

At **Bonsal**, Wake County, top of rail. (93.69 meters, or 307.38 feet.)

T. B. M. 122.—At **Bonsal**, Wake County, 150 feet south of the depot, a railroad spike in the north end of the extra rail support at milepost 180. (92.91 meters, or 304.82 feet.)

T. B. M. 124.—About ¾ mile north of **Merry Oaks**, Chatham County, a railroad spike in a telephone pole 30 feet south of an old farm crossing, east of the track. (85.77 meters, or 281.40 feet.)

At **Merry Oaks**, Chatham County, top of rail, (76.55 meters, or 251.15 feet.)

T. B. M. 126.—At **Merry Oaks**, Chatham County, 150 feet north of the depot, 30 feet south of a road crossing, a railroad spike in a pine tree 117 feet west of the track. (76.79 meters, or 251.94 feet.)

T. B. M. 128.—About 3 miles north of **Moncure**, Chatham County, a railroad spike in a telephone pole 50 feet south of a road crossing. (58.85 meters, or 193.08 feet.)

T. B. M. 129.—About 2½ miles north of **Moncure**, Chatham County, a railroad spike in the north end of the extra rail support at milepost 185. (55.78 meters, or 183.00 feet.)

T. B. M. 130.—About 1½ miles north of **Moncure**, Chatham County, and 800 feet north of the Haw River bridge, a railroad spike in a pine tree 85 feet east of the track. (57.51 meters, or 188.68 feet.)

OSBORNE TO MONCURE, N. C.

Temporary bench marks and elevations of rail in front of railroad depots, Seaboard Air Line Railway.

T. B. M. 235.—About ½ mile south of **Osborne**, Richmond County, a lag screw in a telegraph pole, 50 feet west of the track, and ¼ mile north of milepost 261. (64.36 meters, or 211.15 feet.)

At **Osborne**, Richmond County, top of rail. (67.56 meters, or 221.65 feet.)

T. B. M. 236.—About ¾ mile north of **Osborne**, Richmond County, a lag screw in a telegraph pole, 50 feet west of the track, and ½ mile north of milepost 260. (76.50 meters, or 250.98 feet.)

T. B. M. 237.—About 1½ miles north of **Osborne**, Richmond County, a lag screw in a telegraph pole, 50 feet west of the track, and ¼ mile north of milepost 259. (90.53 meters, or 297.01 feet.)

T. B. M. 238.—About 3 miles north of **Osborne**, Richmond County, a lag screw in a telegraph pole, 50 feet west of the track, and ¼ mile south of milepost 257. (79.31 meters, or 260.20 feet.)

T. B. M. 239.—About 4 miles north of **Osborne**, Richmond County, a lag screw in a telegraph pole, about ½ mile north of milepost 257 and about 50 feet west of the track. (77.91 meters, or 255.61 feet.)

T. B. M. 240.—About 2 miles south of **Hamlet**, Richmond County, a lag screw in a telegraph pole, about 50 feet west of the track, about 500 feet south of milepost 255, and about ¼ mile north of the crossing with the Rockingham Railroad. (86.35 meters, or 283.30 feet.)

T. B. M. 241.—About 1¼ miles south of **Hamlet**, Richmond County, a lag screw in a telegraph pole, about 50 feet west of the track and about ½ mile north of milepost 255. (88.93 meters, or 291.76 feet.)

At **Hamlet**, Richmond County, top of rail. (95.97 meters, or 314.86 feet.)

T. B. M. 242.—At **Hamlet**, Richmond County, in the railroad shopyards, a lag screw in a telegraph pole, about 325 feet north of the Seaboard Air Line Rail-

way crossing, and about 60 feet west of the main track. (103.79 meters, or 340.52 feet.)

T. B. M. 243.—About 1 mile north of **Hamlet**, Richmond County, a lag screw in a telegraph pole, about 50 feet west of the track, and about ¼ mile south of milepost 252. (108.12 meters, or 354.72 feet).

T. B. M. 244.—About 2 miles north of **Hamlet**, Richmond County, a lag screw in a telegraph pole, about 50 feet west of the track, and about ¼ mile south of milepost 251. (119.88 meters, or 393.31 feet.)

T. B. M. 245.—About 2½ miles north of **Hamlet**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ¼ mile north of milepost 251. (126.25 meters, or 414.21 feet.)

T. B. M. 246.—About 3 miles north of **Hamlet**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ¼ mile south of milepost 250. (130.28 meters, or 427.43 feet).

T. B. M. 247.—About 4 miles north of **Hamlet**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ¼ mile south of milepost 249. (135.45 meters, or 444.39 feet).

T. B. M. 248.—About 4½ miles north of **Hamlet**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ¼ mile north of milepost 249. (131.15 meters, or 430.28 feet.)

T. B. M. 249.—About 2½ miles north of **Cognac**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ¼ mile south of milepost 248. (126.09 meters, or 413.68 feet).

T. B. M. 250.—About 1¼ miles south of **Cognac**, Richmond County, a lag screw in a telegraph pole, about 35 feet east of the northbound track, opposite milepost 247. (127.43 meters, or 418.08 feet.)

T. B. M. 251.—About ½ mile south of **Cognac**, Richmond County, a lag screw in a telegraph pole, about 35 feet east of the northbound track, about ¼ mile south of milepost 246, and about 25 feet north of a road crossing. (122.83 meters, or 402.98 feet.)

At **Cognac**, Richmond County, top of rail. (121.81 meters, or 399.64 feet.)

T. B. M. 252.—About ½ mile north of **Cognac**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the northbound track and about ¼ mile south of milepost 245. (117.95 meters, or 386.97 feet.)

T. B. M. 253.—About 1¼ miles north of **Cognac**, Richmond County, a lag screw in a telegraph pole, about 35 feet east of the northbound track, and about ½ mile north of milepost 245. (121.68 meters, or 399.21 feet.)

T. B. M. 254.—About 1 mile south of **Marston**, Richmond County, a lag screw in a telegraph pole, about 35 feet east of the northbound track, and about 500 feet south of milepost 244. (124.42 meters, or 408.20 feet.)

T. B. M. 255.—About ½ mile south of **Marston**, Richmond County, a lag screw in a telegraph pole, about 35 feet east of the northbound track, and about ½ mile north of milepost 244. (127.96 meters, or 419.82 feet.)

T. B. M. 256.—About ½ mile north of **Marston**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the main track, and about ½ mile south of milepost 242. (135.21 meters, or 443.60 feet.)

T. B. M. 257.—About 1¼ miles north of **Marston**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track and about ¼ mile north of milepost 242. (134.96 meters, or 442.78 feet.)

T. B. M. 258.—About ¼ mile south of **Broadacre**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ¼ mile south of milepost 241. (130.59 meters, or 428.44 feet.)

T. B. M. 259.—About ½ mile north of **Broadacre**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ½ mile south of milepost 240. (133.41 meters, or 437.70 feet.)

T. B. M. 260.—About ½ mile south of **Hoffman**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about 500 feet north of milepost 240. (130.38 meters, or 427.76 feet.)

At **Hoffman**, Richmond County, top of rail. (130.82 meters, or 429.20 feet.)

T. B. M. 261.—About ½ mile north of **Hoffman**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ¼ mile north of milepost 239. (128.45 meters, or 421.42 feet.)

T. B. M. 262.—About 1 mile north of **Hoffman**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track and about ¼ mile south of milepost 238. (127.97 meters, or 419.85 feet.)

T. B. M. 263.—About 1¾ miles north of **Hoffman**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ½ mile north of milepost 238. (122.85 meters, or 403.05 feet).

T. B. M. 264.—About 3 miles north of **Hoffman**, Richmond County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ½ mile south of milepost 236. (106.07 meters, or 348.00 feet.)

T. B. M. 265.—About 2½ miles south of **Keyser**, Moore County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ½ mile north of milepost 236. (94.03 meters, or 308.50 feet.)

T. B. M. 266.—About 1½ miles south of **Keyser**, Moore County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ½ mile south of milepost 234. (84.62 meters, or 277.62 feet.)

T. B. M. 267.—About ¾ mile south of **Keyser**, Moore County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ¼ mile north of milepost 234. (86.06 meters, or 282.35 feet.)

At **Keyser**, Moore County, top of rail. (90.32 meters, or 296.32 feet.)

T. B. M. 268.—About ¾ mile north of **Keyser**, Moore County, about ¼ mile south of the depot at Pinebluff, Moore County, a lag screw in a telegraph pole, about 50 feet east of the track, and about ¼ mile south of milepost 232. (91.34 meters, or 299.67 feet.)

T. B. M. 269.—At **Pinebluff**, Moore County, about 165 feet southeast of the depot, a lag screw in a telegraph pole, about 50 feet east of the main track, and about ½ mile north of milepost 232. (96.50 meters, or 316.60 feet.)

At **Pinebluff**, Moore County, top of rail. (95.91 meters, or 314.66 feet.)

T. B. M. 270.—About ¾ mile south of **Aberdeen**, Moore County, a spike in a telegraph pole, about ½ mile north of milepost 230, and about 50 feet east of the track. (98.44 meters, or 322.97 feet.)

At **Aberdeen**, Moore County, top of rail. (103.51 meters, or 339.60 feet.)

T. B. M. 271.—About ¾ mile north of **Aberdeen**, Moore County, a spike in a telegraph pole east of the track and about 500 feet south of milepost 228. (110.23 meters, or 361.65 feet.)

T. B. M. 272.—About 1½ miles north of **Aberdeen**, Moore County, a spike in a telegraph pole east of the track, about ½ mile south of milepost 227. (122.30 meters, or 401.25 feet.)

T. B. M. 273.—About ¾ mile south of **Southern Pines**, Moore County, a spike in a telegraph pole, about ¼ mile north of milepost 226. (147.66 meters, or 484.45 feet.)

At **Southern Pines**, Moore County, top of rail. (156.25 meters, or 512.63 feet.)

T. B. M. 274.—About ¾ mile north of **Southern Pines**, Moore County, a spike in a telegraph pole, about ¼ mile south of milepost 224. (146.29 meters, or 479.95 feet.)

At **Niagara**, Moore County, top of rail. (122.92 meters, or 403.28 feet.)

T. B. M. 276.—About ¾ mile north of **Niagara**, Moore County, a spike in a telegraph pole, about 260 feet south of milepost 221. (112.45 meters, or 368.93 feet.)

T. B. M. 277.—About 1½ miles north of **Niagara**, Moore County, a spike in a telegraph pole, about ¼ mile south of milepost 220. (101.01 meters, or 331.40 feet.)

T. B. M. 278.—About 1 mile south of **Lakeview**, Moore County, a lag screw in a telegraph pole, about ½ mile south of milepost 219. (95.76 meters, or 314.17 feet.)

At **Lakeview**, Moore County, top of rail. (80.89 meters, or 265.39 feet.)

T. B. M. 279.—About 500 feet north of **Lakeview**, Moore County, a spike in a telegraph pole, about ¼ mile south of milepost 218. (80.15 meters, or 262.96 feet.)

T. B. M. 280.—About ¾ mile north of **Lakeview**, Moore County, a spike in a trestle east of the track, 3 feet below the rail, and about ½ mile north of milepost 218. (79.54 meters, or 260.96 feet.)

T. B. M. 281.—About 2¼ miles north of **Lakeview**, Moore County, a spike in a telegraph pole east of the track, about 300 feet south of milepost 216. (93.61 meters, or 307.12 feet.)

At **Vass**, Moore County, top of rail. (89.47 meters, or 293.54 feet.)

T. B. M. 282.—About 1¼ miles north of **Vass**, Moore County, a spike in a telegraph pole east of the track, and ½ mile south of milepost 215. (96.00 meters, or 314.96 feet.)

T. B. M. 283.—About 2¾ miles north of **Vass**, Moore County, a spike in a telegraph pole east of the track, about 750 feet north of milepost 214. (81.72 meters, or 268.11 feet).

T. B. M. 284.—About 2 miles south of **Cameron,** Moore County, a spike in a telegraph pole east of the track, about 750 feet south of milepost 213. (86.93 meters, or 285.20 feet.)

At **Cameron,** Moore County, top of rail. (93.13 meters, or 305.54 feet.)

T. B. M. 286.—About 1 mile north of **Cameron,** Moore County, a spike in a telegraph pole east of the track, about ¼ mile south of milepost 210. (95.92 meters, or 314.70 feet.)

T. B. M. 287.—About 1½ miles north of **Cameron,** Moore County, a spike in a telegraph pole east of the track, about ½ mile north of milepost 210. (101.04 meters, or 331.50 feet.)

T. B. M. 288.—About 2¾ miles north of **Cameron,** Moore County, a spike in a telegraph pole east of the track, about ½ mile south of milepost 208. (112.28 meters, or 368.37 feet.)

T. B. M. 289.—About 1 mile south of **Lemon Springs,** Lee County, a lag screw in a telegraph pole east of the track, about ¼ mile north of milepost 207. (118.90 meters, or 390.09 feet.)

T. B. M. 290.—About ½ mile south of **Lemon Springs,** Lee County, a spike in a telegraph pole east of the track, about 80 feet north of milepost 206. (116.50 meters, or 382.22 feet.)

At **Lemon Springs,** Lee County, top of rail. (119.38 meters, or 391.67 feet.)

T. B. M. 291.—About ¾ mile north of **Lemon Springs,** Lee County, a lag screw in a telegraph pole east of the track, about 500 feet north of milepost 205. (124.01 meters, or 406.86 feet.)

T. B. M. 292.—About 1¼ miles north of **Lemon Springs,** Lee County, a lag screw in a telegraph pole east of the track, about ¼ mile south of milepost 204. (116.65 meters, or 382.71 feet.)

T. B. M. 293.—About 2½ miles north of **Lemon Springs,** Lee County, a lag screw in a telegraph pole east of the track, about ¼ mile south of milepost 203. (117.32 meters, or 384.91 feet.)

T. B. M. 294.—About 3¼ miles south of **Sanford,** Lee County, 7 feet west of the track, a lag screw in a post of an overhead wagon-road crossing, about ¼ mile south of milepost 202. (125.73 meters, or 412.50 feet.)

T. B. M. 295.—About 2½ miles south of **Sanford,** Lee County, 7 feet west of the track, a lag screw in a post of an overhead wagon-road crossing, about ½ mile north of milepost 202. (128.79 meters, or 422.54 feet.)

T. B. M. 296.—About 2 miles south of **Sanford,** Lee County, a spike in a telegraph pole east of the track, about 350 feet north of milepost 201. (119.00 meters, or 390.42 feet.)

T. B. M. 297.—About ½ mile south of **Sanford,** Lee County, a lag screw in a telegraph pole west of the track, about ½ mile north of milepost 200. (108.59 meters, or 356.27 feet.)

At **Sanford,** Lee County, top of rail. (111.60 meters, or 366.14 feet.)

T. B. M. 298.—About ¾ mile north of **Sanford,** Lee County, a lag screw in a telegraph pole east of the track, about ¼ mile south of milepost 198. (104.34 meters, or 342.32 feet.)

T. B. M. 299.—About 1½ miles north of **Sanford,** Lee County, a lag screw in a telegraph pole east of the track, about ½ mile south of milepost 197. (98.40 meters, or 322.83 feet.)

T. B. M. 300.—About 2¼ miles north of **Sanford,** Lee County, a lag screw in a telegraph pole east of the track, about ¼ mile north of milepost 197. (99.20 meters, or 325.46 feet.)

T. B. M. 301.—About 3 miles north of **Sanford,** Lee County, a lag screw in a telegraph pole, about 26 feet south of milepost 196. (104.19 meters, or 341.83 feet.)

At **Colon,** Lee County, top of rail. (97.39 meters, or 319.52 feet.)

T. B. M. 302.—About 1¼ miles north of **Colon,** Lee County, a lag screw in a telegraph pole east of the track, about 720 feet north of milepost 194. (82.45 meters, or 270.50 feet.)

T. B. M. 303.—About 3 miles north of **Colon,** Lee County, a lag screw in a telegraph pole east of the track, about ¼ mile south of milepost 192. (74.49 meters, or 244.39 feet.)

T. B. M. 304.—About 3½ miles north of **Colon,** Lee County, a lag screw in a telegraph pole east of the track, about ¼ mile north of milepost 192. (63.34 meters, or 207.81 feet.)

T. B. M. 305.—About 4 miles south of **Moncure,** Chatham County, a lag screw in a telegraph pole east of the track, about 700 feet south of milepost 191. (71.23 meters, or 233.69 feet.)

T. B. M. 306.—About 2¾ miles south of **Moncure**, Chatham County, a lag screw in a telegraph pole east of the track, about 100 feet north of milepost 190. (65.91 meters, or 216.24 feet.)

T. B. M. 307.—About 2 miles south of **Moncure**, Chatham County, a lag screw in a telegraph pole east of the track, about 900 feet south of milepost 189. (63.89 meters, or 209.61 feet.)

T. B. M. 308.—About ½ mile south of **Moncure**, Chatham County, 5 feet west of the track, a lag screw in the north end of the Cape Fear River trestle, about ¼ mile north of milepost 188. (59.31 meters, or 194.59 feet.)

At **Moncure**, Chatham County, top of rail. (59.67 meters, or 195.77 feet.)

WILMINGTON TO BEAR CREEK, N. C.

Temporary bench marks and elevation of rail in front of railroad depots, Atlantic Coast Line Railroad.

At **Wilmington**, New Hanover County, top of rail at the corner of Front and Red Cross Streets. (7.97 meters, or 26.15 feet.)

T. B. M. 131.—At **Wilmington**, New Hanover County, on the corner of Hanover and Fourth Streets, a triangle on the cement sidewalk on the west side of Hanover Street, 1¼ feet west of the curb. (16.30 meters, or 53.48 feet.)

T. B. M. 132.—At **Wilmington**, New Hanover County, a cross mark on the southeast corner of the cement walk on the south side of the bridge over the railroad tracks on Fourth Street. (13.26 meters, or 43.50 feet.)

T. B. M. 133.—About 1¾ miles west of **Wilmington**, New Hanover County, a spike in a telegraph pole south of the track, about 600 feet west of a switch. (0.73 meters, or 2.40 feet.)

T. B. M. 134.—About 2½ miles west of **Wilmington**, New Hanover County, a spike in the south end of a 6 by 14 inch-timber in the east abutment of a small wooden bridge. (1.32 meters, or 4.33 feet.)

T. B. M. 135.—About 3 miles west of **Wilmington**, New Hanover County, a spike in a telegraph pole south of the track, about ¼ mile east of milepost 361. (0.65 meters, or 2.13 feet.)

T. B. M. 136.—About 3½ miles west of **Wilmington**, New Hanover County, a spike in a telegraph pole south of the track, about 360 feet east of a small trestle. (0.54 meters, or 1.77 feet.)

T. B. M. 137.—At **Navassa**, Brunswick County, a spike in the bridge warning pole about 260 feet west of the Cape Fear River Bridge. (4.00 meters, or 13.12 feet.)

T. B. M. 138.—About 2 miles north of **Wilmington**, New Hanover County, a spike in a telegraph pole east of the track, about 700 feet north of milepost 2. (0.96 meters, or 3.15 feet.)

T. B. M. 139.—About 1 mile north of **Yadkin Junction**, New Hanover County, a spike in a telegraph pole east of the track, about ½ mile south of milepost 3, near a whistling post. (4.28 meters, or 14.04 feet.)

T. B. M. 140.—About 2 miles north of **Yadkin Junction**, New Hanover County, a spike in a telegraph pole east of the track. (7.11 meters, or 23.33 feet.)

T. B. M. 141.—About 2½ miles north of **Yadkin Junction**, New Hanover County, a spike in a telegraph pole east of the track, about 65 feet south of milepost 4. (6.08 meters, or 19.95 feet.)

T. B. M. 142.—About 3½ miles south of **Richards**, Pender County, a spike in the east side of a small pine tree, about 1 foot above the ground, 70 feet west of the track, and about 10 feet south of the south edge of a shanty. (4.70 meters or 15.42 feet.)

T. B. M. 143.—About 3¼ miles south of **Richards**, Pender County, a spike in a telegraph pole east of the track, about 130 feet south of milepost 5. (5.72 meters, or 18.77 feet.)

T. B. M. 144.—About 2½ miles south of **Richards**, Pender County, a spike in a telegraph pole east of the track. (4.86 meters, or 15.94 feet.)

T. B. M. 145.—About 2¼ miles south of **Richards**, Pender County, a spike in a telegraph pole east of the track, about 180 feet south of milepost 6. (6.04 meters, or 19.82 feet.)

T. B. M. 146.—About 1½ miles south of **Richards**, Pender County, a spike about 1 foot above the ground in the east side of a 12-inch pine tree 65 feet west of the track. (4.70 meters, or 15.42 feet.)

T. B. M. 147.—About 1¼ miles south of **Richards**, Pender County, a spike in the east end of a 6 by 12 inch sill under the north end of a bridge, about 180 feet north of milepost 7. (2.86 meters, or 9.38 feet).

T. B. M. 148.—About ½ mile south of **Richards**, Pender County, a spike in a telegraph pole east of the track at the south end of a shallow cut. (6.73 meters, or 22.08 feet.)

At **Richards**, Pender County, top of rail. (10.34 meters, or 33.92 feet.)

T. B. M. 149.—About 200 feet north of the depot at **Richards**, Pender County, a spike in a telegraph pole east of the track. (9.90 meters, or 32.48 feet.)

T. B. M. 150.—About ½ mile north of **Richards**, Pender County, a spike in a telegraph pole east of the track, in a sand cut. (10.56 meters, or 34.65 feet.)

T. B. M. 151.—About 1¾ miles north of **Richards**, Pender County, a spike in a telegraph pole east of the track, about 650 feet south of milepost 10. (10.40 meters, or 34.12 feet.)

T. B. M. 152.—About 2 miles north of **Richards**, Pender County, a spike in a telegraph pole east of the track, about 560 feet south of a road crossing. (11.13 meters, or 36.52 feet.)

T. B. M. 153.—About 3 miles north of **Richards**, Pender County, a spike in a telegraph pole east of the track, about 650 feet north of milepost 11. (9.76 meters, or 32.02 feet.)

T. B. M. 154.—About 3 miles north of **Richards**, Pender County, a spike in a telegraph pole east of the track, about 360 feet south of a road crossing. (10.73 meters, or 35.20 feet.)

T. B. M. 155.—About 2 miles south of **Montague**, Pender County, a spike in a telegraph pole east of the track at a road crossing. (17.43 meters, or 57.18 feet.)

T. B. M. 156.—About 1¾ miles south of **Montague**, Pender County, a spike in a telegraph pole, about ⅛ mile north of milepost 13. (18.03 meters, or 59.15 feet.)

T. B. M. 157.—About 1¼ miles south of **Montague**, Pender County, a spike in a telegraph pole east of the track, about 650 feet south of milepost 14. (13.02 meters, or 42.72 feet.)

T. B. M. 158.—About ½ mile south of **Montague**, Pender County, a spike in a telegraph pole east of the track. (11.30 meters, or 37.07 feet.)

At **Montague**, Pender County, top of rail. (12.06 meters, or 39.57 feet.)

T. B. M. 159.—About ½ mile north of **Montague**, Pender County, a spike in a telegraph pole east of the track. (11.40 meters, or 37.40 feet.)

T. B. M. 160.—About ¾ mile south of **Currie**, Pender County, a spike in a telegraph pole east of the track, about 300 feet south of milepost 17. (11.37 meters, or 37.30 feet.)

T. B. M. 161.—About 650 feet south of the depot at **Currie**, Pender County, the end of the bolt on the north end of the west guard rail of a small bridge. (10.22 meters, or 33.53 feet.)

At **Currie**, Pender County, top of rail. (10.19 meters, or 33.43 feet.)

T. B. M. 162.—About 2½ miles south of **Rooks**, Pender County, a spike in a telegraph pole east of the track. (10.86 meters, or 35.63 feet.)

T. B. M. 163.—About 1¾ miles south of **Rooks**, Pender County, a spike in a telegraph pole east of the track. (12.74 meters, or 41.80 feet.)

T. B. M. 164.—About 1 mile south of **Rooks**, Pender County, a spike in a telegraph pole east of the track, about 820 feet south of milepost 21. (15.94 meters, or 52.30 feet.)

At **Rooks**, Pender County, top of rail. (18.70 meters, or 61.35 feet.)

T. B. M. 165.—About ½ mile north of the depot at **Rooks**, Pender County, a spike in a telegraph pole east of the track at the south end of a cut. (15.97 meters, or 52.39 feet.)

T. B. M. 166.—About 1 mile south of **Atkinson**, Pender County, the tie bolt on the north end of the west guard rail of a small bridge. (14.50 meters, or 47.57 feet.)

At **Atkinson**, Pender County, top of rail. (18.81 meters, or 61.71 feet.)

T. B. M. 167.—About 1⅛ miles north of **Atkinson**, Pender County, a spike in a telegraph pole east of the track. (20.28 meters, or 66.54 feet.)

T. B. M. 168.—About 2 miles north of **Atkinson**, Pender County, a spike in a telegraph pole east of the track, about 280 feet north of milepost 26. (21.42 meters, or 70.28 feet.)

T. B. M. 169.—About 2½ miles north of **Atkinson**, Pender County, the northernmost tie bolt in the east guard rail of a small bridge. (21.93 meters, or 71.95 feet.)

T. B. M. 170.—About 3 miles north of **Atkinson**, Pender County, a spike in a telegraph pole east of the track, about ¼ mile north of milepost 27. (21.58 meters, or 70.80 feet.)

T. B. M. 171.—About 3½ miles south of **Ivanhoe**, Sampson County, a spike in a telegraph pole east of the track, about ¼ mile south of milepost 28. (21.92 meters, or 71.92 feet.)

T. B. M. 172.—About 2¾ miles south of **Ivanhoe**, Sampson County, a spike in a telegraph pole east of the track. (22.49 meters, or 73.79 feet.)

T. B. M. 173.—About 2 miles south of **Ivanhoe**, Sampson County, the northernmost tie bolt on the west guard rail of a small bridge. (24.92 meters, or 81.76 feet.)

T. B. M. 174.—About 1 mile south of **Ivanhoe**, Sampson County, a spike in the west side of a pine tree about 5 inches above the ground, and about 55 feet east of the track. (15.44 meters, or 50.66 feet.)

T. B. M. 175.—About ½ mile south of **Ivanhoe**, Sampson County, a spike in a telegraph pole east of the track, about 65 feet south of a small bridge. (9.71 meters, or 31.86 feet.)

T. B. M. 176.—About ¾ mile north of **Ivanhoe**, Sampson County, a spike in the second telegraph pole south of a road crossing, east of the track. (8.88 meters, or 29.13 feet.)

T. B. M. 177.—About 1½ miles south of **Kerr**, Sampson County, a spike in a telegraph pole east of the track, about 260 feet south of milepost 34. (22.46 meters, or 73.69 feet.)

T. B. M. 178.—About ¾ mile south of **Kerr**, Sampson County, a spike in a telegraph pole east of the track, near a whistling post. (24.29 meters, or 79.69 feet.)

T. B. M. 179.—About ⅓ mile north of **Kerr**, Sampson County, a spike in a telegraph pole east of the track, about 400 feet south of milepost 36. (26.72 meters, or 87.66 feet.)

T. B. M. 180.—About 1¾ miles north of **Kerr**, Sampson County, a spike in a telegraph pole east of the track, about 280 feet north of a siding. (28.41 meters, or 93.21 feet.)

T. B. M. 181.—About 2¼ miles north of **Kerr**, Sampson County, a spike in a telegraph pole east of the track, about 260 feet north of a culvert bridge. (26.96 meters, or 88.45 feet.)

T. B. M. 182.—About 1¾ miles south of **Tomahawk**, Sampson County, a spike in a telegraph pole east of the track. (29.39 meters, or 96.42 feet.)

T. B. M. 183.—About 1¼ miles south of **Tomahawk**, Sampson County, a spike in a telegraph pole, east of the track, about 250 feet south of milepost 39. (29.06 meters, or 95.34 feet.)

T. B. M. 184.—About ½ mile south of **Tomahawk**, Sampson County, a spike in the west side of a very prominent 12-inch pine tree 58 feet west of the track. (28.86 meters, or 94.68 feet.)

At **Tomahawk**, Sampson County, top of rail. (29.93 meters, or 98.20 feet.)

T. B. M. 185.—About ½ mile north of **Tomahawk**, Sampson County, a spike in a telegraph pole east of the track. (28.07 meters, or 92.09 feet.)

T. B. M. 186.—About 1 mile north of **Tomahawk**, Sampson County, a spike in a telegraph pole east of the track. (30.01 meters, or 98.46 feet.)

T. B. M. 187.—About 1¾ miles north of **Tomahawk**, Sampson County, a spike in a telegraph pole at the north end of a small cut east of the track. (30.76 meters, or 100.92 feet.)

T. B. M. 188.—About 2¾ miles north of **Tomahawk**, Sampson County, a spike in a telegraph pole east of the track, about 100 feet south of milepost 43. (30.55 meters, or 100.23 feet.)

T. B. M. 189.—About 3 miles north of **Tomahawk**, Sampson County, a spike about 1 foot above the ground in the east side of a 12-inch pine tree, opposite a negro shack, and 49 feet west of the track. (29.43 meters, or 96.55 feet.)

T. B. M. 190.—About 2½ miles south of **Garland**, Sampson County, a spike in a telegraph pole east of the track, about 425 feet north of milepost 44. (26.26 meters, or 86.15 feet.)

T. B. M. 191.—About 2 miles south of **Garland**, Sampson County, a spike in a telegraph pole east of the track, about midway in a deep cut. (28.77 meters, or 94.39 feet.)

T. B. M. 192.—About 1¼ miles south of **Garland**, Sampson County, a spike in a telegraph pole east of the track, about ¼ mile north of milepost 45. (36.61 meters, or 120.11 feet.)

T. B. M. 193.—About ½ mile south of **Garland**, Sampson County, a spike in a telegraph pole east of the track. (39.81 meters, or 130.61 feet.)

At **Garland**, Sampson County, top of rail. (41.42 meters, or 135.89 feet.)

T. B. M. 194.—About ½ mile north of **Garland**, Sampson County, a spike in a telegraph pole east of the track. (39.37 meters, or 129.17 feet.)

T. B. M. 195.—About 1½ miles north of **Garland**, Sampson County, a spike in a telegraph pole east of the track, opposite a siding switch and about 80 feet north of milepost 48. (41.17 meters, or 135.07 feet.)

T. B. M. 196.—About 2¼ miles north of **Garland**, Sampson County, a spike in a telegraph pole east of the track, about ¼ mile south of milepost 49, and about 650 feet north of a switch. (37.63 meters, or 123.46 feet.)

T. B. M. 197.—About 1½ miles south of **Parkersburg**, Sampson County, a spike in a telegraph pole east of the track. (36.08 meters, or 118.37 feet.)

T. B. M. 198.—About ½ mile south of **Parkersburg**, Sampson County, a spike in a telegraph pole east of the track at the north end of a long cut. (39.98 meters, or 131.17 feet.)

At **Parkersburg**, Sampson County, top of rail. (35.88 meters, or 117.72 feet.)

T. B. M. 199.—About ¾ mile north of **Parkersburg**, Sampson County, a spike in a telegraph pole east of the track, about 525 feet south of milepost 52. (36.48 meters, or 119.68 feet.)

T. B. M. 200.—About 1½ miles north of **Parkersburg**, Sampson County, a spike in a telegraph pole east of the track at the south end of a shallow cut. (41.20 meters, or 135.17 feet.)

T. B. M. 201.—About 2 miles north of **Parkersburg**, Sampson County, a spike in a telegraph pole east of the track, about 80 feet south of milepost 53. (43.00 meters, or 141.08 feet.)

T. B. M. 202.—About 2½ miles north of **Parkersburg**, Sampson County, a spike in a telegraph pole east of the track, about 200 feet south of a switch, and 165 feet south of a road crossing. (43.00 meters, or 141.08 feet.)

T. B. M. 203.—About 1½ miles south of **Mints**, Sampson County, a spike in a telegraph pole east of the track, about 90 feet south of milepost 54. (38.68 meters, or 126.90 feet.)

At **Mints**, Sampson County, top of rail. (43.04 meters, or 141.21 feet.)

T. B. M. 204.—About ¾ mile north of **Mints**, Sampson County, a spike in a telegraph pole east of the track, about 650 feet north of a small bridge. (40.98 meters, or 134.45 feet.)

T. B. M. 205.—About 1 mile north of **Mints**, Sampson County, a spike in a telegraph pole east of the track, about ¼ mile south of milepost 57. (42.01 meters, or 137.83 feet.)

T. B. M. 206.—About 2½ miles south of **Roseboro**, Sampson County, a spike in a telegraph pole east of the track, about ¼ mile south of a road crossing. (43.55 meters, or 142.88 feet.)

T. B. M. 207.—About 1¾ mile south of **Roseboro**, Sampson County, the northernmost tie bolt on the west guard rail of a small bridge. (40.47 meters, or 132.78 feet.)

T. B. M. 208.—About 1¼ miles south of **Roseboro**, Sampson County, a spike in a telegraph pole east of the track. (39.23 meters, or 128.71 feet.)

T. B. M. 209.—About ½ mile south of **Roseboro**, Sampson County, a spike in the west face of an old cedar stump 30 feet west of the track. (40.02 meters, or 131.30 feet.)

T. B. M. 210.—About 1 mile west of **Roseboro**, Sampson County, a spike in an old stump, about 6 feet east of milepost 61, and 15 feet north of the track. (40.68 meters, or 133.46 feet.)

T. B. M. 211.—About 1½ miles west of **Roseboro**, Sampson County, a spike in a telegraph pole north of the track. (40.91 meters, or 134.22 feet.)

T. B. M. 212.—About 2¼ miles west of **Roseboro**, Sampson County, a spike in a telegraph pole north of the track at the west end of a cut. (38.44 meters, or 126.12 feet.)

T. B. M. 213.—About 1¾ miles east of **Hayne**, Sampson County, a spike in a telegraph pole north of the track, in the middle of a deep cut. (35.39 meters, or 116.11 feet.)

T. B. M. 214.—About 1 mile east of **Hayne**, Sampson County, a square-headed spike in the end of a crosstie south of the track, about 500 feet west of a bridge and directly opposite the end of the car platform. (33.83 meters, or 110.99 feet.)

T. B. M. 215.—About ½ mile east of **Hayne**, Sampson County, a spike in a telegraph pole north of the track, at the south end of a light cut, and about 165 feet east of an old road crossing. (42.18 meters, or 138.39 feet.)

At Hayne, Sampson County, top of rail. (45.90 meters, or 150.59 feet.)

T. B. M. 216.—About ½ mile west of **Hayne**, Sampson County, a spike in a telegraph pole north of the track, about 210 feet west of a road crossing. (43.31 meters, or 142.09 feet.)

T. B. M. 217.—About 1¼ miles west of **Hayne**, Sampson County, a spike in a telegraph pole north of the track. (45.51 meters, or 149.31 feet.)

T. B. M. 218.—About 2¼ miles east of **Autryville**, Sampson County, a spike in a telegraph pole north of the track, about 260 feet east of a whistling post. (43.92 meters, or 144.09 feet.)

T. B. M. 219.—About ½ mile east of **Autryville**, Sampson County, a spike in a telegraph pole north of the track, at the east end of a cut. (37.02 meters, or 121.46 feet.)

At **Autryville**, Sampson County, top of rail. (31.89 meters, or 104.63 feet.)

T. B. M. 220.—About ¼ mile west of **Autryville**, Sampson County, the easternmost tie bolt on the south guard rail of a bridge. (32.73 meters, or 107.38 feet.)

T. B. M. 221.—About 1¼ miles east of **Stedman**, Cumberland County, the easternmost tie bolt on the north guard rail of a small bridge. (35.49 meters, or 116.44 feet.)

T. B. M. 222.—About ¾ mile east of **Stedman**, Cumberland County, a spike in a telegraph pole north of the track near the corner of a woods. (37.29 meters, or 122.34 feet.)

At **Stedman**, Cumberland County, top of rail. (39.12 meters, or 128.35 feet.)

T. B. M. 223.—About ⅓ mile west of **Stedman**, Cumberland County, a spike in a telegraph pole north of the track, about 800 feet east of milepost 72. (38.33 meters, or 125.75 feet.)

T. B. M. 224.—About 1½ miles west of **Stedman**, Cumberland County, a spike in a telegraph pole north of the track, about 130 feet east of an old lumber camp crossing. (38.76 meters, or 127.17 feet.)

T. B. M. 225.—About 2 miles east of **Vander**, Cumberland County, a spike in a telegraph pole north of the track, about 300 feet east of a road crossing. (42.57 meters, or 139.67 feet.)

T. B. M. 226.—About 1½ miles east of **Vander**, Cumberland County, a spike in a telegraph pole north of the track. (40.57 meters, or 133.10 feet.)

T. B. M. 227.—About ¾ mile east of **Vander**, Cumberland County, a spike in a telegraph pole north of the track, about 325 feet east of milepost 75. (40.45 meters, or 132.71 feet.)

At **Vander**, Cumberland County, top of rail. (45.13 meters, or 148.06 feet.)

T. B. M. 228.—About ¾ mile west of **Vander**, Cumberland County, a spike in a telegraph pole north of the track, about 165 feet east of a road crossing, and 35 feet south of a whistling post. (41.46 meters, or 136.02 feet.)

T. B. M. 229.—About 1½ miles west of **Vander**, Cumberland County, a spike in a telegraph pole north of the track. (37.53 meters, or 123.13 feet.)

T. B. M. 230.—About 2 miles west of **Vander**, Cumberland County, a spike in the fourth telegraph pole west of a cut, north of the track. (35.29 meters, or 115.78 feet.)

T. B. M. 231.—About 2½ miles west of **Vander**, Cumberland County, the easternmost tie bolt on the south guard rail of the easternmost of two small bridges. (28.86 meters, or 94.68 feet.)

T. B. M. 232.—About 4½ miles east of **Fayetteville**, Cumberland County, a spike in a telegraph pole north of the track. (28.34 meters, or 92.98 feet.)

T. B. M. 233.—About 3¾ miles east of **Fayetteville**, Cumberland County, a spike in a telegraph pole north of the track. (26.68 meters, or 87.53 feet.)

T. B. M. 234.—About 2¾ miles east of **Fayetteville**, Cumberland County, a spike in a telegraph pole north of the track, about 325 feet west of a road crossing. (27.50 meters, or 90.22 feet.)

T. B. M. 235.—At **Fayetteville**, Cumberland County, a spike in the west side of a cedar tree on Racepath Street, near the southwest corner of the small Episcopal Church, and 17 feet north of the track. (25.79 meters, or 84.61 feet.)

T. B. M. 236.—At **Fayetteville**, Cumberland County, the southernmost tie bolt on the west guard rail of a small bridge on Russell Street, about ½ mile south of Gillespi Street. (26.62 meters, or 87.34 feet.)

T. B. M. 237.—At **Fayetteville**, Cumberland County, the top of a hydrant at the northwest corner of Mumford and Donaldson Streets. (30.54 meters, or 100.20 feet.)

T. B. M. 238.—At **Fayetteville**, Cumberland County, a cross mark cut in the stone curb on the northeast corner of the Hay Street crossing. (31.79 meters, or 104.30 feet.)

T. B. M. 239.—At **Fayetteville**, Cumberland County, a spike in a telegraph pole east of the track, on the southeast corner of the Hillsboro Street crossing. (30.32 meters, or 99.47 feet.)

T. B. M. 240.—About 1½ miles north of **Fayetteville**, Cumberland County, a spike in the west end of a crosstie directly opposite a whistling post. (37.04 meters, or 121.52 feet.)

T. B. M. 241.—About 2¼ miles north of **Fayetteville**, Cumberland County, a spike in a post at the southeast corner of a road crossing. (45.74 meters, or 150.07 feet.)

T. B. M. 242.—About 2¾ miles north of **Fayetteville**, Cumberland County, a spike in the west end of a crosstie, about 325 feet south of a whistling post. (52.17 meters, or 171.16 feet.)

T. B. M. 243.—About 2 miles south of **Shaw**, Cumberland County, a spike in a telegraph pole east of the track, about 560 feet south of milepost 86. (60.46 meters, or 198.36 feet.)

T. B. M. 244.—About 1¼ miles south of **Shaw**, Cumberland County, a spike in a telegraph pole east of the track. (62.72 meters, or 205.77 feet.)

T. B. M. 245.—About ½ mile south of **Shaw**, Cumberland County, a spike in a telegraph pole west of the track. (65.98 meters, or 216.47 feet.)

At **Shaws**, Cumberland County, top of rail. (69.53 meters, or 228.12 feet.)

T. B. M. 246.—About ¾ mile north of **Shaw**, Cumberland County, a spike in a telegraph pole east of the track. (70.43 meters, or 231.07 feet.)

T. B. M. 247.—About 1¾ miles north of **Shaw**, Cumberland County, a spike in a telegraph pole east of the track, midway between two shallow cuts. (82.83 meters, or 271.75 feet.)

T. B. M. 248.—About 3¼ miles south of **Manchester**, Cumberland County, a bolt at the southwest corner of a signal block foundation at the Camp Bragg spur road. (85.24 meters, or 279.66 feet.)

T. B. M. 249.—About 2¾ miles south of **Manchester**, Cumberland County, a spike in the east end of a crosstie at the top of a hill, in a deep cut. (84.18 meters, or 276.18 feet.)

T. B. M. 250.—About 2¼ miles south of **Manchester**, Cumberland County, a spike in the east end of a crosstie just north of milepost 92. (75.45 meters, or 247.54 feet.)

T. B. M. 251.—About 1¾ miles south of **Manchester**, Cumberland County, a spike in a telegraph pole west of the track, at the south end of a cut. (69.83 meters, or 229.10 feet.)

T. B. M. 252.—About 410 feet south of the depot at **Manchester**, Cumberland County, a spike in a telegraph pole west of the track. (52.57 meters, or 172.47 feet.)

At **Manchester**, Cumberland County, top of rail. (53.76 meters, or 176.38 feet.)

T. B. M. 253.—About ½ mile north of **Manchester**, Cumberland County, a spike in a telegraph pole west of the track, about 525 feet north of a siding switch. (53.01 meters, or 173.92 feet.)

T. B. M. 254.—About 1 mile north of **Manchester**, Cumberland County, the southernmost tie bolt on the east guard rail of the southernmost of two small bridges. (54.89 meters, or 180.08 feet.)

T. B. M. 255.—About 650 feet south of the depot at **Overhills**, Harnett County, a spike in a telegraph pole west of the track. (58.88 meters, or 193.18 feet.)

T. B. M. 256.—About ½ mile north of **Overhills**, Harnett County, the southernmost tie bolt on the west guard rail of a small bridge. (62.41 meters, or 204.76 feet.)

T. B. M. 257.—About 1 mile north of **Overhills**, Harnett County, a spike in the east end of a crosstie, about 230 feet south of milepost 98. (72.62 meters, or 238.25 feet.)

T. B. M. 258.—About 1½ miles north of **Overhills**, Harnett County, a spike in a telegraph pole west of the track, at the south end of a deep cut. (84.95 meters, or 278.71 feet.)

T. B. M. 259.—About 2¼ miles north of **Overhills**, Harnett County, a spike in a telegraph pole west of the track, at the south end of a deep cut. (95.98 meters, or 314.89 feet.)

T. B. M. 260.—About 1 mile south of **Spout Springs**, Harnett County, a spike about 1 foot above the ground in the east side of a 12-inch pine tree, about 325 feet south of milepost 100, at the south end of a cut, and about 60 feet east of the track. (102.12 meters, or 335.04 feet.)

At **Spout Springs**, Harnett County, top of rail. (102.55 meters, or 336.45 feet.)

T. B. M. 261.—About 325 feet north of the depot at **Spout Springs**, Harnett County, a spike in the west end of a tie supporting a switch. (103.30 meters, or 338.91 feet.)

T. B. M. 262.—About ¾ mile north of **Spout Springs**, Harnett County, an iron bar in a clay cut, directly opposite a telegraph pole, and 17 feet west of the track. (108.47 meters, or 355.87 feet.)

T. B. M. 263.—About 1½ miles north of **Spout Springs**, Harnett County, a spike in a telegraph pole west of the track at the south end of the first curve north of the depot. (100.47 meters, or 329.63 feet.)

T. B. M. 264.—About 1½ miles south of **Pineview**, Harnett County, a spike in the east end of a crosstie in a deep cut. (96.89 meters, or 317.88 feet.)

T. B. M. 265.—About ½ mile south of **Pineview**, Harnett County, the second tie bolt from the south end of the east guardrail of a small bridge. (88.31 meters, or 289.73 feet.)

At **Pineview**, Harnett County, top of rail. (96.12 meters, or 315.35 feet.)

T. B. M. 266—About ¾ mile north of **Pineview**, Harnett County, a spike in the second telegraph pole north of a shallow cut, west of the track. (91.15 meters, or 299.05 feet.)

T. B. M. 267.—About 1½ miles north of **Pineview**, Harnett County, a spike in a telegraph pole west of the track, about 325 feet north of an old road crossing. (83.39 meters, or 273.59 feet.)

T. B. M. 268.—About 2 miles south of **Olivia**, Harnett County, a spike in a telegraph pole west of the track, at the north end of a cut. (89.64 meters, or 294.09 feet.)

T. B. M. 269.—About 1½ miles south of **Olivia**, Harnett County, a spike in a roadcrossing post. (100.61 meters, or 330.08 feet.)

T. B. M. 270.—About ½ mile south of **Olivia**, Harnett County, a spike in a telegraph pole west of the track, near the south end of a cut. (100.21 meters, or 328.77 feet.)

At **Olivia**, Harnett County, top of rail. (97.29 meters, or 319.19 feet.)

T. B. M. 271.—About ¾ mile south of **Swanns**, Lee County, a spike in the west end of a crosstie. (99.67 meters, or 327.00 feet.)

T. B. M. 272.—At **Swanns**, Lee County, the top of the switch apparatus connected to the derailer used on the siding east of the main line. (96.04 meters, or 315.09 feet.)

At **Swanns**, Lee County, top of rail. (95.89 meters, or 314.60 feet.)

T. B. M. 273.—About ¾ mile north of **Swanns**, Lee County, the southernmost tie bolt on the east guardrail of a small bridge. (87.91 meters, or 288.42 feet.)

T. B. M. 274.—About 2½ miles north of **Swanns**, Lee County, a spike in the west end of a crosstie, about ¼ mile north of milepost 112, in a long cut. (110.82 meters, or 363.58 feet.)

T. B. M. 275.—About 2½ miles south of **Jonesboro**, Lee County, a spike in a telegraph pole west of the track, at the south end of a cut. (116.36 meters, or 381.76 feet.)

T. B. M. 276.—About 2 miles south of **Jonesboro**, Lee County, a spike in a telegraph pole west of the track, at the north end of a cut. (116.07 meters, or 380.81 feet.)

T. B. M. 277.—About 1 mile south of **Jonesboro**, Lee County, a spike in a telegraph pole west of the track, in a light cut. (125.47 meters, or 411.65 feet.)

T. B. M. 278.—About ½ mile south of **Jonesboro**, Lee County, the southernmost tie bolt on the west guardrail of a small bridge. (123.78 meters, or 406.10 feet.)

At **Jonesboro**, Lee County, top of rail. (129.20 meters, or 423.88 feet.)

T. B. M. 279.—About 650 feet north of the depot at **Jonesboro**, Lee County, a spike in the first telegraph pole north of a street crossing, west of the track. (129.21 meters, or 423.92 feet.)

T. B. M. 280.—About ¾ mile north of **Jonesboro**, Lee County, a spike in a telegraph pole west of the track between two cuts. (124.77 meters, or 409.35 feet.)

T. B. M. 281.—About 1¼ miles south of **Sanford**, Lee County, a spike in the third telegraph pole south of a road crossing, west of the track. (119.23 meters, or 391.17 feet.)

T. B. M. 282.—About ½ mile south of **Sanford**, Lee County, the spike nearest the southeast corner of the switch base, in the southernmost of two similar switches. (115.25 meters, or 378.12 feet.)

Atlantic & Yadkin Railway.

T. B. M. 1.—About ½ mile north of **Sanford**, Lee County, a lag bolt in the first telegraph pole north of a road crossing, west of the track. (105.28 meters, or 345.41 feet.)

T. B. M. 2.—About 1 mile north of **Sanford**, Lee County, a lag bolt in a telegraph pole west of the track, near a whistling post. (98.59 meters, or 323.46 feet.)

T. B. M. 3.—About 2¾ miles north of **Sanford**, Lee County, a lag bolt in a telegraph pole west of the track. (83.03 meters, or 272. 41 feet.)

T. B. M. 4.—About 3½ miles north of **Sanford**, Lee County, the southernmost tie bolt on the west guardrail of the southernmost of three bridges. (77.87 meters, or 255.48 feet.)

T. B. M. 5.—About 2¼ miles south of **Cumnock**, Lee County, a lag bolt in the first telegraph pole north of a road crossing, west of the track at the south end of a deep cut. (82.79 meters, or 271.62 feet.)

T. B. M. 6.—About ¾ mile south of **Cumnock**, Lee County, a lag bolt in the west end of the southernmost crosstie of a bridge. (73.18 meters, or 240.09 feet.)

At **Cumnock**, Lee County, top of rail. (78.64 meters, or 258.00 feet.)

T. B. M. 7.—About ¾ mile north of **Cumnock**, Lee County, a lag bolt in a telegraph pole west of the track at the north end of a fill. (72.57 meters, or 238.09 feet.)

T. B. M. 8.—About 1½ miles north of **Cumnock**, Lee County, a lag bolt in a telegraph pole west of the track, about 165 feet south of milepost 122. (74.54 meters, or 244.55 feet.)

T. B. M. 9.—About ½ mile south of **Gulf**, Chatham County, a lag bolt in a telegraph pole west of the track, the second one south of the whistling post. (78.95 meters, or 259.02 feet.)

At **Gulf**, Chatham County, top of rail. (83.81 meters, or 274.97 feet.)

T. B. M. 10.—About ¾ mile north of **Gulf**, Chatham County, a lag bolt in a telegraph pole west of the track at the north end of a cut. (87.34 meters, or 286.55 feet.)

T. B. M. 11.—About 1¾ miles south of **Goldston**, Chatham County, a lag bolt in a telegraph pole west of the track, about 165 feet south of milepost 119. (95.24 meters, or 312.47 feet.)

T. B. M. 12.—About ½ mile south of **Goldston**, Chatham County, a lag bolt in a telegraph pole west of the track. (118.36 meters, or 388.32 feet.)

At **Goldston**, Chatham County, top of rail. (128.22 meters, or 420.67 feet.)

T. B. M. 283.—About ½ mile north of **Goldston**, Chatham County, a spike in a telegraph pole west of the track, at the north end of a light cut. (137.38 meters, or 450.72 feet.)

T. B. M. 13.—About 1 mile north of **Goldston**, Chatham County, a lag bolt in a telegraph pole west of the track, about 200 feet south of the post marked "Station One Mile." (137.38 meters, or 450.72 feet.)

T. B. M. 14.—About 1¼ miles south of **Bear Creek**, Chatham County, a lag bolt in a telegraph pole west of the track at the north end of a cut. (133.98 meters, or 439.57 feet.)

T. B. M. 15.—About ½ mile south of **Bear Creek**, Chatham County, a lag bolt in a telegraph pole west of the track at the north end of a cut. (132.37 meters, or 434.28 feet.)

GREENSBORO TO BEAR CREEK, N. C.

Tempoary bench marks and elevation of rail in front of railroad depots, Atlantic & Yadkin Railway.

T. B. M. 54.—About ½ mile south of **Greensboro**, Guilford County, a screw in a telegraph pole, a short distance south of milepost 70. (245.50 meters, or 805.44 feet.)

T. B. M. 53.—About 1½ miles south of **Greensboro**, Guilford County, a screw in the north end of a railroad trestle, a short distance south of milepost 71, and 7 feet east of the east rail. (228.10 meters, or 748.36 feet.)

T. B. M. 52.—About 3¼ miles south of **Greensboro**, Guilford County, a screw in a telegraph pole west of the track, about ¼ mile north of milepost 73. (241.20 meters, or 791.34 feet.)

T. B. M. 51.—About 4 miles south of **Greensboro**, Guilford County, a screw in a telegraph pole on the west side of the railroad, about ½ mile north of milepost 74. (251.81 meters, or 826.15 feet.)

T. B. M. 50.—About 4¾ miles south of **Greensboro**, Guilford County, a screw in a telegraph pole west of the track, about ¼ mile south of milepost 74. (252.27 meters, or 827.66 feet.)

T. B. M. 49.—About 1½ miles north of **Pleasant Garden**, Guilford County, a screw in a telegraph pole on the west side of the track, about 800 feet north of milepost 76, and 65 feet south of a road crossing. (261.34 meters, or 857.41 feet.)

T. B. M. 48.—About 1 mile north of **Pleasant Garden**, Guilford County, a screw in a telegraph pole west of the track, about ½ mile north of milepost 77. (258.49 meters, or 848.06 feet.)

At **Pleasant Garden**, Guilford County, top of rail. (253.80 meters, or 832.68 feet.)

T. B. M. 47.—About ½ mile south of **Pleasant Garden**, Guilford County, a screw in a telegraph pole west of the track, about 750 feet north of milepost 78. (260.05 meters, or 853.18 feet.)

T. B. M. 46.—About 1¼ miles south of **Pleasant Garden**, Guilford County, a screw in a telegraph pole west of the track, about ¼ mile north of milepost 79. (245.61 meters, or 805.81 feet.)

T. B. M. 45.—About 2 miles south of **Pleasant Garden**, Guilford County, a screw in a telegraph pole west of the track, about ½ mile south of milepost 79. (247.48 meters, or 811.94 feet.)

T. B. M. 44.—About 3¼ miles south of **Pleasant Garden**, Guilford County, a screw in a telegraph pole west of the track, about ¼ mile north of milepost 81. (245.81 meters, or 806.46 feet.)

T. B. M. 43.—About ½ mile north of **Climax**, Guilford County, a screw in a telegraph pole west of the track, about ½ mile north of milepost 82. (252.01 meters, or 826.80 feet.)

At **Climax**, Guilford County, top of rail. (251.10 meters, or 823.82 feet.)

T. B. M. 42.—About ½ mile south of **Climax**, Guilford County, a screw in a telegraph pole west of the track, about ½ mile north of milepost 83. (243.78 meters, or 799.80 feet.)

T. B. M. 41.—About 1 mile south of **Climax**, Guilford County, a screw in a telegraph pole west of the track, about ¼ mile south of milepost 83. (243.82 meters, or 799.93 feet.)

T. B. M. 40.—About ¾ mile north of **Julian**, Guilford County, a screw in a telegraph pole west of the track, 35 feet north of a road crossing, and about 750 feet north of milepost 85. (246.02 meters, or 807.15 feet.)

At **Julian**, Guilford County, top of rail. (235.72 meters, or 773.36 feet.)

T. B. M. 39.—About ½ mile south of **Julian**, Guilford County, a screw in a telegraph pole west of the track, 35 feet south of milepost 86. (235.04 meters, or 771.13 feet.)

T. B. M. 38.—About 1¼ miles south of **Julian**, Guilford County, a screw in a telegraph pole west of the track, about ¼ mile north of milepost 87. (230.71 meters, or 756.92 feet.)

T. B. M. 37.—About 2¾ miles south of **Julian**, Guilford County, a screw in a telegraph pole west of the track, about ¼ mile south of milepost 88. (219.66 meters, or 720.67 feet.)

T. B. M. 36.—About 3½ miles south of **Julian**, Guilford County, a screw in a telegraph pole west of the track, about 260 feet south of milepost 89. (225.45 meters, or 739.66 feet.)

T. B. M. 35.—About 3½ miles north of **Liberty**, Randolph County, a screw in a telegraph pole west of the track, about 540 feet north of milepost 90. (222.17 meters, or 728.90 feet.)

T. B. M. 34.—About 1¾ miles north of **Liberty**, Randolph County, a screw in a telegraph pole west of the track, about ¼ mile south of milepost 91. (228.28 meters, or 748.95 feet.)

T. B. M. 33.—About ¾ mile north of **Liberty**, Randolph County, a screw in a telegraph pole west of the track, about 650 feet south of milepost 92. (236.18 meters, or 774.87 feet.)

At **Liberty**, Randolph County, top of rail. (239.63 meters, or 786.19 feet.)

T. B. M. 31.—About ¼ mile south of **Liberty**, Randolph County, a screw in a telegraph pole west of the track, about 500 feet south of milepost 93. (236.87 meters, or 777.13 feet.)

T. B. M. 30.—About 1 mile south of **Liberty**, Randolph County, a screw in a telegraph pole west of the track, about 650 feet north of milepost 94. (223.94 meters, or 734.71 feet.)

T. B. M. 29.—About 1¾ miles north of **Staley**, Randolph County, a screw in the north end of a railroad trestle, about ½ mile north of milepost 96. (206.32 meters, or 676.90 feet.)

T. B. M. 28.—About ¾ mile north of **Staley**, Randolph County, a screw in a telegraph pole west of the track, about ½ mile south of milepost 96. (219.07 meters, or 718.73 feet.)

At **Staley**, Randolph County, top of rail. (221.07 meters, or 725.29 feet.)

T. B. M. 27.—About 1 mile south of **Staley**, Randolph County, a screw in a telegraph pole west of the track, 35 feet south of the county line, and about 820 feet south of milepost 98. (207.02 meters, or 679.20 feet.)

T. B. M. 26.—About 2 miles south of **Staley**, Randolph County, a screw in a telegraph pole west of the track, about 750 feet south of milepost 99. (221.05 meters, or 725.23 feet.)

T. B. M. 25.—About 3½ miles south of **Staley**, Randolph County, a screw in a telegraph pole west of the track, about ⅛ mile north of milepost 101. (199.98 meters, or 656.10 feet.)

T. B. M. 24.—About 3¼ miles north of **Siler City**, Chatham County, a screw in a telegraph pole west of the track, about ½ mile south of milepost 101. (196.93 meters, or 646.09 feet.)

T. B. M. 23.—About 1¾ miles north of **Siler City**, Chatham County, a screw in a telegraph pole west of the track, about 300 feet south of milepost 103. (196.72 meters or 645.41 feet.)

T. B. M. 22½.—About ¾ mile north of **Siler City**, Chatham County, a screw in the south end of the railroad trestle, about 260 feet north of milepost 104. (189.12 meters, or 620.47 feet.)

At **Siler City**, Chatham County, top of rail. (179.49 meters, or 588.88 feet.)

T. B. M. 22.—About ¾ mile south of **Siler City**, Chatham County, a screw in the south end of the railroad trestle, about ½ mile north of milepost 106. (172.48 meters, or 565.88 feet.)

T. B. M. 21.—About 2¾ miles south of **Siler City**, Chatham County, a screw in a telegraph pole west of the track, about ½ mile north of milepost 108. (167.89 meters, or 550.82 feet.)

T. B. M. 20.—About ¾ mile north of **Ore Hill**, Chatham County, a screw in a telegraph pole west of the track, about ½ mile south of milepost 108. (159.36 meters, or 522.83 feet.)

At **Ore Hill**, Chatham County, top of rail. (151.26 meters, or 496.26 feet.)

T. B. M. 19.—About ¾ mile north of **Bonlee**, Chatham County, a screw in the north end of the railroad trestle, about 650 feet south of milepost 110. (145.93 meters, or 478.77 feet.)

At **Bonlee**, Chatham County, top of rail. (157.49 meters, or 516.70 feet.)

T. B. M. 18.—About ¼ mile south of **Bonlee**, Chatham County, a screw in a telegraph pole west of the track, about 600 feet south of milepost 111. (155.31 meters, or 509.55 feet.)

T. B. M. 17.—About 1 mile south of **Bonlee**, Chatham County, a screw in a telegraph pole west of the track, about ¼ mile north of milepost 112. (148.69 meters, or 487.83 feet.)

T. B. M. 16.—About ¾ mile north of **Bear Creek**, Chatham County, a screw in a telegraph pole west of the track, about ½ mile north of milepost 113. (146.93 meters, or 482.05 feet.)

At **Bear Creek**, Chatham County, top of rail. (142.74 meters, or 468.31 feet.)

T. B. M. 15.—About ½ mile south of **Bear Creek**, Chatham County, a screw in a telegraph pole west of the track, about 600 feet north of milepost 114. (132.61 meters, or 435.07 feet.)

ELEVATIONS OF INTERSECTION POINTS.

The following table gives the elevations as determined by non-reciprocal measures of vertical angles of a number of intersection points along the oblique arc triangulation:

Station.	Point to which elevation refers.	Elevation above mean sea level.		Station.	Point to which elevation refers.	Elevation above mean sea level.	
		Meters.	*Feet.*			*Meters.*	*Feet.*
Mount Mitchell	Ground.	2,038	6,686	Mount Hardy	Ground.	1,860	6,102
Lincolnton Courthouse	Base of cupola.	288	945	Richland Balsam Mountain.	do	1,942	6,371
Crowder Mountain	Ground.	490	1,608	Tryon Mountain, northeast summit.	do	942	3,091
Spencer Mountain	do	394	1,293				
Silver Creek Knob	do	868	2,848	Great Hogback Mountain.	do	1,457	4,780
Blackstock Knob	do	1,944	6,378	Chimney Top Mountain	do	1,394	4,573
Bakers Knob	do	552	1,811	Whitesides Mountain	do	1,503	4,931
Hibriten Mountain	do	690	2,264	Little Bald Mountain	do	1,590	5,217
Carleton Knob	do	696	2,283	Pickens Nose	do	1,497	4,911
East Drowning Creek Mountain.	do	630	2,067	Standing Indian Mountain.	do	1,675	5,495
West Drowning Creek Mountain.	do	648	2,126	Tryon Mountain	do	990	3,248
Little Pisgah Mountain	do	1,352	4,436	Fodderstack Mountain	do	1,375	4,511
Mount Pisgah	do	1,741	5,712	Saddleback Mountain	do	1,391	4,564
Sugarloaf Mountain	do	1,212	3,976	Bear Wallow Mountain	do	1,294	4,245
Pinnacle Mountain	do	1,168	3,832	Sitting Bull Mountain (Ga.).	do	1,538	5,046
Big Craggy Mountain	do	1,850	6,070	Pilot Mountain	do	736	2,415
Cold Mountain 1	do	1,410	4,626				

Lengths—Feet to meters (from 1 to 1000 units).

[Reduction factor: 1 foot=0.3048006096 meter.]

Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.
0	0.0	50	15.24003	100	30.48006	150	45.72009	200	60.96012
1	0.30480	1	15.54483	1	30.78486	1	46.02489	1	61.26492
2	0.60960	2	15.84963	2	31.08966	2	46.32969	2	61.56972
3	0.91440	3	16.15443	3	31.39446	3	46.63449	3	61.87452
4	1.21920	4	16.45923	4	31.69926	4	46.93929	4	62.17932
5	1.52400	5	16.76403	5	32.00406	5	47.24409	5	62.48412
6	1.82880	6	17.06883	6	32.30886	6	47.54890	6	62.78893
7	2.13360	7	17.37363	7	32.61367	7	47.85370	7	63.09373
8	2.43840	8	17.67844	8	32.91847	8	48.15850	8	63.39853
9	2.74321	9	17.98324	9	33.22327	9	48.46330	9	63.70333
10	3.04801	60	18.28804	110	33.52807	160	48.76810	210	64.00813
1	3.35281	1	18.59284	1	33.83287	1	49.07290	1	64.31293
2	3.65761	2	18.89764	2	34.13767	2	49.37770	2	64.61773
3	3.96241	3	19.20244	3	34.44247	3	49.68250	3	64.92253
4	4.26721	4	19.50724	4	34.74727	4	49.98730	4	65.22733
5	4.57201	5	19.81204	5	35.05207	5	50.29210	5	65.53213
6	4.87681	6	20.11684	6	35.35687	6	50.59690	6	65.83693
7	5.18161	7	20.42164	7	35.66167	7	50.90170	7	66.14173
8	5.48641	8	20.72644	8	35.96647	8	51.20650	8	66.44653
9	5.79121	9	21.03124	9	36.27127	9	51.51130	9	66.75133
20	6.09601	70	21.33604	120	36.57607	170	51.81610	220	67.05613
1	6.40081	1	21.64084	1	36.88087	1	52.12090	1	67.36093
2	6.70561	2	21.94564	2	37.18567	2	52.42570	2	67.66574
3	7.01041	3	22.25044	3	37.49047	3	52.73051	3	67.97054
4	7.31521	4	22.55525	4	37.79528	4	53.03531	4	68.27534
5	7.62002	5	22.86005	5	38.10008	5	53.34011	5	68.58014
6	7.92482	6	23.16485	6	38.40488	6	53.64491	6	68.88494
7	8.22962	7	23.46965	7	38.70968	7	53.94971	7	69.18974
8	8.53442	8	23.77445	8	39.01448	8	54.25451	8	69.49454
9	8.83922	9	24.07925	9	39.31928	9	54.55931	9	69.79934
30	9.14402	80	24.38405	130	39.62408	180	54.86411	230	70.10414
1	9.44882	1	24.68885	1	39.92888	1	55.16891	1	70.40894
2	9.75362	2	24.99365	2	40.23368	2	55.47371	2	70.71374
3	10.05842	3	25.29845	3	40.53848	3	55.77851	3	71.01854
4	10.36322	4	25.60325	4	40.84328	4	56.08331	4	71.32334
5	10.66802	5	25.90805	5	41.14808	5	56.38811	5	71.62814
6	10.97282	6	26.21285	6	41.45288	6	56.69291	6	71.93294
7	11.27762	7	26.51765	7	41.75768	7	56.99771	7	72.23774
8	11.58242	8	26.82245	8	42.06248	8	57.30251	8	72.54255
9	11.88722	9	27.12725	9	42.36728	9	57.60732	9	72.84735
40	12.19202	90	27.43205	140	42.67209	190	57.91212	240	73.15215
1	12.49682	1	27.73686	1	42.97689	1	58.21692	1	73.45695
2	12.80163	2	28.04166	2	43.28169	2	58.52172	2	73.76175
3	13.10643	3	28.34646	3	43.58649	3	58.82652	3	74.06655
4	13.41123	4	28.65126	4	43.89129	4	59.13132	4	74.37135
5	13.71603	5	28.95606	5	44.19609	5	59.43612	5	74.67615
6	14.02083	6	29.26086	6	44.50089	6	59.74092	6	74.98095
7	14.32563	7	29.56566	7	44.80569	7	60.04572	7	75.28575
8	14.63043	8	29.87046	8	45.11049	8	60.35052	8	75.59055
9	14.93523	9	30.17526	9	45.41529	9	60.65532	9	75.89535

Lengths—Feet to meters (from 1 to 1000 units)—Continued.

Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.
250	76.20015	300	91.44018	350	106.68021	400	121.92024	450	137.16027
1	76.50495	1	91.74498	1	106.98501	1	122.22504	1	137.46507
2	76.80975	2	92.04978	2	107.28981	2	122.52985	2	137.76988
3	77.11455	3	92.35458	3	107.59462	3	122.83465	3	138.07468
4	77.41935	4	92.65939	4	107.89942	4	123.13945	4	138.37948
5	77.72416	5	92.96419	5	108.20422	5	123.44425	5	138.68428
6	78.02896	6	93.26899	6	108.50902	6	123.74905	6	138.98908
7	78.33376	7	93.57379	7	108.81382	7	124.05385	7	139.29388
8	78.63856	8	93.87859	8	109.11862	8	124.35865	8	139.59868
9	78.94336	9	94.18339	9	109.42342	9	124.66345	9	139.90348
260	79.24816	310	94.48819	360	109.72822	410	124.96825	460	140.20828
1	79.55296	1	94.79299	1	110.03302	1	125.27305	1	140.51308
2	79.85776	2	95.09779	2	110.33782	2	125.57785	2	140.81788
3	80.16256	3	95.40259	3	110.64262	3	125.88265	3	141.12268
4	80.46736	4	95.70739	4	110.94742	4	126.18745	4	141.42748
5	80.77216	5	96.01219	5	111.25222	5	126.49225	5	141.73228
6	81.07696	6	96.31699	6	111.55702	6	126.79705	6	142.03708
7	81.38176	7	96.62179	7	111.86182	7	127.10185	7	142.34188
8	81.68656	8	96.92659	8	112.16662	8	127.40665	8	142.64669
9	81.99136	9	97.23139	9	112.47142	9	127.71146	9	142.95149
270	82.29616	320	97.53620	370	112.77623	420	128.01626	470	143.25629
1	82.60097	1	97.84100	1	113.08103	1	128.32106	1	143.56109
2	82.90577	2	98.14580	2	113.38583	2	128.62586	2	143.86589
3	83.21057	3	98.45060	3	113.69063	3	128.93066	3	144.17069
4	83.51537	4	98.75540	4	113.99543	4	129.23546	4	144.47549
5	83.82017	5	99.06020	5	114.30023	5	129.54026	5	144.78029
6	84.12497	6	99.36500	6	114.60503	6	129.84506	6	145.08509
7	84.42977	7	99.66980	7	114.90983	7	130.14986	7	145.38989
8	84.73457	8	99.97460	8	115.21463	8	130.45466	8	145.69469
9	85.03937	9	100.27940	9	115.51943	9	130.75946	9	145.99949
280	85.34417	330	100.58420	380	115.82423	430	131.06426	480	146.30429
1	85.64897	1	100.88900	1	116.12903	1	131.36906	1	146.60909
2	85.95377	2	101.19380	2	116.43383	2	131.67386	2	146.91389
3	86.25857	3	101.49860	3	116.73863	3	131.97866	3	147.21869
4	86.56337	4	101.80340	4	117.04343	4	132.28346	4	147.52350
5	86.86817	5	102.10820	5	117.34823	5	132.58827	5	147.82830
6	87.17297	6	102.41300	6	117.65304	6	132.89307	6	148.13310
7	87.47777	7	102.71781	7	117.95784	7	133.19787	7	148.43790
8	87.78258	8	103.02261	8	118.26264	8	133.50267	8	148.74270
9	88.08738	9	103.32741	9	118.56744	9	133.80747	9	149.04750
290	88.39218	340	103.63221	390	118.87224	440	134.11227	490	149.35230
1	88.69698	1	103.93701	1	119.17704	1	134.41707	1	149.65710
2	89.00178	2	104.24181	2	119.48184	2	134.72187	2	149.96190
3	89.30658	3	104.54661	3	119.78664	3	135.02667	3	150.26670
4	89.61138	4	104.85141	4	120.09144	4	135.33147	4	150.57150
5	89.91618	5	105.15621	5	120.39624	5	135.63627	5	150.87630
6	90.22098	6	105.46101	6	120.70104	6	135.94107	6	151.18110
7	90.52578	7	105.76581	7	121.00584	7	136.24587	7	151.48590
8	90.83058	8	106.07061	8	121.31064	8	136.55067	8	151.79070
9	91.13538	9	106.37541	9	121.61544	9	136.85547	9	152.09550

Lengths—Feet to meters (from 1 to 1000 units)—Continued.

Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.
500	152.40030	550	167.64034	600	182.88037	650	198.12040	700	213.36043
1	152.70511	1	167.94514	1	183.18517	1	198.42520	1	213.66523
2	153.00991	2	168.24994	2	183.48997	2	198.73000	2	213.97003
3	153.31471	3	168.55474	3	183.79477	3	199.03480	3	214.27483
4	153.61951	4	168.85954	4	184.09957	4	199.33960	4	214.57963
5	153.92431	5	169.16434	5	184.40437	5	199.64440	5	214.88443
6	154.22911	6	169.46914	6	184.70917	6	199.94920	6	215.18923
7	154.53391	7	169.77394	7	185.01397	7	200.25400	7	215.49403
8	154.83871	8	170.07874	8	185.31877	8	200.55880	8	215.79883
9	155.14351	9	170.38354	9	185.62357	9	200.86360	9	216.10363
510	155.44831	560	170.68834	610	185.92837	660	201.16840	710	216.40843
1	155.75311	1	170.99314	1	186.23317	1	201.47320	1	216.71323
2	156.05791	2	171.29794	2	186.53797	2	201.77800	2	217.01803
3	156.36271	3	171.60274	3	186.84277	3	202.08280	3	217.32283
4	156.66751	4	171.90754	4	187.14757	4	202.38760	4	217.62764
5	156.97231	5	172.21234	5	187.45237	5	202.69241	5	217.93244
6	157.27711	6	172.51715	6	187.75718	6	202.99721	6	218.23724
7	157.58192	7	172.82195	7	188.06198	7	203.30201	7	218.54204
8	157.88672	8	173.12675	8	188.36678	8	203.60681	8	218.84684
9	158.19152	9	173.43155	9	188.67158	9	203.91161	9	219.15164
520	158.49632	570	173.73635	620	188.97638	670	204.21641	720	219.45644
1	158.80112	1	174.04115	1	189.28118	1	204.52121	1	219.76124
2	159.10592	2	174.34595	2	189.58598	2	204.82601	2	220.06604
3	159.41072	3	174.65075	3	189.89078	3	205.13081	3	220.37084
4	159.71552	4	174.95555	4	190.19558	4	205.43561	4	220.67564
5	160.02032	5	175.26035	5	190.50038	5	205.74041	5	220.98044
6	160.32512	6	175.56515	6	190.80518	6	206.04521	6	221.28524
7	160.62992	7	175.86995	7	191.10998	7	206.35001	7	221.59004
8	160.93472	8	176.17475	8	191.41478	8	206.65481	8	221.89484
9	161.23952	9	176.47955	9	191.71958	9	206.95961	9	222.19964
530	161.54432	580	176.78435	630	192.02438	680	207.26441	730	222.50445
1	161.84912	1	177.08915	1	192.32918	1	207.56922	1	222.80925
2	162.15392	2	177.39395	2	192.63399	2	207.87402	2	223.11405
3	162.45872	3	177.69876	3	192.93879	3	208.17882	3	223.41885
4	162.76353	4	178.00356	4	193.24359	4	208.48362	4	223.72365
5	163.06833	5	178.30836	5	193.54839	5	208.78842	5	224.02845
6	163.37313	6	178.61316	6	193.85319	6	209.09322	6	224.33325
7	163.67793	7	178.91796	7	194.15799	7	209.39802	7	224.63805
8	163.98273	8	179.22276	8	194.46279	8	209.70282	8	224.94285
9	164.28753	9	179.52756	9	194.76759	9	210.00762	9	225.24765
540	164.59233	590	179.83236	640	195.07239	690	210.31242	740	225.55245
1	164.89713	1	180.13716	1	195.37719	1	210.61722	1	225.85725
2	165.20193	2	180.44196	2	195.68199	2	210.92202	2	226.16205
3	165.50673	3	180.74676	3	195.98679	3	211.22682	3	226.46685
4	165.81153	4	181.05156	4	196.29159	4	211.53162	4	226.77165
5	166.11633	5	181.35636	5	196.59639	5	211.83642	5	227.07645
6	166.42113	6	181.66116	6	196.90119	6	212.14122	6	227.38125
7	166.72593	7	181.96596	7	197.20599	7	212.44602	7	227.68606
8	167.03073	8	182.27076	8	197.51080	8	212.75083	8	227.99086
9	167.33553	9	182.57557	9	197.81560	9	213.05563	9	228.29566

Lengths—Feet to meters (from 1 to 1000 units)—Continued.

Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.
750	228.60046	800	243.84049	850	259.08052	900	274.32055	950	289.56058
1	228.90526	1	244.14529	1	259.38532	1	274.62535	1	289.86538
2	229.21006	2	244.45009	2	259.69012	2	274.93015	2	290.17018
3	229.51486	3	244.75489	3	259.99492	3	275.23495	3	290.47498
4	229.81966	4	245.05969	4	260.29972	4	275.53975	4	290.77978
5	230.12446	5	245.36449	5	260.60452	5	275.84455	5	291.08458
6	230.42926	6	245.66929	6	260.90932	6	276.14935	6	291.38938
7	230.73406	7	245.97409	7	261.21412	7	276.45415	7	291.69418
8	231.03886	8	246.27889	8	261.51892	8	276.75895	8	291.99898
9	231.34366	9	246.58369	9	261.82372	9	277.06375	9	292.30378
760	231.64846	810	246.88849	860	262.12852	910	277.36855	960	292.60859
1	231.95326	1	247.19329	1	262.43332	1	277.67336	1	292.91339
2	232.25806	2	247.49809	2	262.73813	2	277.97816	2	293.21819
3	232.56287	3	247.80290	3	263.04293	3	278.28296	3	293.52299
4	232.86767	4	248.10770	4	263.34773	4	278.58776	4	293.82779
5	233.17247	5	248.41250	5	263.65253	5	278.89256	5	294.13259
6	233.47727	6	248.71730	6	263.95733	6	279.19736	6	294.43739
7	233.78207	7	249.02210	7	264.26213	7	279.50216	7	294.74219
8	234.08687	8	249.32690	8	264.56693	8	279.80696	8	295.04699
9	234.39167	9	249.63170	9	264.87173	9	280.11176	9	295.35179
770	234.69647	820	249.93650	870	265.17653	920	280.41656	970	295.65659
1	235.00127	1	250.24130	1	265.48133	1	280.72136	1	295.96139
2	235.30607	2	250.54610	2	265.78613	2	281.02616	2	296.26619
3	235.61087	3	250.85090	3	266.09093	3	281.33096	3	296.57099
4	235.91567	4	251.15570	4	266.39573	4	281.63576	4	296.87579
5	236.22047	5	251.46050	5	266.70053	5	281.94056	5	297.18059
6	236.52527	6	251.76530	6	267.00533	6	282.24536	6	297.48539
7	236.83007	7	252.07010	7	267.31013	7	282.55017	7	297.79020
8	237.13487	8	252.37490	8	267.61494	8	282.85497	8	298.09500
9	237.43967	9	252.67971	9	267.91974	9	283.15977	9	298.39980
780	237.74448	830	252.98451	880	268.22454	930	283.46457	980	298.70460
1	238.04928	1	253.28931	1	268.52934	1	283.76937	1	299.00940
2	238.35408	2	253.59411	2	268.83414	2	284.07417	2	299.31420
3	238.65888	3	253.89891	3	269.13894	3	284.37897	3	299.61900
4	238.96368	4	254.20371	4	269.44374	4	284.68377	4	299.92380
5	239.26848	5	254.50851	5	269.74854	5	284.98857	5	300.22860
6	239.57328	6	254.81331	6	270.05334	6	285.29337	6	300.53340
7	239.87808	7	255.11811	7	270.35814	7	285.59817	7	300.83820
8	240.18288	8	255.42291	8	270.66294	8	285.90297	8	301.14300
9	240.48768	9	255.72771	9	270.96774	9	286.20777	9	301.44780
790	240.79248	840	256.03251	890	271.27254	940	286.51257	990	301.75260
1	241.09728	1	256.33731	1	271.57734	1	286.81737	1	302.05740
2	241.40208	2	256.64211	2	271.88214	2	287.12217	2	302.36220
3	241.70688	3	256.94691	3	272.18694	3	287.42697	3	302.66701
4	242.01168	4	257.25171	4	272.49174	4	287.73178	4	302.97181
5	242.31648	5	257.55652	5	272.79655	5	288.03658	5	303.27661
6	242.62129	6	257.86132	6	273.10135	6	288.34138	6	303.58141
7	242.92609	7	258.16612	7	273.40615	7	288.64618	7	303.88621
8	243.23089	8	258.47092	8	273.71095	8	288.95098	8	304.19101
9	243.53569	9	258.77572	9	274.01575	9	289.25578	9	304.49581

Lengths—Meters to feet (from 1 to 1000 units).

[Reduction factor: 1 meter=3.280833333 feet.]

Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.
0		50	164.04167	100	328.08333	150	492.12500	200	656.16667
1	3.28083	1	167.32250	1	331.36417	1	495.40583	1	659.44750
2	6.56167	2	170.60333	2	334.64500	2	498.68667	2	662.72833
3	9.84250	3	173.88417	3	337.92583	3	501.96750	3	666.00917
4	13.12333	4	177.16500	4	341.20667	4	505.24833	4	669.29000
5	16.40417	5	180.44583	5	344.48750	5	508.52917	5	672.57083
6	19.68500	6	183.72667	6	347.76833	6	511.81000	6	675.85167
7	22.96583	7	187.00750	7	351.04917	7	515.09083	7	679.13250
8	26.24667	8	190.28833	8	354.33000	8	518.37167	8	682.41333
9	29.52750	9	193.56917	9	357.61083	9	521.65250	9	685.69417
10	32.80833	60	196.85000	110	360.89167	160	524.93333	210	688.97500
1	36.08917	1	200.13083	1	364.17250	1	528.21417	1	692.25583
2	39.37000	2	203.41167	2	367.45333	2	531.49500	2	695.53667
3	42.65083	3	206.69250	3	370.73417	3	534.77583	3	698.81750
4	45.93167	4	209.97333	4	374.01500	4	538.05667	4	702.09833
5	49.21250	5	213.25417	5	377.29583	5	541.33750	5	705.37917
6	52.49333	6	216.53500	6	380.57667	6	544.61833	6	708.66000
7	55.77417	7	219.81583	7	383.85750	7	547.89917	7	711.94083
8	59.05500	8	223.09667	8	387.13833	8	551.18000	8	715.22167
9	62.33583	9	226.37750	9	390.41917	9	554.46083	9	718.50250
20	65.61667	70	229.65833	120	393.70000	170	557.74167	220	721.78333
1	68.89750	1	232.93917	1	396.98083	1	561.02250	1	725.06417
2	72.17833	2	236.22000	2	400.26167	2	564.30333	2	728.34500
3	75.45917	3	239.50083	3	403.54250	3	567.58417	3	731.62583
4	78.74000	4	242.78167	4	406.82333	4	570.86500	4	734.90667
5	82.02083	5	246.06250	5	410.10417	5	574.14583	5	738.18750
6	85.30167	6	249.34333	6	413.38500	6	577.42667	6	741.46833
7	88.58250	7	252.62417	7	416.66583	7	580.70750	7	744.74917
8	91.86333	8	255.90500	8	419.94667	8	583.98833	8	748.03000
9	95.14417	9	259.18583	9	423.22750	9	587.26917	9	751.31083
30	98.42500	80	262.46667	130	426.50833	180	590.55000	230	754.59167
1	101.70583	1	265.74750	1	429.78917	1	593.83083	1	757.87250
2	104.98667	2	269.02833	2	433.07000	2	597.11167	2	761.15333
3	108.26750	3	272.30917	3	436.35083	3	600.39250	3	764.43417
4	111.54833	4	275.59000	4	439.63167	4	603.67333	4	767.71500
5	114.82917	5	278.87083	5	442.91250	5	606.95417	5	770.99583
6	118.11000	6	282.15167	6	446.19333	6	610.23500	6	774.27667
7	121.39083	7	285.43250	7	449.47417	7	613.51583	7	777.55750
8	124.67167	8	288.71333	8	452.75500	8	616.79667	8	780.83833
9	127.95250	9	291.99417	9	456.03583	9	620.07750	9	784.11917
40	131.23333	90	295.27500	140	459.31667	190	623.35833	240	787.40000
1	134.51417	1	298.55583	1	462.59750	1	626.63917	1	790.68083
2	137.79500	2	301.83667	2	465.87833	2	629.92000	2	793.96167
3	141.07583	3	305.11750	3	469.15917	3	633.20083	3	797.24250
4	144.35667	4	308.39833	4	472.44000	4	636.48167	4	800.52333
5	147.63750	5	311.67917	5	475.72083	5	639.76250	5	803.80417
6	150.91833	6	314.96000	6	479.00167	6	643.04333	6	807.08500
7	154.19917	7	318.24083	7	482.28250	7	646.32417	7	810.36583
8	157.48000	8	321.52167	8	485.56333	8	649.60500	8	813.64667
9	160.76083	9	324.80250	9	488.84417	9	652.88583	9	816.92750

Lengths—Meters to feet (from 1 to 1000 units)—Continued.

Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.
250	820.20833	300	984.25000	350	1,148.29167	400	1,312.33333	450	1,476.37500
1	823.48917	1	987.53083	1	1,151.57250	1	1,315.61417	1	1,479.65583
2	826.77000	2	990.81167	2	1,154.85333	2	1,318.89500	2	1,482.93667
3	830.05083	3	994.09250	3	1,158.13417	3	1,322.17583	3	1,486.21750
4	833.33167	4	997.37333	4	1,161.41500	4	1,325.45667	4	1,489.49833
5	836.61250	5	1,000.65417	5	1,164.69583	5	1,328.73750	5	1,492.77917
6	839.89333	6	1,003.93500	6	1,167.97667	6	1,332.01833	6	1,496.06000
7	843.17417	7	1,007.21583	7	1,171.25750	7	1,335.29917	7	1,499.34083
8	846.45500	8	1,010.49667	8	1,174.53833	8	1,338.58000	8	1,502.62167
9	849.73583	9	1,013.77750	9	1,177.81917	9	1,341.86083	9	1,505.90250
260	853.01667	310	1,017.05833	360	1,181.10000	410	1,345.14167	460	1,509.18333
1	856.29750	1	1,020.33917	1	1,184.38083	1	1,348.42250	1	1,512.46417
2	859.57833	2	1,023.62000	2	1,187.66167	2	1,351.70333	2	1,515.74500
3	862.85917	3	1,026.90083	3	1,190.94250	3	1,354.98417	3	1,519.02583
4	866.14000	4	1,030.18167	4	1,194.22333	4	1,358.26500	4	1,522.30667
5	869.42083	5	1,033.46250	5	1,197.50417	5	1,361.54583	5	1,525.58750
6	872.70167	6	1,036.74333	6	1,200.78500	6	1,364.82667	6	1,528.86833
7	875.98250	7	1,040.02417	7	1,204.06583	7	1,368.10750	7	1,532.14917
8	879.26333	8	1,043.30500	8	1,207.34667	8	1,371.38833	8	1,535.43000
9	882.54417	9	1,046.58583	9	1,210.62750	9	1,374.66917	9	1,538.71083
270	885.82500	320	1,049.86667	370	1,213.90833	420	1,377.95000	470	1,541.99167
1	889.10583	1	1,053.14750	1	1,217.18917	1	1,381.23083	1	1,545.27250
2	892.38667	2	1,056.42833	2	1,220.47000	2	1,384.51167	2	1,548.55333
3	895.66750	3	1,059.70917	3	1,223.75083	3	1,387.79250	3	1,551.83417
4	898.94833	4	1,062.99000	4	1,227.03167	4	1,391.07333	4	1,555.11500
5	902.22917	5	1,066.27083	5	1,230.31250	5	1,394.35417	5	1,558.39583
6	905.51000	6	1,069.55167	6	1,233.59333	6	1,397.63500	6	1,561.67667
7	908.79083	7	1,072.83250	7	1,236.87417	7	1,400.91583	7	1,564.95750
8	912.07167	8	1,076.11333	8	1,240.15500	8	1,404.19667	8	1,568.23833
9	915.35250	9	1,079.39417	9	1,243.43583	9	1,407.47750	9	1,571.51917
280	918.63333	330	1,082.67500	380	1,246.71667	430	1,410.75833	480	1,574.80000
1	921.91417	1	1,085.95583	1	1,249.99750	1	1,414.03917	1	1,578.08083
2	925.19500	2	1,089.23667	2	1,253.27833	2	1,417.32000	2	1,581.36167
3	928.47583	3	1,092.51750	3	1,256.55917	3	1,420.60083	3	1,584.64250
4	931.75667	4	1,095.79833	4	1,259.84000	4	1,423.88167	4	1,587.92333
5	935.03750	5	1,099.07917	5	1,263.12083	5	1,427.16250	5	1,591.20417
6	938.31833	6	1,102.36000	6	1,266.40167	6	1,430.44333	6	1,594.48500
7	941.59917	7	1,105.64083	7	1,269.68250	7	1,433.72417	7	1,597.76583
8	944.88000	8	1,108.92167	8	1,272.96333	8	1,437.00500	8	1,601.04667
9	948.16083	9	1,112.20250	9	1,276.24417	9	1,440.28583	9	1,604.32750
290	951.44167	340	1,115.48333	390	1,279.52500	440	1,443.56667	490	1,607.60833
1	954.72250	1	1,118.76417	1	1,282.80583	1	1,446.84750	1	1,610.88917
2	958.00333	2	1,122.04500	2	1,286.08667	2	1,450.12833	2	1,614.17000
3	961.28417	3	1,125.32583	3	1,289.36750	3	1,453.40917	3	1,617.45083
4	964.56500	4	1,128.60667	4	1,292.64833	4	1,456.69000	4	1,620.73167
5	967.84583	5	1,131.88750	5	1,295.92917	5	1,459.97083	5	1,624.01250
6	971.12667	6	1,135.16833	6	1,299.21000	6	1,463.25167	6	1,627.29333
7	974.40750	7	1,138.44917	7	1,302.49083	7	1,466.53250	7	1,630.57417
8	977.68833	8	1,141.73000	8	1,305.77167	8	1,469.81333	8	1,633.85500
9	980.96917	9	1,145.01083	9	1,309.05250	9	1,473.09417	9	1,637.13583

Lengths—Meters to feet (from 1 to 1000 units)—Continued.

Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.
500	1,640.41667	550	1,804.45833	600	1,968.50000	650	2,132,54167	700	2,296.58333
1	1,643.69750	1	1,807.73917	1	1,971.78083	1	2,135.82250	1	2,299.86417
2	1,646.97833	2	1,811.02000	2	1,975.06167	2	2,139.10333	2	2,303.14500
3	1,650.25917	3	1,814.30083	3	1,978.34250	3	2,142.38417	3	2,306.42583
4	1,653.54000	4	1,817.58167	4	1,981.62333	4	2,145.66500	4	2,309.70667
5	1,656.82083	5	1,820.86250	5	1,984.90417	5	2,148.94583	5	2,312.98750
6	1,660.10167	6	1,824.14333	6	1,988.18500	6	2,152.22667	6	2,316.26833
7	1,663.38250	7	1,827.42417	7	1,991.46583	7	2,155.50750	7	2,319.54917
8	1,666.66333	8	1,830.70500	8	1,994.74667	8	2,158.78833	8	2,322.83000
9	1,669.94417	9	1,833.98583	9	1,998.02750	9	2,162.06917	9	2,326.11083
510	1,673.22500	560	1,837.26667	610	2,001.30833	660	2,165.35000	710	2,329.39167
1	1,676.50583	1	1,840.54750	1	2,004.58917	1	2,168.63083	1	2,332.67250
2	1,679.78667	2	1,843.82833	2	2,007.87000	2	2,171.91167	2	2,335.95333
3	1,683.06750	3	1,847.10917	3	2,011.15083	3	2,175.19250	3	2,339.23417
4	1,686.34833	4	1,850.39000	4	2,014.43167	4	2,178.47333	4	2,342.51500
5	1,689.62917	5	1,853.67083	5	2,017.71250	5	2,181.75417	5	2,345.79583
6	1,692.91000	6	1,856.95167	6	2,020.99333	6	2,185.03500	6	2,349.07667
7	1,696.19083	7	1,860.23250	7	2,024.27417	7	2,188.31583	7	2,352.35750
8	1,699.47167	8	1,863.51333	8	2,027.55500	8	2,191.59667	8	2,355.63833
9	1,702.75250	9	1,866.79417	9	2,030.83583	9	2,194.87750	9	2,358.91917
520	1,706.03333	570	1,870.07500	620	2,034.11667	670	2,198.15833	720	2,362.20000
1	1,709.31417	1	1,873.35583	1	2,037.39750	1	2,201.43917	1	2,365.48083
2	1,712.59500	2	1,876.63667	2	2,040.67833	2	2,204.72000	2	2,368.76167
3	1,715.87583	3	1,879.91750	3	2,043.95917	3	2,208.00083	3	2,372.04250
4	1,719.15667	4	1,883.19833	4	2,047.24000	4	2,211.28167	4	2,375.32333
5	1,722.43750	5	1,886.47917	5	2,050.52083	5	2,214.56250	5	2,378.60417
6	1,725.71833	6	1,889.76000	6	2,053.80167	6	2,217.84333	6	2,381.88500
7	1,728.99917	7	1,893.04083	7	2,057.08250	7	2,221.12417	7	2,385.16583
8	1,732.28000	8	1,896.32167	8	2,060.36333	8	2,224.40500	8	2,388.44667
9	1,735.56083	9	1,899.60250	9	2,063.64417	9	2,227.68583	9	2,391.72750
530	1,738.84167	580	1,902.88333	630	2,066.92500	680	2,230.96667	730	2,395.00833
1	1,742.12250	1	1,906.16417	1	2,070.20583	1	2,234.24750	1	2,398.28917
2	1,745.40333	2	1,909.44500	2	2,073.48667	2	2,237.52833	2	2,401.57000
3	1,748.68417	3	1,912.72583	3	2,076.76750	3	2,240.80917	3	2,404.85083
4	1,751.96500	4	1,916.00667	4	2,080.04833	4	2,244.09000	4	2,408.13167
5	1,755.24583	5	1,919.28750	5	2,083.32917	5	2,247.37083	5	2,411.41250
6	1,758.52667	6	1,922.56833	6	2,086.61000	6	2,250.65167	6	2,414.69333
7	1,761.80750	7	1,925.84917	7	2,089.89083	7	2,253.93250	7	2,417.97417
8	1,765.08833	8	1,929.13000	8	2,093.17167	8	2,257.21333	8	2,421.25500
9	1,768.36917	9	1,932.41083	9	2,096.45250	9	2,260.49417	9	2,424.53583
540	1,771.65000	590	1,935.69167	640	2,099.73333	690	2,263.77500	740	2,427.81667
1	1,774.93083	1	1,938.97250	1	2,103 01417	1	2,267.05583	1	2,431.09750
2	1,778.21167	2	1,942.25333	2	2,106.29500	2	2,270.33667	2	2,434.37833
3	1,781.49250	3	1,945.53417	3	2,109.57583	3	2,273.61750	3	2,437.65917
4	1,784.77333	4	1,948.81500	4	2,112.85667	4	2,276.89833	4	2,440.94000
5	1,788.05417	5	1,952.09583	5	2,116.13750	5	2,280.17917	5	2,444.22083
6	1,791.33500	6	1,955.37667	6	2,119.41833	6	2,283.46000	6	2,447.50167
7	1,794.61583	7	1,958.65750	7	2,122.69917	7	2,286.74083	7	2,450.78250
8	1,797.89667	8	1,961.93833	8	2,125.98000	8	2,290.02167	8	2,454.06333
9	1,801.17750	9	1,965.21917	9	2,129.26083	9	2,293.30250	9	2,457.34417

Lengths—Meters to feet (from 1 to 1000 units)—Continued.

Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.	Meters.	Feet.
750	2,460.62500	800	2,624.66667	850	2,788.70833	900	2,952.75000	950	3,116.79167
1	2,463.90583	1	2,627.94750	1	2,791.98917	1	2,956.03083	1	3,120.07250
2	2,467.18667	2	2,631.22833	2	2,795.27000	2	2,959.31167	2	3,123.35333
3	2,470.46750	3	2,634.50917	3	2,798.55083	3	2,962.59250	3	3,126.63417
4	2,473.74833	4	2,637.79000	4	2,801.83167	4	2,965.87333	4	3,129.91500
5	2,477.02917	5	2,641.07083	5	2,805.11250	5	2,969.15417	5	3,133.19583
6	2,480.31000	6	2,644.35167	6	2,808.39333	6	2,972.43500	6	3,136.47667
7	2,483.59083	7	2,647.63250	7	2,811.67417	7	2,975.71583	7	3,139.75750
8	2,486.87167	8	2,650.91333	8	2,814.95500	8	2,978.99667	8	3,143.03833
9	2,490.15250	9	2,654.19417	9	2,818.23583	9	2,982.27750	9	3,146.31917
760	2,493.43333	810	2,657.47500	860	2,821.51667	910	2,985.55833	960	3,149.60000
1	2,496.71417	1	2,660.75583	1	2,824.79750	1	2,988.83917	1	3,152.88083
2	2,499.99500	2	2,664.03667	2	2,828.07833	2	2,992.12000	2	3,156.16167
3	2,503.27583	3	2,667.31750	3	2,831.35917	3	2,995.40083	3	3,159.44250
4	2,506.55667	4	2,670.59833	4	2,834.64000	4	2,998.68167	4	3,162.72333
5	2,509.83750	5	2,673.87917	5	2,837.92083	5	3,001.96250	5	3,166.00417
6	2,513.11833	6	2,677.16000	6	2,841.20167	6	3,005.24333	6	3,169.28500
7	2,516.39917	7	2,680.44083	7	2,844.48250	7	3,008.52417	7	3,172.56583
8	2,519.68000	8	2,683.72167	8	2,847.76333	8	3,011.80500	8	3,175.84667
9	2,522.96083	9	2,687.00250	9	2,851.04417	9	3,015.08583	9	3,179.12750
770	2,526.24167	820	2,690.28333	870	2,854.32500	920	3,018.36667	970	3,182.40833
1	2,529.52250	1	2,693.56417	1	2,857.60583	1	3,021.64750	1	3,185.68917
2	2,532.80333	2	2,696.84500	2	2,860.88667	2	3,024.92833	2	3,188.97000
3	2,536.08417	3	2,700.12583	3	2,864.16750	3	3,028.20917	3	3,192.25083
4	2,539.36500	4	2,703.40667	4	2,867.44833	4	3,031.49000	4	3,195.53167
5	2,542.64583	5	2,706.68750	5	2,870.72917	5	3,034.77083	5	3,198.81250
6	2,545.92667	6	2,709.96833	6	2,874.01000	6	3,038.05167	6	3,202.09333
7	2,549.20750	7	2,713.24917	7	2,877.29083	7	3,041.33250	7	3,205.37417
8	2,552.48833	8	2,716.53000	8	2,880.57167	8	3,044.61333	8	3,208.65500
9	2,555.76917	9	2,719.81083	9	2,883.85250	9	3,047.89417	9	3,211.93583
780	2,559.05000	830	2,723.09167	880	2,887.13333	930	3,051.17500	980	3,215.21667
1	2,562.33083	1	2,726.37250	1	2,890.41417	1	3,054.45583	1	3,218.49750
2	2,565.61167	2	2,729.65333	2	2,893.69500	2	3,057.73667	2	3,221.77833
3	2,568.89250	3	2,732.93417	3	2,896.97583	3	3,061.01750	3	3,225.05917
4	2,572.17333	4	2,736.21500	4	2,900.25667	4	3,064.29833	4	3,228.34000
5	2,575.45417	5	2,739.49583	5	2,903.53750	5	3,067.57917	5	3,231.62083
6	2,578.73500	6	2,742.77667	6	2,906.81833	6	3,070.86000	6	3,234.90167
7	2,582.01583	7	2,746.05750	7	2,910.09917	7	3,074.14083	7	3,238.18250
8	2,585.29667	8	2,749.33833	8	2,913.38000	8	3,077.42167	8	3,241.46333
9	2,588.57750	9	2,752.61917	9	2,916.66083	9	3,080.70250	9	3,244.74417
790	2,591.85833	840	2,755.90000	890	2,919.94167	940	3,083.98333	990	3,248.02500
1	2,595.13917	1	2,759.18083	1	2,923.22250	1	3,087.26417	1	3,251.30583
2	2,598.42000	2	2,762.46167	2	2,926.50333	2	3,090.54500	2	3,254.58667
3	2,601.70083	3	2,765.74250	3	2,929.78417	3	3,093.82583	3	3,257.86750
4	2,604.98167	4	2,769.02333	4	2,933.06500	4	3,097.10667	4	3,261.14833
5	2,608.26250	5	2,772.30417	5	2,936.34583	5	3,100.38750	5	3,264.42917
6	2,611.54333	6	2,775.58500	6	2,939.62667	6	3,103.66833	6	3,267.71000
7	2,614.82417	7	2,778.86583	7	2,942.90750	7	3,106.94917	7	3,270.99083
8	2,618.10500	8	2,782.14667	8	2,946.18833	8	3,110.23000	8	3,274.27167
9	2,621.38583	9	2,785.42750	9	2,949.46917	9	3,113.51083	9	3,277.55250

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PART II.

GENERAL STATEMENT.

The remaining pages of this publication are devoted to a description of field methods and to a discussion of the office computation and the least-squares adjustments. The condition equations and other data used in making the adjustments are included, as well as the resulting corrections.

While these may be of little interest to the engineer who desires only the geographic positions and elevations of control points in some particular area, there are a number of reasons why they should be published. The methods employed in the field work are of interest and value to local organizations carrying on detailed triangulation. For the information of those using the data the size of the errors in the observations and the distribution of the discrepancies in the adjustments should be evident in the published results. The condition equations and other adjustment data should be published in order that future work may be started at any point without recourse to the original data. Finally, publication of complete results is the best insurance against loss of original records by fire or otherwise.

A complete report on the eastern oblique arc of triangulation is given in special publication No. 7 and is not repeated here. The following pages refer only to the triangulation and traverse which were done in 1918.

ORGANIZATION OF FIELD PARTIES.

Early in February, 1918, a party in charge of M. E. Lutz, signalman, started work at Savannah, Ga., on the line of precise traverse which was to extend to Norfolk, Va. The work was carried forward under Mr. Lutz's direction to the vicinity of Camden, S. C., where, on July 12, 1918, Clem L. Garner, hydrographic and geodetic engineer, took charge of the party. In the meantime, early in May, work had been started at the northern end of the line, in the vicinity of Norfolk, Va., by a party in charge of J. S. Bilby, signalman. On June 16, 1918, Max Steinberg, hydrographic and geodetic engineer, took charge of Mr. Bilby's party near Franklin, Va. The two parties continued operations until they met near Moncure, N. C., on October 10, 1918.

Mr. Steinberg then moved his party to Wilmington, N. C., and started work on the Wilmington-Sanford precise traverse line, while Mr. Garner started work on the arc of precise triangulation connecting the eastern oblique arc with the traverse at Sanford. Work on the Wilmington-Sanford traverse was started about October 15, 1918, and by the end of November had been completed to Sanford. Mr. Steinberg's party then assisted in making the connection between the traverse in the vicinity of Sanford and the triangulation which Mr. Garner's party had brought down from the oblique arc. All work was completed, and both parties disbanded by the end of December, 1918.

Both traverse parties were combined parties and performed all the operations of reconnaissance and signal building, measurement of horizontal angles, tape measurements, and precise leveling. Usually there were four subparties, one for each of the four operations mentioned above, but the different subparties often had to help each other in order to keep all classes of work close together. The triangulation party was also organized in the same way except that there was no taping party.

Weather conditions were very unfavorable for observing while the triangulation party was in the field, and as a result a number of triangles had closing errors larger than the prescribed limits for precise triangulation. Therefore, in August, 1919, E. D. Bromley, extra observer, organized a party to remeasure the angles in some triangles having large closures and also to strengthen the triangulation by adding several new lines and by observing a Laplace azimuth at Sanford. This party was also delayed by unfavorable weather conditions but finally closed work in December after having reduced most of the large closures.

TRANSPORTATION.

The transportation for the precise traverse parties was furnished almost entirely by motor velocipede cars. Automobiles and the regular train service were also used to a limited extent. An automobile truck and a touring car were used for the transportation of the triangulation party.

Motor velocipede cars are quite satisfactory on traverse work, especially on a railroad where the traffic is not too heavy. If, however, there are good roads nearly parallel to the railroad it is often advisable to use automobile trucks instead. This has been done on a number of the recent traverses.

RECONNAISSANCE AND SIGNAL BUILDING.

Detailed specifications for reconnaissance and signal building for both triangulation and traverse are given in Special Publication No. 93 and will not be repeated here. As stated previously, the reconnaissance and signal building for the triangulation and traverse in this publication were done by a subparty. Usually this subparty was only a few miles in advance of the rest of the party and often helped the subparty making the tape measurements by setting stakes and clearing lines.

TAPE MEASUREMENTS.

Detailed instructions for making precise traverse measurements are given in Special Publication No. 58, and complete reports of actual field work are given in Special Publications Nos. 79 and 86. Tape measurements are made with 50-meter invar tapes whose lengths and coefficients of expansion are determined by the Bureau of Standards. The tapes are supported throughout by being placed on top of the rail, except at curves where the lines leave the track, and stakes are driven for the support of the tape, usually one stake at each end and one in the middle, unless the character of the ground makes the use of additional stakes necessary.

The tapes are standardized by the Bureau of Standards at a given temperature and under a tension of 15 kilograms when supported throughout, at five points (0, 12½, 25, 37½, and 50 meter points) and at three points (0, 25, and 50 meter points). In the field the tapes are used under one of these three conditions of support, or a combination of them, the tension is maintained at 15 kilograms by a spring balance fastened to one end of the tape, and the temperature of the tape is determined by two thermometers, one fastened to each end of the tape. The tape is held in place and the proper tension applied by a tape stretcher at each end. The tape ends are marked on the rail by an ordinary glass cutter and on stakes by a pin or knife cut.

When the measurements are along a tangent of the railroad and the traverse stations are on the right of way a short distance from the track, the tape measurements are first made to a point on the rail opposite the station, then the offset distance from the point on the rail to the station is measured and also the angle at the point on the rail. From these data the distance between the traverse stations is computed.

The measurements are reduced to the horizontal by computing the inclination corrections from the elevations furnished by the precise levels and the wye levels. The precise levels give the elevations of the traverse stations, the points on the rail opposite the stations, the points of tangency where the measurements leave the rail, and any change of grade along the tangents. The wye levels give the elevation of each stake on which the tape is supported. On more recent traverses a new instrument has been used to determine the inclination correction for the measurements on the rail. This is called the track level and is described in detail in Special Publication No. 86. By its use the inclination of the rail on which the tape is held is determined and the necessity of running precise levels over the traverse lines is eliminated.

When work was first started on the Savannah-Norfolk traverse, it was the custom to make two measurements with two different invar tapes, but it was found that large errors were introduced by mistakes in recording the number of tape lengths and in recording setups for setbacks, and vice versa; the same mistake being made on both measurements. To eliminate these errors, it was decided to have the lengths depend on one measurement with a 50-meter invar tape and then to make a check measurement with a 300-foot steel tape. A check measurement with a 300-foot steel tape was later made of that part of the line which had already been measured with two invar tapes. To avoid the confusion between setups and setbacks, no setbacks were measured (except small ones less than a decimeter), all distances less than about 49.9 meters being measured as setups. These changes were made while work was in progress on the Savannah-Norfolk traverse, and the new method has been used on all traverse work since then.

The subparty which makes the tape measurements usually follows immediately after the reconnaissance and signal building subparty. The former not only makes all the tape measurements but also sets the stakes, except when helped by the reconnaissance and signal building subparty, and runs the wye levels over the stakes, except

when helped by the precise leveling subparty. When the traverse is carried through loops, this subparty also measures the horizontal angles at the supplementary stations, except when helped by the observing subparty.

HORIZONTAL ANGLE AND AZIMUTH OBSERVATIONS.

The instructions for the observation of horizontal angles on precise triangulation are given in detail in Special Publication No. 19 and on precise traverse in Special Publication No. 58. All the angles at the main stations of both the triangulation and traverse in this publication were measured with direction theodolites having a graduated circle 12 inches in diameter and three micrometer microscopes reading to one second of arc. These instruments were made by the Coast and Geodetic Survey and have been used on precise triangulation for many years.

On the traverse all horizontal angle observations, except the azimuth observations, were made during the day. Most of the observations were made in the early morning or late afternoon, except on cloudy days when they could be made in the middle of the day. The observations were made on poles and targets for short lines and on heliographs for long lines. Electric signal lamps were also used on cloudy days. The observations on the triangulation were all made at night on electric signal lamps.

Angles on the triangulation were measured as usual in 16 positions of the instrument. When work was first started on the traverse the angles were measured in 16 positions, but during the progress of the work on the Savannah-Norfolk traverse it was decided to measure the angles in only 8 positions of the instrument, and this plan has been followed on all traverses since then.

When the traverse was carried through loops the angles at the supplementary stations in the loops were measured with a 7-inch repeating theodolite. Each angle was measured by two sets of three repetitions.

The 12-inch direction theodolite was used for the observations for astronomic azimuths. Observations were made on Polaris at any hour angle by the usual methods, but the Naval Observatory time signals as transmitted over the telegraph lines were used in place of time observations with the vertical circle.

The observing subparty usually followed after the taping subparty but sometimes preceded it. It made all the observations with the 12-inch instrument and sometimes helped the taping subparty on the observations with the 7-inch instrument.

PRECISE LEVELING.

Special Publication No. 18 contains complete instructions for precise leveling. The leveling over the traverse lines followed these instructions, except that there were numerous extra foresights to give additional elevations for computing the inclination corrections of the traverse lines. Extra foresights were taken on the rails opposite the traverse stations and bench marks and at points of tangency.

The precise leveling was done after the station marks were set and the concrete had had a chance to harden. The progress of the precise leveling subparty was therefore necessarily limited by the

progress of the reconnaissance and signal building subparty, since the traverse stations established by the latter were used for bench marks by the precise leveling subparty. This gave the precise leveling subparty an opportunity to assist the taping subparty with the wye levels.

ASTRONOMIC WORK.

A complete report on the astronomic latitudes, longitudes, and azimuths in North Carolina will be found in Special Publication No. 110. Full descriptions of the instruments and methods employed will be found in Special Publications Nos. 14 and 35.

A Laplace point is a station of the triangulation or traverse at which the astronomic azimuth has been observed and the astronomic longitude has been determined. A Laplace or true geodetic azimuth is an observed astronomic azimuth corrected for the prime vertical component of the deflection of the vertical. This deflection is the angle formed at the point of observation by the actual plumb line direction with the normal to the reference spheroid used in computing the triangulation. The Laplace equation, used for computing the true geodetic azimuth from the astronomic azimuth, is

$$\alpha_G = \alpha_A + (\lambda_A - \lambda_G) \sin \phi_G,$$

where α_G is the geodetic azimuth, α_A the astronomic azimuth, λ_A the astronomic longitude, λ_G the geodetic longitude, and ϕ_G the geodetic latitude. These Laplace or true geodetic azimuths are held fixed in the adjustment of triangulation and traverse.

AZIMUTHS.

There were 15 astronomic azimuths used in the adjustment of the traverse and triangulation in this publication. Astronomic longitudes were determined at or near seven of these azimuth stations and the Laplace correction computed for these stations by the above equation. The astronomic azimuths between these Laplace points were corrected by interpolated values of the Laplace correction.

The astronomic azimuths were observed by the same parties which did the traverse and triangulation. The following table shows for each station at which astronomic azimuths were observed, the station used as a mark, the date of observation, the astronomic azimuth, and the probable error.

Astronomic azimuths.

Stations.	Date.	Azimuth.	Probable error.
		° ′ ″	″
Sanford to Jonesboro	{Sept. 25, 1919; Nov. 17, 18, 1919.}	250 18 28.32	±0.28
Dro to Farley	Oct. 8, 1918	31 25 29.45	±0.55
Raleigh to Cary	Sept. 25, 1918	92 50 17.33	±0.92
Tank to Dif	Aug. 30, 1918	168 40 58.60	±0.49
Mobile to Dec	Aug. 19, 1918	354 24 49.66	±0.49
Cox to Cow	July 24, 1918	236 22 08.92	±0.48
Boykins to Cay (Va.)	June 24, 1918	73 12 36.27	±0.36
Church to Suffolk (Va.)	June 1, 1918	271 39 33.64	±0.32
Roseboro to Hayne	Nov. 11, 1918	110 45 45.37	±0.55
Bridge to Union	Oct. 22, 1918	4 20 44.12	±0.95
Hoffman to Carr	Sept. 9, 10, 1918	253 22 20.97	±0.50
Bethune I to Bethune J (S. C.)	Aug. 10, 1918	201 11 42.03	±0.58
Columbia to College (S. C.)	June 18, 1918	174 41 46.07	±0.42
Denmark to Pete (S. C.)	Apr. 27, 1918	6 29 44.36	±0.30
Allen to Extension (S. C.)	June 11, 1918	130 00 11.75	±0.49

LONGITUDES.

The astronomic longitudes at Raleigh and Wilmington, N. C., and Allendale, S. C., were determined in 1853, 1854, and 1907 by parties under B. A. Gould, G. W. Dean, and W. Bowie, respectively. The others were determined in 1918 by parties under J. E. McGrath and W. B. Fairfield, hydrographic and geodetic engineers.

The following table shows for each longitude station the date of determination, the name of the triangulation or traverse station to which it was reduced, the geodetic latitude, the astronomic longitude, the seconds of the geodetic longitude, the astronomic minus the geodetic longitude, the Laplace correction, and the name of the azimuth station at which this Laplace correction was used.

Astronomic longitudes.

Year.	Name of station.	Geodetic latitude	Astronomic longitude.	Geodetic longitude.	A-G.	Laplace correction (A-G) sin ϕ.	Name of azimuth station.
		° ′ ″	° ′ ″	″	″	″	
1907	Allendale latitude (S. C.)	33 00 31.476	81 18 34.09	40.662	−06.57	−03.58	Allen.
1918	Bethune I (S. C.)	34 28 07.227	80 15 23.82	29.426	−05.61	−03.18	Bethune I.
1918	Lee	35 28 47.235	79 10 28.91	37.053	−08.14	−04.72	Sanford.
1918	Littleton	36 25 55.621	77 54 54.63	62.598	−07.97	−04.73	Cox.
1918	Suffolk (Va.)	36 44 01.332	76 34 29.36	41.256	−11.90	−07.12	Church.
1853	Raleigh longitude	35 46 46.90	78 38 05.31	19.00	−13.69	−08.00	Raleigh.
1854	Wilmington, St. James Church.	34 14 06.835	77 56 37.86	45.659	−07.80	−04.39	Bridge.

OFFICE COMPUTATION.

Special Publication No. 28 explains in detail the adjustment of triangulation by least squares. The methods used for the computation of the lengths of a traverse are given in Special Publication No. 58 and the development of a method of adjusting a traverse by least squares is given in Special Publication No. 79.

The triangulation in this publication was adjusted by O. P. Sutherland, mathematician. The office computation of the traverse lengths were made under the direct supervision of Mr. Sutcliffe, and he also made the least-squares adjustments of the traverse lines. Mr.

Avers had charge of the computation and adjustment of the precise leveling. The astronomic azimuths and longitudes were computed by Miss Sarah Beall, mathematician.

The adjustment of these traverses differs from the adjustments shown in Special Publications Nos. 79 and 86 in that none of the traverse lengths in this publication were corrected. It was found that the discrepancies could be eliminated without correcting the lengths and without applying excessive corrections to any of the angles. The latitude and longitude equations were formed the same as in Special Publications Nos. 79 and 86, except that the parts of these equations giving corrections to the lengths were omitted and the azimuth discrepancies were all approximately eliminated before the least-squares adjustments were made. The traverses in this publication also differ from other traverses in that the supplementary stations in the loops are marked and described. It was necessary, therefore, to eliminate the discrepancies in the loops so that the positions of the supplementary stations could be computed and be made consistent with the main stations.

The azimuth discrepancy in each loop was eliminated first, and then if the discrepancy in position was small it was eliminated by applying arbitrary corrections to the positions of the supplementary stations. If the discrepancy was too large the supplementary stations in the loop were adjusted by least squares between the main stations at each end, using azimuth, latitude and longitude equations.

THE LEAST-SQUARES ADJUSTMENT OF THE PRECISE TRIANGULATION FROM THE EASTERN OBLIQUE ARC TO SANFORD.

This triangulation starts from the line Buffalo-Moore which was fixed in position, length, and azimuth by the adjustment of the oblique arc. At Sanford the lengths of the lines Foch-Lemon, Lemon-Sanford, and Sanford-Allenby as determined by the traverse measurements were held fixed in the adjustment. The Laplace azimuth Sanford to Jonesboro was also held fixed. Due to an error in the adjustment, the azimuth of this line as held in the adjustment was 250° 18′ 23″.54 instead of the correct value of 250° 18′ 23″.60.

The triangulation was adjusted by a single least-squares adjustment. There were 29 angle equations, 8 side equations, 1 azimuth equation, and 3 length equations in the adjustment.

Before the adjustment the length discrepancy between the lines Buffalo-Moore and Foch-Lemon was 57 in the seventh decimal place of logarithms, or one part in 76,000, the line Foch-Lemon being longer as measured than as computed through the triangulation. The azimuth discrepancy was 6″.94, the Laplace azimuth being smaller than the azimuth as computed through the triangulation.

HORIZONTAL DIRECTIONS.

All the observed directions in this arc of triangulation have been given equal or unit weight. Those directions were reduced to center where either the instrument or the object observed was not coincident with the center of the station mark.

In the following table are given the lists of observed and adjusted directions at each of the stations in the triangulation and also the elevations of the telescope of the theodolite above the station mark

where this information is available. These elevations enable the reader to judge the amount of building done, and they indicate to the engineer or surveyor who may use the station in the future the probable amount of building required by him to see adjacent stations. In the table is included a column showing the number assigned to each direction in the figure adjustment. Following this table is given the condition equations used in the adjustment of the triangulation.

Abstract of horizontal directions and elevations of telescope above the station marks.

Station occupied and elevation of instrument above station mark.	Number of direction.	Object observed.	Observed direction.	Final seconds after figure adjustment.
			° ′ ″	″
Buffalo, 1.45 meters	1	Bull	0 00 00.00	00.47
	2	Stuart	2 25 09.49	09.02
Bull, 1.28 meters	4	Cedder Mountain	0 00 00.00	00.50
	5	Stuart	33 29 06.38	05.82
	6	Moore	49 58 55.56	55.58
	7	Buffalo	157 53 45.14	45.19
Stuart, 1.0 meter	8	Cedder Mountain	0 00 00.00	59.53
	9	Moore	51 46 39.28	39.51
	10	Buffalo	161 25 44.68	44.40
	11	Bull	214 35 56.02	56.55
Moore, 1.60 meters	13	Bull	0 00 00.00	00.34
	14	Stuart	0 40 54.08	53.57
	15	Cedder Mountain	74 50 22.10	21.48
	16	Ogburn	108 33 44.60	44.22
	17	Kernersville	139 13 25.48	25.32
	12	Buffalo	329 31 35.14	36.50
Cedder Mountain, 4.43 meters	20	Moore	0 00 00.00	00.81
	21	Stuart	54 03 56.58	55.33
	22	Bull	55 10 46.19	47.10
	18	Ogburn	271 21 45.44	44.94
	19	Kernersville	295 49 47.67	47.69
Ogburn, 22.19 meters	31	Cedder Mountain	0 00 00.00	00.35
	28	Guilford	174 09 22.86	22.75
	29	Kernersville	230 36 04.58	04.17
	30	Moore	302 21 37.21	37.37
Kernersville, 18.15 meters	26	Guilford	0 00 00.00	59.17
	27	High Point	55 59 09.25	09.03
	23	Moore	223 00 29.48	30.06
	24	Cedder Mountain	274 27 15.62	15.62
	25	Ogburn	300 35 16.96	17.45
Guilford, 12.11 meters	32	Greensboro	0 00 00.00	59.46
	33	High Point	121 54 07.96	07.84
	34	Kernersville	189 19 17.84	18.64
	35	Ogburn	253 27 56.38	56.24
Greensboro, 1.55 meters	41	Climax	0 00 00.00	00.16
	42	Asheboro	33 06 40.53	39.90
	43	High Point	81 49 17.48	17.57
	44	Guilford	121 35 11.18	11.59
High Point, 2.66 meters	39	Climax	0 00 00.00	59.46
	40	Asheboro	48 28 29.81	29.47
	36	Kernersville	240 16 05.20	05.72
	37	Guilford	296 51 45.95	45.79
	38	Greensboro	315 11 43.20	43.72
Climax, 19.27 meters	55	Liberty	0 00 00.00	00.24
	56	Asheboro	70 36 52.99	52.74
	57	High Point	135 41 35.17	35.18
	58	Greensboro	189 04 03.23	03.23

Abstract of horizontal directions and elevations of telescope above the station marks—Continued.

Station occupied and elevation of instrument above station mark.	Number of direction.	Object observed.	Observed direction.	Final seconds after figure adjustment.
			° ′ ″	″
Asheboro, 1.73 meters	50	Ramsure	0 00 00.00	58.66
	45	High Point	211 25 20.81	21.78
	46	Greensboro	249 26 00.27	00.04
	47	Climax	277 52 10.27	10.88
	48	Liberty	310 19 16.33	16.41
	49	Siler	338 27 48.11	48.01
Liberty, 12.14 meters	52	Ramsure	0 00 00.00	00.90
	53	Asheboro	48 51 41.09	40.84
	54	Climax	125 47 43.90	43.54
	51	Siler	295 49 46.13	45.84
Ramsure, 1.45 meters	63	Paul Beck	0 00 00.00	59.70
	64	Carthage	19 00 48.69	48.76
	59	Asheboro	174 45 38.58	40.10
	60	Liberty	256 13 19.48	18.67
	61	Siler	313 00 58.66	58.64
	62	Ore Hill	326 30 44.68	44.19
Siler, 15.0 meters	65	Ore Hill	0 00 00.00	59.93
	66	Paul Beck	56 52 05.78	06.49
	67	Ramsure	124 55 04.10	03.26
	68	Asheboro	145 07 34.44	34.61
	69	Liberty	183 57 08.88	08.92
Ore Hill	74	Siler	0 00 00.00	59.66
	70	Jonesboro	179 44 32.39	31.96
	71	Carthage	221 25 34.37	33.61
	72	Paul Beck	262 27 34.36	34.41
	73	Ramsure	318 24 46.80	48.29
Paul Beck	75	Ramsure	0 00 00.00	00.74
	76	Siler	64 58 03.61	03.55
	77	Ore Hill	90 33 32.29	31.95
	78	Jonesboro	166 47 14.85	14.30
	79	Carthage	211 59 22.55	22.77
Carthage	83	Jonesboro	0 00 00.00	00.30
	84	Lemon	21 28 03.25	02.60
	85	Foch	122 42 02.20	02.26
	80	Ramsure	263 49 03.20	02.35
	81	Paul Beck	276 47 35.25	36.01
	82	Ore Hill	294 19 44.74	45.13
Foch	86	Carthage	0 00 00.00	00.26
	87	Lemon	33 55 46.52	46.26
Lemon	90	Sanford	0 00 00.00	00.49
	91	Jonesboro	8 50 19.52	19.05
	92	Swan	55 36 40.55	40.19
	88	Foch	193 21 13.60	13.49
	89	Carthage	238 11 28.12	28.56
Swan	93	Lemon	0 00 00.00	00.36
	94	Jonesboro	84 13 43.53	43.16
Jonesboro	98	Sanford	0 00 00.00	59.34
	99	Paul Beck	40 23 02.42	03.40
	100	Ore Hill	61 26 19.90	19.67
	101	Allenby	100 01 56.42	56.28
	95	Swan	271 54 30.27	30.63
	96	Lemon	320 54 27.39	26.89
	97	Carthage	348 47 34.25	34.45
Allenby	102	Jonesboro	0 00 00.00	59.87
	103	Sanford	18 10 35.45	35.57
Sanford	106	Lemon	0 00 00.00	00.10
	104	Allenby	166 08 23.50	23.66
	105	Jonesboro	227 55 51.33	51.06

CONDITION EQUATIONS.

No.

1. $0 = -0.48 - (1) + (2) - (5) + (7) - (10) + (11)$.
2. $0 = -0.03 - (5) + (6) - (9) + (11) - (13) + (14)$.
3. $0 = +1.34 - (4) + (6) - (13) + (15) - (20) + (22)$.
4. $0 = +1.47 - (8) + (9) - (14) + (15) - (20) + (21)$.
5. $0 = -1.74 - (15) + (16) - (18) + (20) - (30) + (31)$.

6. $0 = -0.67 - (15) + (17) - (19) + (20) - (23) + (24)$.
7. $0 = -0.70 - (16) + (17) - (23) + (25) - (29) + (30)$.
8. $0 = +2.56 - (25) + (26) - (28) + (29) - (34) + (35)$.
9. $0 = -0.85 - (26) + (27) - (33) + (34) - (36) + (37)$.
10. $0 = -1.42 - (32) + (33) - (37) + (38) - (43) + (44)$.

11. $0 = +1.14 - (38) + (39) - (41) + (43) - (57) + (58)$.
12. $0 = +1.34 - (38) + (40) - (42) + (43) - (45) + (46)$.
13. $0 = -0.10 - (39) + (40) - (45) + (47) - (56) + (57)$.
14. $0 = +1.13 - (47) + (48) - (53) + (54) - (55) + (56)$.
15. $0 = +0.27 - (48) + (49) - (51) + (53) - (68) + (69)$.

16. $0 = +4.90 - (48) + (50) - (52) + (53) - (59) + (60)$.
17. $0 = -2.86 - (51) + (52) - (60) + (61) - (67) + (69)$.
18. $0 = +2.63 - (61) + (63) - (66) + (67) - (75) + (76)$.
19. $0 = -0.55 - (62) + (63) - (72) + (73) - (75) + (77)$.
20. $0 = -0.11 - (65) + (66) - (72) + (74) - (76) + (77)$.

21. $0 = -4.05 - (62) + (64) - (71) + (73) - (80) + (82)$.
22. $0 = -1.00 - (71) + (72) - (77) + (79) - (81) + (82)$.
23. $0 = -1.09 - (78) + 79) - (81) + (83) - (97) + (99)$.
24. $0 = +0.85 - (70) + (71) - (82) + (83) - (97) + (100)$.
25. $0 = +1.16 - (83) + (84) - (89) + (91) - (96) + (97)$.

26. $0 = -0.74 - (84) + (85) - (86) + (87) - (88) + (89)$.
27. $0 = +0.75 - (90) + (91) - (96) + (98) - (105) + (106)$.
28. $0 = -0.34 - (98) + (101) - (102) + (103) - (104) + (105)$.
29. $0 = +1.48 - (91) + (92) - (93) + (94) - (95) + (96)$.
30. $0 = -96.36 - 49.8(1) + 49.8(2) - 7.1(5) + 6.4(6) + 0.7(7) - 1.8(9) + 3.4(10) - 1.6(11) - 6.2(12) + 180.6(13) - 174.4(14)$.

31. $0 = +394.01 - 3.2(4) + 10.3(5) - 7.1(6) - 177.0(13) + 177.6(14) - 0.6(15) - 1.5(20) + 109.8(21) - 108.3(22)$.
32. $0 = -0.18 - 3.16(15) + 6.71(16) - 3.55(17) - 4.58(18) + 4.63(19) - 0.05(20) - 0.47(23) + 4.29(24) - 3.82(25)$.
33. $0 = +8.73 - 2.12(38) + 3.98(39) - 1.86(40) - 2.93(41) + 3.23(42) - 0.30(43) - 0.92(45) + 3.89(46) - 2.97(47)$.
34. $0 = -12.10 - 1.79(48) + 5.33(49) - 3.54(50) - 1.02(51) + 2.86(52) - 1.84(53) - 4.46(67) + 5.72(68) - 1.26(69)$.
35. $0 = +3.62 - 8.77(61) + 11.95(62) - 3.18(63) - 2.84(65) + 1.37(66) + 1.47(67) + 0.02(75) + 4.40(76) - 4.42(77)$.

36. $0 = -15.30 - 3.18(62) + 9.29(63) - 6.11(64) - 2.42(71) + 3.84(72) - 1.42(73) - 9.14(80) + 15.80(81) - 6.66(82)$.
37. $0 = -3.76 - 0.27(70) + 2.42(71) - 2.15(72) - 6.41(81) + 6.66(82) - 0.25(83) - 1.67(97) + 7.14(99) - 5.47(100)$.
38. $0 = +6.94 - (12) + (17) - (23) + (27) - (36) + (40) - (45) + (50) - (59) + (64) - (80) + (84) - (89) + (90) + (105) - (106)$
39. $0 = +8.96 - 5.35(83) + 4.93(84) + 0.42(85) - 3.13(86) + 3.13(87) + 1.39(96) - 3.98(97) + 2.59(98) - 1.90(105) + 1.90(106)$.
40. $0 = +14.36 - 13.54(90) + 13.54(91) + 2.59(96) - 2.22(98) - 0.37(101) + 6.41(102) - 6.41(103)$.

41. $0 = -5.74 - 1.77(4) + 3.46(6) - 1.69(7) + 2.37(12) - 2.37(13) - 3.55(16) + 3.55(17)$
$- 0.05(18) + 1.51(20) - 1.46(22) + 0.47(23) - 0.47(25) - 1.42(26) + 1.42(27)$
$- 1.40(28) + 1.40(29) + 1.33(30) - 1.33(31) + 1.31(32) - 1.31(33) + 1.02(34)$
$- 1.02(35) + 1.39(36) - 1.39(37) - 1.86(39) + 1.86(40) - 0.30(41) + 2.83(43)$
$- 2.53(44) + 0.92(45) - 0.92(47) - 1.79(48) + 1.79(50) - 1.02(51) + 1.02(52)$
$+ 0.49(53) - 0.49(54) - 0.74(55) + 0.74(56) + 1.57(57) - 1.57(58) + 0.31(59)$
$- 0.31(60) - 1.62(62) + 1.62(64) + 1.47(65) - 0.21(67) - 1.26(69) - 2.36(70)$
$+ 2.36(71) + 2.38(73) - 2.38(74) + 3.57(80) - 3.57(82) + 0.42(84) - 0.42(85)$
$+ 3.13(86) - 3.13(87) - 1.81(89) + 1.81(91) - 3.98(96) + 4.63(97) - 0.65(100)$.

COMPUTED CORRECTIONS TO OBSERVED DIRECTIONS.

A least-squares solution of the preceding condition equations resulted in the following corrections to the observed directions:

Table of corrections to observed directions.

Number of direction.	Correction to direction.	Number of direction.	Correction to direction.	Number of direction.	Correction to direction.
	″		″		″
1	+0.469	36	+0.514	71	−0.761
2	−0.469	37	−0.163	72	+0.048
		38	+0.517	73	+1.490
4	+0.494	39	−0.522	74	−0.345
5	−0.564	40	−0.334	75	+0.742
6	+0.018	41	+0.160	76	−0.065
7	+0.049	42	−0.640	77	−0.336
8	−0.472	43	+0.080	78	−0.558
9	+0.231	44	+0.401	79	+0.217
10	−0.284	45	+0.967	80	−0.851
11	+0.526	46	−0.245	81	+0.762
12	+1.357	47	+0.603	82	+0.395
13	+0.339	48	+0.082	83	+0.291
14	−0.517	49	−0.092	84	−0.654
15	−0.629	50	−1.335	85	+0.055
16	−0.375	51	−0.291	86	+0.266
17	−0.160	52	+0.903	87	−0.264
18	−0.501	53	−0.245	88	−0.105
19	+0.025	54	−0.369	89	+0.444
20	+0.812	55	+0.239	90	+0.491
21	−1.248	56	−0.258	91	−0.469
22	+0.910	57	+0.016	92	−0.361
23	+0.574	58	+0.003	93	+0.361
24	−0.006	59	+1.522	94	−0.361
25	+0.490	60	−0.809	95	+0.361
26	−0.839	61	−0.021	96	−0.506
27	−0.219	62	−0.483	97	+0.198
28	−0.109	63	−0.293	98	−0.667
29	−0.395	64	+0.079	99	+0.977
30	+0.163	65	−0.070	100	−0.221
31	+0.347	66	+0.705	101	−0.147
32	−0.532	67	−0.842	102	−0.126
33	−0.120	68	+0.171	103	+0.126
34	+0.797	69	+0.037	104	+0.164
35	−0.145	70	−0.426	105	−0.261
				106	+0.099

The maximum correction to an observed direction is +1.″522 on direction No. 59 at station Ramsure. The probable error of an observed direction is given by the formula

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

in which Σv^2 is the sum of the squares of the corrections to the directions and c is the number of conditions. The probable error of an observed direction resulting from the figure adjustment for this arc of precise triangulation is ±0.″58.

CORRECTIONS TO ANGLES AND CLOSURE OF TRIANGLES.

The correction to each angle is the algebraic sum of the corrections to two directions. In order to make it possible to study the corrections to the separate angles, they are shown in the following table for every triangle in the precise scheme. There are shown the corrections to the angles resulting from the figure adjustment, the corrections for closure of the triangles, the corrected spherical angles, and the spherical excess for each triangle. The plus sign prefixed to the correction for closure of a triangle indicates that the sum of the

angles is less than 180° plus the spherical excess. The spherical excess is a convenient indication of the size of the triangle, since it is proportional to the area.

Table of triangles.

Station.	Correction to angle from figure adjustment.	Correction for closure of triangle.	Corrected spherical angle.	Spherical excess.
	"		° ′ ″	"
Bull	+0.03		107 54 49.61	
Moore	−1.02	----------	30 28 23.84	2.03
Buffalo	----------		41 36 48.58	
Stuart	−0.51		109 39 04.89	
Moore	−1.87	----------	31 09 17.07	1.99
Buffalo	----------		39 11 40.03	
Stuart	+0.30		162 49 17.04	
Moore	−0.85	+0.03	0 40 53.23	0.03
Bull	+0.58		16 29 49.76	
Stuart	+0.81		53 10 12.15	
Buffalo	−0.94	+0.48	2 25 08.55	0.07
Bull	+0.61		124 24 39.37	
Cedder Mountain	−2.06		54 03 54.52	
Moore	−0.11	−1.47	74 09 27.91	2.41
Stuart	+0.70		51 46 39.98	
Cedder Mountain	+0.10		55 10 46.29	
Moore	−0.96	−1.34	74 50 21.14	2.51
Bull	−0.48		49 58 55.08	
Cedder Mountain	+2.16		1 06 51.77	
Stuart	−1.00	+0.10	145 24 02.98	0.07
Bull	−1.06		33 29 05.32	
Kernersville	−0.58		51 26 45.56	
Moore	+0.46	+0.67	64 23 03.84	2.52
Cedder Mountain	+0.79		64 10 13.12	
Ogburn	+0.57		71 45 33.20	
Kernersville	−0.09	+0.70	77 34 47.39	1.69
Moore	+0.22		30 39 41.10	
Ogburn	+0.76		129 23 56.18	
Kernersville	+0.49	+1.77	26 08 01.83	0.76
Cedder Mountain	+0.52		24 28 02.75	
Ogburn	+0.19		57 38 22.98	
Moore	+0.24	+1.74	33 43 22.74	1.59
Cedder Mountain	+1.31		88 38 15.87	
Guilford	−0.94		64 08 37.60	
Kernersville	−1.32	−2.56	59 24 41.72	0.74
Ogburn	−0.30		56 26 41.42	
High Point	−0.68		56 35 40.07	
Kernersville	+0.61	+0.85	55 59 09.86	0.73
Guilford	+0.92		67 25 10.80	
Greensboro	+0.32		39 45 54.02	
High Point	+0.68	+1.42	18 19 57.93	0.33
Guilford	+0.42		121 54 08.38	
Climax	−0.01		53 22 28.05	
High Point	−1.06	−1.14	44 48 15.74	1.20
Greensboro	−0.07		81 49 17.41	
Asheboro	−1.20		38 00 38.26	
High Point	−0.86	−1.34	93 16 45.75	1.68
Greensboro	+0.72		48 42 37.67	
Asheboro	−0.36		66 26 49.10	
High Point	+0.20	+0.10	48 28 30.01	1.55
Climax	+0.26		65 04 42.44	
Asheboro	+0.84		28 26 10.84	
Greensboro	−0.79	+0.30	33 06 39.74	1.07
Climax	+0.25		118 27 10.49	

Table of triangles—Continued.

Station.	Correction to angle from figure adjustment.	Correction for closure of triangle.	Corrected spherical angle.	Spherical excess.
	″		° ′ ″	″
Liberty	−0.11	−1.13	76 56 02.70	0.73
Asheboro	−0.53		32 27 05.53	
Climax	−0.49		70 36 52.50	
Ramsure	−2.33	−4.90	81 27 38.57	0.76
Asheboro	−1.42		49 40 42.25	
Liberty	−1.15		48 51 39.94	
Siler	+1.01	−1.77	20 12 31.35	0.54
Ramsure	−1.54		138 15 18.54	
Asheboro	−1.24		21 32 10.65	
Siler	+0.88	+2.86	59 02 05.66	0.69
Ramsure	+0.79		56 47 39.97	
Liberty	+1.19		64 10 15.06	
Siler	−0.13	−0.27	38 49 34.31	0.91
Asheboro	−0.18		28 08 31.60	
Liberty	+0.04		113 01 55.00	
Paul Beck	−0.80	−2.63	64 58 02.81	0.64
Ramsure	−0.28		46 59 01.06	
Siler	−1.55		68 02 56.77	
Ore Hill	+1.44	+0.55	55 57 13.88	0.60
Paul Beck	−1.08		90 33 31.21	
Ramsure	+0.19		33 29 15.51	
Ore Hill	−0.39	+0.11	97 32 25.25	0.21
Paul Beck	−0.28		25 35 28.40	
Siler	+0.78		56 52 06.56	
Ore Hill	−1.83	−3.07	41 35 11.37	0.25
Ramsure	−0.47		13 29 45.55	
Siler	−0.77		124 55 03.33	
Carthage	+1.61	+2.50	12 58 33.66	0.69
Ramsure	+0.37		19 00 49.06	
Paul Beck	+0.52		148 00 37.97	
Carthage	+1.24	+4.05	30 30 42.78	2.03
Ramsure	+0.56		52 30 04.57	
Ore Hill	+2.25		96 59 14.68	
Carthage	−0.37	+1.00	17 32 09.12	0.74
Paul Beck	+0.56		121 25 50.82	
Ore Hill	+0.81		41 02 00.80	
Jonesboro	+0.78	+1.09	51 35 28.95	1.71
Carthage	−0.46		83 12 24.29	
Paul Beck	+0.77		45 12 08.47	
Jonesboro	−0.43	−0.85	72 38 45.22	2.04
Carthage	−0.09		65 40 15.17	
Ore Hill	−0.33		41 41 01.65	
Jonesboro	−1.21	−0.94	21 03 16.27	1.07
Paul Beck	−0.21		76 13 42.35	
Ore Hill	+0.48		82 43 02.45	
Lemon	−0.91	−1.16	130 38 50.49	0.35
Carthage	−0.95		21 28 02.30	
Jonesboro	+0.70		27 53 07.56	
Foch	−0.52	+0.74	33 55 46.00	0.73
Carthage	+0.71		101 13 59.66	
Lemon	+0.55		44 50 15.07	
Sanford	+0.37	−0.75	132 04 09.04	0.05
Jonesboro	−0.16		39 05 32.45	
Lemon	−0.96		8 50 18.56	
Allenby	+0.25	+0.34	18 10 35.70	0.04
Jonesboro	+0.52		100 01 56.94	
Sanford	−0.43		61 47 27.40	
Swan	−0.73	−1.48	84 13 42.80	0.20
Lemon	+0.11		46 46 21.14	
Jonesboro	−0.86		48 59 56.26	

ACCURACY OF OBSERVATIONS.

The maximum correction to any one angle is $-2''.33$ to the angle at Ramsure between Asheboro and Liberty. A table is given below showing statistics in regard to the accuracy of the precise triangulation in this publication. The mean error of an angle is given by the formula

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

in which $\Sigma\Delta^2$ is the sum of the squares of the closing errors of the triangles and n is the number of triangles.

Statistics showing accuracy of triangulation:	
Total number of triangles	38
Number of triangles with plus closures	20
Number of triangles with minus closures	16
Number of concluded triangles	2
Average closure of all triangles without regard to sign	1″.34
Maximum closure of a triangle	4″.90
Mean error of an angle	±1″.01
Probable error of an observed direction	±0″.58

The average closing error of the 36 closed triangles of this arc is 1″.34; the instructions under which the work was done call for an average closing error of about 1″.00. The instructions say that the closing error of a triangle shall seldom exceed 3″.00; in this work there are three triangles where this limit is exceeded, the maximum being 4″.90.

Although the error of closure of triangles is an excellent indication of the accuracy of triangulation, there is another criterion of accuracy about equally accurate, namely, length closure. After several of the larger triangle closures had been reduced by additional observations it was found that the lengths as computed through the triangulation from the oblique arc checked very closely with the traverse lengths at Sanford. It was also found that the loop of which this triangulation forms a part has a very small closure in position. Further check observations were therefore deemed unnecessary.

For purposes of comparison a table showing the average closing errors of a number of other arcs of precise triangulation is given below:

Ninety-eighth meridian arc, Alice, Texas, to Colombres, Mexico	0″.63
Texas-California arc	0″.90
Ninety-eighth meridian arc	0″.92
California–Oregon arc	0″.92
One hundred fourth meridian arc	0″.99
Rio Grande arc	1″.01
Transcontinental arc	1″.06
Utah-Washington arc	1″.12
Eastern Oblique arc	1″.19
California-Washington arc	1″.22
Oblique arc–Sanford arc	1″.34

It will be noted from the above that this arc has a larger closing error than any of the other arcs, probably caused by the unfavorable weather conditions under which the observing was done.

THE LEAST-SQUARES ADJUSTMENT OF THE PRECISE TRAVERSE FROM SANFORD TO NORFOLK.

This traverse was adjusted starting near Sanford from triangulation station Allenby, with the azimuth Allenby to Sanford, and ending at station Creek, near Norfolk, Va., with the azimuth Creek to Porter. The position and azimuth at Allenby were fixed by the adjustment of the triangulation extending from the eastern oblique arc to Sanford, which has just been described. Stations Creek and Porter were connected by one figure of triangulation with the old (1912–13) stations Baugh, Paradise, and Wilson of the triangulation along the Southern Branch of the Elizabeth River. This one figure was adjusted by least squares first, and then the position and azimuth at Creek were held fixed in the adjustment of the traverse.

DISCREPANCY IN GEOGRAPHIC POSITION.

After the azimuth discrepancies were approximately eliminated the position of station Creek as computed through the traverse from station Allenby was too small by 0″.289 (8.91 meters) of latitude and too large by 0″.028 (0.69 meters) of longitude. The total discrepancy in position was 8.94 meters. If it is assumed that the positions which were held fixed at each end of the line are without error and the whole error is in the traverse, then the discrepancy is about 1 part in 36,000 of the length of the traverse, which is about 200 miles. If this discrepancy is considered as the closing error of the loop formed by the traverse, the triangulation extending from the eastern oblique arc to Sanford, the oblique arc triangulation, and the triangulation down Chesapeake Bay from the oblique arc to the Elizabeth River, a distance of about 750 miles, then it amounts to about 1 part in 135,000 of the length of the loop.

CONDITION EQUATIONS.

This traverse was adjusted by a single least-squares adjustment. Besides the fixed azimuths at each end there were 7 observed azimuths along the traverse which made necessary the use of 8 azimuth equations. Three of these azimuths were Laplace azimuths and the other 4 were corrected by interpolated values of the Laplace corrections.

The formulae for the distribution of latitude and longitude discrepanices are based on the assumption that the changes in the geodetic positions will be small. Usually the accumulated discrepancy in azimuth in a traverse is large enough to cause rather large discrepancies in position—too large to be eliminated by the equations used without making a preliminary solution. This being the case, it is necessary to distribute approximately the angle discrepancies between the azimuth stations prior to the computation of the geographic positions which are used in the formation of the latitude and longitude equations. This method was used for this traverse, and consequently the azimuth equations given below do not show the actual azimuth discrepancy but only that remaining after the discrepancy has been approximately distributed.

In making the adjustment the angles at the stations, beginning at Allenby, were designated by odd numbers and the lengths of the lines between stations by even numbers. Later it was found that

the corrections to the lengths were not necessary, and that part of the equations was omitted. Therefore, only odd numbers appear in the condition equations.

The condition equations used in adjusting this traverse are given below, the first 8 being azimuth equations and Nos. 9 and 10 being, respectively, the latitude and longitude equations.

Condition equations.

No.

1. $0=+1.1+(1)+(3)+(5)+(7)+(9)+(11)$.

2. $0=-0.3+(13)+(15)+(17)+(19)+(21)+(23)+(25)+(27)+(29)+(31)+(33)$
$+(35)+(37)+(39)+(41)+(43)+(45)+(47)+(49)+(51)+(53)+(55)$
$+(57)+(59)+(61)$.

3. $0=+0.1+(63)+(65)+(67)+(69)+(71)+(73)+(75)+(77)+(79)+(81)+(83)$
$+(85)+(87)+(89)+(91)+(93)+(95)+(97)$.

4. $0=-0.5+(99)+(101)+(103)+(105)+(107)+(109)+(111)+(113)+(115)+(117)$
$+(119)+(121)+(123)+(125)+(127)+(129)+(131)+(133)+(135)+(137)$
$+(139)+(141)+(143)+(145)$.

5. $0=+0.3+(147)+(149)+(151)+(153)+(155)+(157)+(159)+(161)+(163)+(165)$
$+(167)+(169)+(171)+(173)+(175)+(177)+(179)+(181)+(183)+(185)$
$+(187)+(189)+(191)+(193)+(195)+(197)+(199)+(201)+(203)+(205)$
$+(207)+(209)+(211)+(213)+(215)+(217)+(219)+(221)+(223)+(225)$
$+(227)+(229)+(231)+(233)+(235)+(237)+(239)+(241)+(243)+(245)$.

6. $0=\ 0.0+(247)+(249)+(251)+(253)+(255)+(257)+(259)+(261)+(263)+(265)$
$+(267)+(269)+(271)+(273)+(275)+(277)+(279)+(281)+(283)+(285)$
$+(287)+(289)+(291)+(293)+(295)+(297)+(299)+(301)+(303)+(305)$
$+(307)+(309)+(311)+(313)+(315)+(317)+(319)+(321)+(323)+(325)$
$+(327)+(329)+(331)+(333)+(335)+(337)+(339)+(341)$.

7. $0=-0.6+(343)+(345)+(347)+(349)+(351)+(353)+(355)+(357)+(359)+(361)$
$+(363)+(365)+(367)+(369)+(371)+(373)+(375)+(377)+(379)+(381)$
$+(383)+(385)+(387)$.

8. $0=-0.1+(389)+(391)+(393)+(395)+(397)+(399)$.

9. $0=-20.9185-2.91(\ 1)-2.87(\ 3)-2.87(\ 5)-2.86(\ 7)-2.85(\ 9)-2.85(11)$
$-2.83(13)-2.82(15)-2.81(17)-2.81(19)-2.79(21)-2.78(23)$
$-2.77(25)-2.77(27)-2.74(29)-2.66(31)-2.63(33)-2.63(35)$
$-2.62(37)-2.61(39)-2.60(41)-2.60(43)-2.59(45)-2.58(47)$
$-2.57(49)-2.55(51)-2.55(53)-2.54(55)-2.54(57)-2.53(59)$
$-2.52(61)-2.38(63)-2.33(65)-2.27(67)-2.27(69)-2.26(71)$
$-2.26(73)-2.25(75)-2.25(77)-2.25(79)-2.24(81)-2.23(83)$
$-2.23(85)-2.21(87)-2.21(89)-2.22(91)-2.22(93)-2.22(95)$
$-2.22(97)-2.23(99)-2.22(101)-2.22(103)-2.21(105)-2.21(107)$
$-2.20(109)-2.20(111)-2.20(113)-2.19(115)-2.19(117)-2.19(119)$
$-2.19(121)-2.19(123)-2.19(125)-2.18(127)-2.18(129)-2.18(131)$
$-2.19(133)-2.19(135)-2.19(137)-2.17(139)-2.17(141)-2.15(143)$
$-2.14(145)-2.14(147)-2.14(149)-2.14(151)-2.14(153)-2.13(156)$
$-2.13(157)-2.12(159)-2.11(161)-2.10(163)-2.10(165)-2.08(167)$
$-2.08(169)-2.08(171)-2.08(173)-2.08(175)-2.08(177)-2.07(179)$
$-2.03(181)-2.03(183)-2.02(185)-2.02(187)-2.02(189)-2.00(191)$
$-1.97(193)-1.97(195)-1.92(197)-1.91(199)-1.88(201)-1.87(203)$
$-1.86(205)-1.86(207)-1.82(209)-1.79(211)-1.79(213)-1.77(215)$
$-1.76(217)-1.75(219)-1.74(221)-1.74(223)-1.73(225)-1.73(227)$
$-1.72(229)-1.71(231)-1.71(233)-1.70(235)-1.68(237)-1.67(239)$
$-1.66(241)-1.65(243)-1.63(245)-1.58(247)-1.57(249)-1.55(251)$
$-1.54(253)-1.53(255)-1.53(257)-1.52(259)-1.50(261)-1.50(263)$
$-1.49(265)-1.49(267)-1.49(269)-1.48(271)-1.45(273)-1.45(275)$
$-1.45(277)-1.45(279)-1.43(281)-1.41(283)-1.40(285)-1.38(287)$
$-1.38(289)-1.36(291)-1.35(293)-1.35(295)-1.34(297)-1.32(299)$
$-1.32(301)-1.28(303)-1.27(305)-1.25(307)-1.20(309)-1.18(311)$
$-1.17(313)-1\ 16(315)-1.14(317)-1.12(319)-1.12(321)-1.11(323)$
$-1.10(325)-1.10(327)-1.09(329)-1.09(331)-1.07(333)-1.06(335)$
$-1.03(337)-0.99(339)-0.96(341)-0.92(343)-0.91(345)-0.90(347)$
$-0.90(349)-0.88(351)-0.87(353)-0.85(355)-0.84(357)-0.80(359)$
$-0.77(361)-0.74(363)-0.70(365)-0.64(367)-0.64(369)-0.62(371)$
$-0.61(373)-0.60(375)-0.52(377)-0.52(379)-0.51(381)-0.46(383)$
$-0.34(385)-0.31(387)-0.28(389)-0.24(391)-0.15(393)-0.12(395)$
$-0.06(397)$.

10. $0=+\ 2.0267-2.01(\ 1)-1.96(\ 3)-1.94(\ 5)-1.92(\ 7)-1.90(\ 9)-1.89(11)$
$-1.85(13)-1.85(15)-1.85(17)-1.86(19)-1.86(21)-1.85(23)$
$-1.83(25)-1.83(27)-1.80(29)-1.74(31)-1.72(33)-1.72(35)$
$-1.70(37)-1.69(39)-1.69(41)-1.69(43)-1.67(45)-1.64(47)$
$-1.63(49)-1.62(51)-1.62(53)-1.59(55)-1.59(57)-1.59(59)$
$-1.59(61)-1.60(63)-1.46(65)-1.35(67)-1.34(69)-1.33(71)$
$-1.32(73)-1.30(75)-1.29(77)-1.28(79)-1.28(81)-1.27(83)$
$-1.26(85)-1.24(87)-1.23(89)-1.20(91)-1.19(93)-1.19(95)$
$-1.18(97)-1.17(99)-1.16(101)-1.16(103)-1.14(105)-1.14(107)$
$-1.13(109)-1.12(111)-1.12(113)-1.08(115)-1.07(117)-1.04(119)$
$-1.03(121)-1.02(123)-1.01(125)-1.00(127)-0.97(129)-0.97(131)$
$-0.96(133)-0.95(135)-0.95(137)-0.88(139)-0.87(141)-0.84(143)$
$-0.81(145)-0.75(147)-0.75(149)-0.74(151)-0.74(153)-0.73(155)$
$-0.71(157)-0.71(159)-0.71(161)-0.70(163)-0.70(165)-0.68(167)$
$-0.67(169)-0.67(171)-0.66(173)-0.65(175)-0.65(177)-0.64(179)$
$-0.60(181)-0.60(183)-0.59(185)-0.59(187)-0.59(189)-0.59(191)$
$-0.57(193)-0.57(195)-0.55(197)-0.55(199)-0.56(201)-0.57(203)$
$-0.57(205)-0.57(207)-0.57(209)-0.55(211)-0.55(213)-0.58(215)$

−0.58(217) −0.58(219) −0.58(221) −0.58(223) −0.59(225) −0.59(227)
−0.59(229) −0.59(231) −0.59(233) −0.58(235) −0.57(237) −0.57(239)
−0.58(241) −0.57(243) −0.56(245) −0.52(247) −0.52(249) −0.52(251)
−0.52(253) −0.52(255) −0.52(257) −0.51(259) −0.50(261) −0.50(263)
−0.50(265) −0.50(267) −0.50(269) −0.51(271) −0.52(273) −0.52(275)
−0.51(277) −0.51(279) −0.52(281) −0.52(283) −0.53(285) −0.55(287)
−0.55(289) −0.56(291) −0.57(293) −0.57(295) −0.57(297) −0.58(299)
−0.58(301) −0.55(303) −0.54(305) −0.53(307) −0.51(309) −0.49(311)
−0.49(313) −0.48(315) −0.47(317) −0.46(319) −0.46(321) −0.45(323)
−0.44(325) −0.43(327) −0.43(329) −0.43(331) −0.42(333) −0.41(335)
−0.40(337) −0.38(339) −0.35(341) −0.34(343) −0.33(345) −0.32(347)
−0.32(349) −0.31(351) −0.30(353) −0.27(355) −0.27(357) −0.26(359)
−0.25(361) −0.24(363) −0.23(365) −0.20(367) −0.19(369) −0.17(371)
−0.17(373) −0.16(375) −0.13(377) −0.13(379) −0.12(381) −0.12(383)
−0.11(385) −0.10(387) −0.10(389) −0.08(391) −0.04(393) −0.03(395)
−0.01(397).

TABLE OF CORRECTIONS.

The following table gives in the first column the name of the station, in the second the designation given to the angle in the adjustment, in the third the correction due to the azimuth adjustment which was made previous to the final adjustment, in the fourth the correction due to the latitude and longitude adjustment, and in the last column the total correction. The average correction to an angle was 1.″1, with a maximum of 2.″7.

Table of corrections to the angles due to the distribution of the azimuth discrepancies and to the latitude and longitude adjustment.

Station.	Designation of angle in the adjustment.	Correction due to the azimuth.	Correction due to the adjustment.	Total correction.	Station.	Designation of angle in the adjustment.	Correction due to the azimuth.	Correction due to the adjustment.	Total correction.
		″	″	″			″	″	″
Allenby	1	−1.9	+0.5	−1.4	Dix	71	−1.0	+0.4	−0.6
Osgood	3	−2.0	+0.2	−1.8	Div	73	−1.0	+0.3	−0.7
Davis	5	−1.9	−0.1	−2.0	Dit	75	−1.0	+0.1	−0.9
Gibbons	7	−2.0	−0.4	−2.4	Dis	77	−1.0	−0.1	−1.1
Esprey	9	−1.9	−0.6	−2.5	Forrest	79	−1.0	−0.2	−1.2
Farley	11	−2.0	−0.7	−2.7	Dir	81	−1.0	−0.1	−1.1
Dro	13	+0.1	+0.2	+0.3	Dip	83	−1.0	−0.2	−1.2
Moncure	15	+0.1	+0.3	+0.4	Dim	85	−0.9	−0.3	−1.2
Dri	17	+0.1	+0.4	+0.5	Wake	87	−1.0	−0.4	−1.4
Dre	19	+0.1	+0.6	+0.7	Youngsville	89	−1.0	−0.6	−1.6
Dra	21	+0.1	+0.8	+0.9	Dil	91	−1.0	−1.1	−2.1
Doz	23	+0.1	+0.7	+0.8	Dik	93	−1.0	−1.3	−2.3
Doy	25	+0.1	+0.5	+0.6	Dig	95	−1.0	−1.3	−2.3
Dox	27	+0.1	+0.5	+0.6	Tank	97	−1.0	−1.4	−2.4
Dow	29	+0.1	+0.4	+0.5	Dif	99	+0.1	+1.8	+1.9
Dov	31	+0.1	+0.2	+0.3	Did	101	0.0	+1.8	+1.8
Dot	33	+0.1	+0.2	+0.3	Dic	103	0.0	+1.8	+1.8
Dos	35	+0.1	+0.2	+0.3	Dib	105	+0.1	+1.6	+1.7
Dor	37	+0.1	+0.1	+0.2	Dez	107	0.0	+1.6	+1.6
Dop	39	+0.1	0.0	+0.1	Dey	109	0.0	+1.5	+1.5
Don	41	+0.1	+0.1	+0.2	Dex	111	0.0	+1.4	+1.4
Baldwin	43	+0.1	+0.1	+0.2	Dew	113	0.0	+1.4	+1.4
Apex	45	+0.1	−0.1	0.0	Franklinton	115	0.0	+0.9	+0.9
Dom	47	+0.1	−0.5	−0.4	Deter	117	+0.1	+0.7	+0.8
Dol	49	+0.1	−0.5	−0.4	Det	119	0.0	+0.2	+0.2
Dok	51	+0.1	−0.5	−0.4	Des	121	+0.1	+0.1	+0.2
Dol	53	+0.1	−0.5	−0.4	Der	123	0.0	−0.1	−0.1
Doh	55	+0.1	−0.8	−0.7	Dep	125	0.0	−0.2	−0.2
Dog	57	+0.1	−0.8	−0.7	Deo	127	+0.1	−0.2	−0.1
Dof	59	+0.1	−0.7	−0.6	Den	129	0.0	−0.7	−0.7
Cary	61	+0.1	−0.6	−0.5	Dem	131	0.0	−0.7	−0.7
Raleigh	63	−1.0	+3.3	+2.3	Del	133	0.0	−1.0	−1.0
Hilltop	65	−1.0	+1.7	+0.7	Dek	135	+0.1	−1.1	−1.0
Dob	67	−1.0	+0.6	−0.4	Kittrel	137	0.0	−1.1	−1.1
Diz	69	−1.0	+0.5	−0.5	Deg	139	+0.1	−2.0	−1.9

Table of corrections to the angles due to the distribution of the azimuth discrepancies and to the latitude and longitude adjustment—Continued.

Station.	Designation of angle in the adjustment.	Correction due to the azimuth.	Correction due to the adjustment.	Total correction	Station.	Designation of angle in the adjustment.	Correction due to the azimuth.	Correction due to the adjustment.	Total correction.
		"	"	"			"	"	"
Def	141	+0.1	−2.1	−2.0	Cod	271	+0.6	−1.5	−0.9
Ded	143	0.0	−2.4	−2.4	Cob	273	+0.6	−1.0	−0.4
Dec	145	+0.1	−2.7	−2.6	Coa	275	+0.6	−1.0	−0.4
Mobile	147	+0.4	−0.2	+0.2	Cly	277	+0.6	−1.2	−0.6
Mill	*149*	*+0.4*	*−0.2*	*+0.2*	*Clu*	279	*+0.6*	*−1.2*	*−0.6*
Henderson	151	+0.4	−0.4	0.0	Clo	281	+0.6	−0.8	−0.2
Daya	153	+0.4	−0.4	0.0	Cli	283	+0.6	−0.6	0.0
Dare	155	+0.5	−0.4	+0.1	Cle	285	+0.6	−0.4	+0.2
Deb	157	+0.4	−0.7	−0.3	Roanoke	287	+0.6	+0.1	+0.7
Daz	159	+0.4	−0.6	−0.2	Cla	289	+0.6	+0.1	+0.7
Day	161	+0.4	−0.5	−0.1	Clz	291	+0.6	+0.4	+1.0
Das	163	+0.4	−0.6	−0.2	Clv	293	+0.6	+0.7	+1.3
Dar	165	+0.4	−0.6	−0.2	Cit	295	+0.6	+0.7	+1.3
Dap	167	+0.4	−0.7	−0.3	Cir	297	+0.6	+0.8	+1.4
Daw	169	+0.4	−0.8	−0.4	Cip	299	+0.6	+1.2	+1.8
Dan	171	+0.4	−0.8	−0.4	Weldon	301	+0.6	+1.2	+1.8
Dal	173	+0.5	−1.0	−0.5	Garysburg	303	+0.6	+1.1	+1.7
Dag	175	+0.4	−1.1	−0.7	Cin	305	+0.6	+1.1	+1.7
Daf	177	+0.4	−1.1	−0.7	Cim	307	+0.6	+1.1	+1.7
Middleburg	179	+0.4	−1.2	−0.8	Cil	309	+0.6	+1.3	+1.9
Dad	181	+0.4	−1.4	−1.0	Cik	311	+0.6	+1.2	+1.8
Dab	183	+0.4	−1.4	−1.0	Cig	313	+0.6	+1.3	+1.9
Cuz	185	+0.4	−1.4	−1.0	Cid	315	+0.7	+1.3	+2.0
Cuy	187	+0.4	−1.4	−1.0	Cib	317	+0.6	+1.3	+1.9
Manson	189	+0.4	−1.4	−1.0	Cia	319	+0.6	+1.4	+2.0
Cux	191	+0.4	−1.2	−0.8	Cra	321	+0.6	+1.4	+2.0
Ridgeway	193	+0.5	−1.2	−0.7	Cet	323	+0.6	+1.3	+1.9
Cuv	195	+0.4	−1.2	−0.8	Cer	325	+0.7	+1.3	+2.0
Norlina	197	+0.4	−1.1	−0.7	Cep	327	+0.6	+1.1	+1.7
Cus	199	+0.4	−1.0	−0.6	Cel	329	+0.6	+1.2	+1.8
Warren	201	+0.4	−0.5	−0.1	Cef	331	+0.6	+1.2	+1.8
Cut	203	+0.4	−0.3	+0.1	Ced	333	+0.6	+1.3	+1.9
Cur	205	+0.4	−0.2	+0.2	Caz	335	+0.6	+1.2	+1.8
Cup	207	+0.4	−0.1	+0.3	Care	337	+0.6	+1.3	+1.9
Macon	209	+0.5	+0.3	+0.8	Ceda	339	+0.6	+1.4	+2.0
Cun	211	+0.4	+0.2	+0.6	Cay	341	+0.6	+1.3	+1.9
Cum	213	+0.4	+0.2	+0.6	Boykins	343	−0.7	−0.4	−1.1
Cul	215	+0.4	+0.9	+1.3	Caw	345	−0.6	−0.5	−1.1
Cug	217	+0.4	+1.0	+1.4	Cat	347	−0.7	−0.6	−1.3
Cuf	219	+0.4	+1.1	+1.5	Cas	349	−0.6	−0.6	−1.2
Cue	221	+0.4	+1.2	+1.6	Cap	351	−0.7	−0.5	−1.2
Cud	223	+0.4	+1.2	+1.6	Can	353	−0.7	−0.6	−1.3
Vaughn	225	+0.4	+1.5	+1.9	Cam	355	−0.6	−0.8	−1.4
Cub	227	+0.5	+1.5	+2.0	Newsoms	357	−0.7	−0.7	−1.4
Cru	229	+0.4	+1.6	+2.0	Cal	359	−0.6	−0.5	−1.1
Cro	231	+0.4	+1.6	+2.0	Buck	361	−0.7	−0.3	−1.0
Cote	233	+0.4	+1.7	+2.1	Mack	363	−0.6	−0.2	−0.8
Cri	235	+0.4	+1.6	+2.0	Cab	365	−0.7	+0.1	−0.6
Cre	237	+0.4	+1.6	+2.0	Louis	367	−0.6	+0.2	−0.4
Coz	239	+0.4	+1.7	+2.1	Franklin	369	−0.7	+0.1	−0.6
Coy	241	+0.4	+2.0	+2.4	Small	371	−0.7	0.0	−0.7
Littleton	243	+0.4	+1.9	+2.3	Low	373	−0.6	+0.1	−0.5
Cox	245	+0.4	+2.0	+2.4	Burnt	375	−0.7	0.0	−0.7
Cow	247	+0.6	−2.3	−1.7	Carrs	377	−0.6	+0.4	−0.2
Cov	249	+0.6	−2.2	−1.6	Center	379	−0.7	+0.4	−0.3
Summit	251	+0.6	−2.0	−1.4	Hill	381	−0.6	+0.3	−0.3
Cot	253	+0.6	−1.9	−1.3	Purvis	383	−0.7	+0.8	+0.1
Cos	255	+0.6	−1.8	−1.2	Kilby	385	−0.7	+1.9	+1.2
Cor	257	+0.6	−1.8	−1.2	Church	387	−0.6	+2.0	+1.4
Thelma	259	+0.6	−1.9	−1.3	Suffolk	389	0.0	−0.5	−0.5
Cop	261	+0.6	−1.8	−1.2	Shade	391	−0.1	−0.4	−0.5
Con	263	+0.6	−1.8	−1.2	Algren	393	−0.1	−0.1	−0.2
Cog	265	+0.6	−1.7	−1.1	Sunray	395	−0.1	0.0	−0.1
Cof	267	+0.6	−1.7	−1.1	Wood	397	−0.1	+0.3	+0.2
Coe	269	+0.6	−1.7	−1.1	Creek	399	0.0	+0.8	+0.8

THE ADJUSTMENT OF THE PRECISE TRAVERSE FROM SANFORD TO WILMINGTON.

This traverse starts from station Jonesboro, with the azimuth Jonesboro to Swan, and ends at station Union near Wilmington. The position and azimuth at Jonesboro were fixed by the adjustment of the triangulation extending from the eastern oblique arc to Sanford, which has previously been described. At Wilmington station Union was connected with the secondary triangulation along the Cape Fear River, and the position of this point as computed through the traverse was used to control the positions of the triangulation stations along the Cape Fear River and the coasts of North and South Carolina. The azimuth of the line Bridge to Union was fixed by observing a Laplace azimuth at Bridge. Another azimuth was observed near the middle of the line, and this was corrected by an interpolated value of the Laplace correction. The only adjustment of this traverse line was the distribution of the azimuth discrepancies between these two observed azimuths and the fixed azimuth at Jonesboro.

TABLE OF CORRECTIONS.

The following table gives the correction to each angle to eliminate the azimuth discrepancies:

Table of corrections to the angles due to the distribution of the azimuth discrepancy

Station.	Correction due to the azimuth.	Station.	Correction due to the azimuth.	Station.	Correction due to the azimuth.
	"		"		"
Jonesboro	−1.5	Autry	−1.5	Corbet	+0.6
Spout Springs	−1.4	Empie	−1.4	Atkinson	+0.7
Prince	−1.5	Hayne	−1.5	Denneys	+0.7
Camp	−1.5	Roseboro	+0.7	Currie	+0.7
Lake	−1.4	Mentz	+0.6	Montague	+0.6
Shaw	−1.5	Garland	+0.7	Huggins	+0.7
Pine	−1.4	Kerr	+0.6	Richards	+0.6
Fayetteville	−1.5	Moores	+0.7	Dru	+0.7
Vander	−1.4	Black River	+0.6	Yadkin	+0.6
Ville	−1.5	Ivanhoe	+0.7	Bridge	+0.7

THE LEAST-SQUARES ADJUSTMENT OF THE PRECISE TRAVERSE FROM SANFORD TO ALLENDALE, S. C.

This traverse was adjusted starting from triangulation station Foch, with the azimuth Foch to Lemon, and ending at station Extension at Allendale, S. C. The position and azimuth at Foch were fixed by the adjustment of the triangulation extending from the eastern oblique arc to Sanford, which has previously been described. Station Extension was established in 1907 and its position fixed by being connected with the Augusta-Beaufort traverse line which was run in 1901. The azimuth of the line Extension to Allen was fixed by observing a Laplace azimuth at Allen.

DISCREPANCY IN GEOGRAPHIC POSITION

After the azimuth discrepancies were approximately eliminated the position of station Foch as computed through the traverse from station Extension was too large by 0″.029 (0.89 meters) of latitude and too small by 0″.001 (0.03 meters) of longitude. The total discrepancy in position was 0.89 meters. If it is assumed that the positions which were held fixed at each end of the line are without error and the whole error is in the traverse, then the discrepancy is about 1 part in 360,000 of the length of the traverse, which is about 200 miles. If this discrepancy is considered as the closing error of the loop formed by this traverse, the traverse and triangulation from Allendale to the eastern oblique arc, the eastern oblique arc and the eastern triangulation extending from the oblique arc to Sanford, a distance of about 650 miles, then it amounts to about 1 part in 1,175,000 of the length of the loop.

CONDITION EQUATIONS

This traverse was adjusted by a single least-squares adjustment. Besides the Laplace azimuth at Allendale and the fixed azimuth at the other end of the line there were four observed azimuths along the traverse which made necessary the use of five azimuth equations. One of these azimuths was a Laplace azimuth and the others were corrected by interpolated values of the Laplace correction.

As explained on page 153, the azimuth discrepancies were approximately eliminated before the least-squares adjustment was made, and the azimuth equations given below do not show the actual azimuth discrepancies.

In making the adjustment the angles at the stations, beginning at Allen, were numbered consecutively. None of the lengths were corrected. The condition equations used in adjusting this traverse are given below, the first five being azimuth equations and Nos. 6 and 7 being, respectively, the latitude and longitude equations.

Condition equations.

No.

1. $0=0.0+(1)+(2)+(3)+(4)+(5)+(6)+(7)+(8)+(9)+(10)+(11)+(12)+(13)+(14)$.
2. $0=-3.1+(15)+(16)+(17)+(18)+(19)+(20)+(21)+(22)+(23)+(24)+(25)+(26)+(27)+(28)+(29)+(30)+(31)$.
3. $0=+2.7+(32)+(33)+(34)+(35)+(36)+(37)+(38)+(39)+(40)+(41)$
4. $0=+1.1+(41a)+(42)+(43)+(44)+(45)+(46)+(47)+(48)+(49)+(50)+(51)+(52)+(53)+(54)+(55)+(56)+(57)+(58)+(59)+(60)+(61)+(62)+(63)+(64)$.
5. $0=-0.7+(65)+(66)$.
6. $0=+2.0991-1.97(1)-1.95(2)-1.92(3)-1.92(4)-1.90(5)-1.90(6)$
$-1.89(7)-1.88(8)-1.86(9)-1.85(10)-1.85(11)-1.84(12)$
$-1.83(13)-1.83(14)-1.82(15)-1.82(16)-1.81(17)-1.81(18)$
$-1.80(19)-1.79(20)-1.80(21)-1.80(22)-1.78(23)-1.78(24)$
$-1.79(25)-1.79(26)-1.78(27)-1.78(28)-1.78(29)-1.77(30)$
$-1.71(31)-1.65(32)-1.58(33)-1.55(34)-1.46(35)-1.37(36)$
$-1.26(37)-1.20(38)-1.08(39)-1.02(40)-0.90(41)-0.90(41a)$
$-0.79(42)-0.77(43)-0.74(44)-0.70(45)-0.68(46)-0.65(47)$
$-0.63(48)-0.60(49)-0.53(50)-0.51(51)-0.45(52)-0.44(53)$
$-0.40(54)-0.38(55)-0.33(56)-0.31(57)-0.28(58)-0.25(59)$
$-0.23(60)-0.22(61)-0.19(62)-0.18(63)-0.16(64)-0.12(65)$.
7. $0=-0.0724-3.35(1)-3.37(2)-3.40(3)-3.38(4)-3.30(5)-3.23(6)$
$-3.19(7)-3.12(8)-3.05(9)-3.02(10)-2.99(11)-2.94(12)$
$-2.92(13)-2.89(14)-2.85(15)-2.80(16)-2.72(17)-2.68(18)$
$-2.59(19)-2.58(20)-2.52(21)-2.48(22)-2.36(23)-2.34(24)$
$-2.30(25)-2.28(26)-2.25(27)-2.14(28)-2.08(29)-2.05(30)$
$-1.79(31)-1.72(32)-1.65(33)-1.62(34)-1.54(35)-1.48(36)$
$-1.39(37)-1.30(38)-1.25(39)-1.18(40)-1.08(41)-1.08(41a)$
$-0.98(42)-0.95(43)-0.93(44)-0.93(45)-0.91(46)-0.90(47)$
$-0.85(48)-0.80(49)-0.75(50)-0.73(51)-0.65(52)-0.62(53)$
$-0.57(54)-0.53(55)-0.44(56)-0.40(57)-0.38(58)-0.36(59)$
$-0.35(60)-0.30(61)-0.27(62)-0.23(63)-0.21(64)-0.20(65)$.

TABLE OF CORRECTIONS.

The following table gives the corrections to the angles resulting from the least-squares solution of the preceding condition equations. The first column gives the name of the station, the second the designation of the angle in the adjustment, the third the correction due to the azimuth adjustment which was made previous to the final adjustment, the fourth the correction due to the latitude and longitude adjustment, and the last column the total correction. The average correction to an angle was 0″.7, with a maximum of 2″.6.

Table of corrections to the angles due to the distribution of the azimuth discrepancies and to the latitude and longitude adjustment.

Station.	Designation of angle in the adjustment.	Correction due to the azimuth.	Correction due to the adjustment.	Total correction.	Station.	Designation of angle in the adjustment.	Correction due to the azimuth.	Correction due to the adjustment.	Total correction.
		″	″	″			″	″	″
Allen	1	−0.2	−0.2	−0.4	Lugoff	36	+1.7	−0.2	+1.5
Joint	2	−0.2	−0.3	−0.5	Camden	37	+1.6	−0.3	+1.3
Fairfax	3	−0.2	−0.5	−0.7	Shepard	38	+1.7	−0.3	+1.4
Waikiki	4	−0.2	−0.5	−0.7	Cassatt	39	+1.6	−0.6	+1.0
Sycamore	5	−0.2	−0.3	−0.5	Bethune	40	+1.7	−0.6	+1.1
Harding	6	−0.1	−0.2	−0.3	McBee	41	+1.6	−0.8	+0.8
Ulmers	7	−0.2	−0.1	−0.3	McBee	41a	−0.1	+0.2	+0.1
Schofield	8	−0.1	+0.1	0.0	Mid	42	0.0	+0.1	+0.1
Olar	9	−0.2	+0.2	0.0	Chateau	43	−0.1	+0.1	0.0
Govan	10	−0.2	+0.2	0.0	Thierry	44	−0.1	+0.1	0.0
Zion	11	−0.2	+0.3	+0.1	Cane	45	0.0	0.0	0.0
Barnum	12	−0.1	+0.4	+0.3	Patrick	46	−0.1	−0.1	−0.2
Luther	13	−0.2	+0.4	+0.2	Sutter	47	−0.1	−0.1	−0.2
Pete	14	−0.2	+0.5	+0.3	Gillespie	48	−0.1	−0.1	−0.2
Denmark	15	+1.2	−0.8	+0.4	Kalb	49	0.0	−0.1	−0.1
Plaza	16	+1.2	−0.7	+0.5	Cheraw	50	−0.1	−0.2	−0.3
Otside	17	+1.3	−0.6	+0.7	Yadkin	51	−0.1	−0.2	−0.3
Creco	18	+1.2	−0.4	+0.8	Kollock	52	0.0	−0.2	−0.2
Norway	19	+1.2	−0.3	+0.9	Fulton	53	−0.1	−0.1	−0.2
Wilson	20	+1.3	−0.3	+1.0	Osborne	54	−0.1	−0.1	−0.2
Neeces	21	+1.2	−0.1	+1.1	Light	55	−0.1	−0.1	−0.2
Livingston	22	+1.2	0.0	+1.2	Hamlet	56	0.0	0.0	0.0
North	23	+1.3	+0.3	+1.6	Rockingham	57	−0.1	0.0	−0.1
Douglas	24	+1.2	+0.3	+1.5	Vesle	58	−0.1	0.0	−0.1
Woodford	25	+1.2	+0.4	+1.6	Ainse	59	−0.1	−0.1	−0.2
Miller	26	+1.3	+0.5	+1.8	Oise	60	0.0	−0.1	−0.1
Swansea	27	+1.2	+0.5	+1.7	Cognac	61	−0.1	0.0	−0.1
Flanders	28	+1.2	+0.8	+2.0	Marston	62	0.0	−0.1	−0.1
Gaston	29	+1.3	+1.0	+2.3	Broadacre	63	−0.1	0.0	−0.1
Top	30	+1.2	+1.0	+2.2	Hoffman	64	−0.1	0.0	−0.1
Columbia	31	+1.1	+1.5	+2.6	Carr	65	+0.7	+0.3	+1.0
Nob	32	+1.7	+0.1	+1.8	Foch	66	+0.7	+0.4	+1.1
Weddell	33	+1.6	+0.1	+1.7					
Pontiac	34	+1.7	0.0	+1.7					
Blaney	35	+1.6	−0.1	+1.5					

COMPLETED GEODETIC CONTROL IN THE UNITED STATES.

The map facing page 160 (fig. 2) shows the location and extent of the completed geodetic control in the United States. The hachured areas in black represent the portion of the United States that has been covered by triangulation and traverse which have been computed rigidly on the North American datum and issued in published form. Following the numbers below, corresponding to the numbers shown on

the map, are the titles of the publications that contain the published results. For example, the results of the published triangulation in the State of Oregon are contained in four different publications, as is shown by the four different hachured areas in black. These areas are numbered 13, 19, 27, and 10. Referring to these numbers below, it will be seen that the results are contained in Special Publications Nos. 13, 31, 74, and 84. The publications listed below may be obtained from the Superintendent of Documents, Washington, D. C. upon the payment of a nominal sum.

1. Appendix 8, Report for 1888.
2. Appendix 8, Report for 1893.
3. Appendix 6, Report for 1901.
4. Appendix EEE, Annual Report of the Chief of Engineers, 1902. (This publication is obtainable only from the Chief of Engineers, U. S. Army, Washington, D. C.)
5. Special Publication No. 88.
6. Appendix 9, Report for 1904.
7. Special Publication No. 86.
8. Appendix 5, Report for 1910.
9. Appendix 4, Report for 1911.
10. Special Publication No. 84.
11. Appendix 6, Report for 1911.
12. Special Publication No. 11.
13. Special Publication No. 13.
14. Special Publication No. 16.
15. Special Publication No. 17.
16. Special Publication No. 19.
17. Special Publication No. 24.
18. Special Publication No. 30.
19. Special Publication No. 31.
20. Report on the Triangulation of Greater New York. (This publication is obtainable only from the city engineer, New York City.)
21. Report on Plan of Sewerage for the City of Cincinnati. (This publication is obtainable only from the city engineer, Cincinnati, Ohio.)
22. Special Publications Nos. 43 and 45.
23. Special Publication No. 46.
24. Special Publication No. 54.
25. Special Publication No. 62.
26. Special Publication No. 70.
27. Special Publication No. 74.
28. Special Publication No. 76.
29. Special Publication No. 78.
30. Special Publication No. 79.
31. Special Publication No. 101.

The hachured areas in red on the map represent the portion of the United States that has been covered by triangulation and traverse which have been rigidly computed on the North American datum but which have not yet been issued in published form.

The heavy black lines on the map indicate the published precise level net of the United States. The red lines indicate the portion of the precise level net of the United States not yet issued in published form.

It is impracticable to designate on the map the publications containing the results of precise leveling by this bureau. However, the map does indicate where lines of levels have been run, and if the published results are desired for any particular locality, and this bureau is so advised, the proper publications will be selected.

UNITED STATES COAST AND GEODETIC SURVEY

Graphic index sheet showing: (1) Areas in the United States covered by published and unpublished triangulation and traverse which have been computed rigidly on the North American datum. (2) Net of published and unpublished precise leveling in the United States. July, 1924

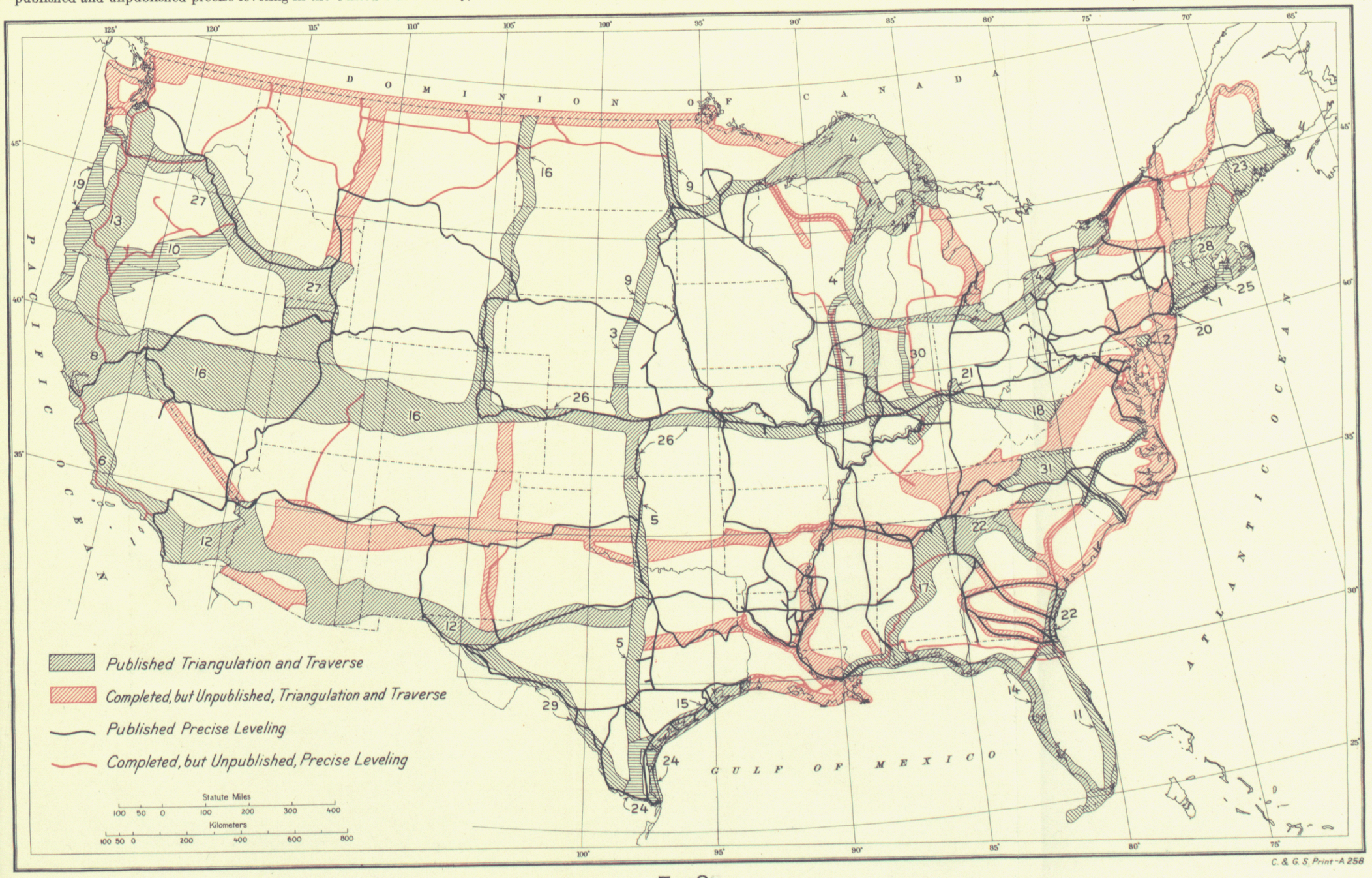

FIG. 2

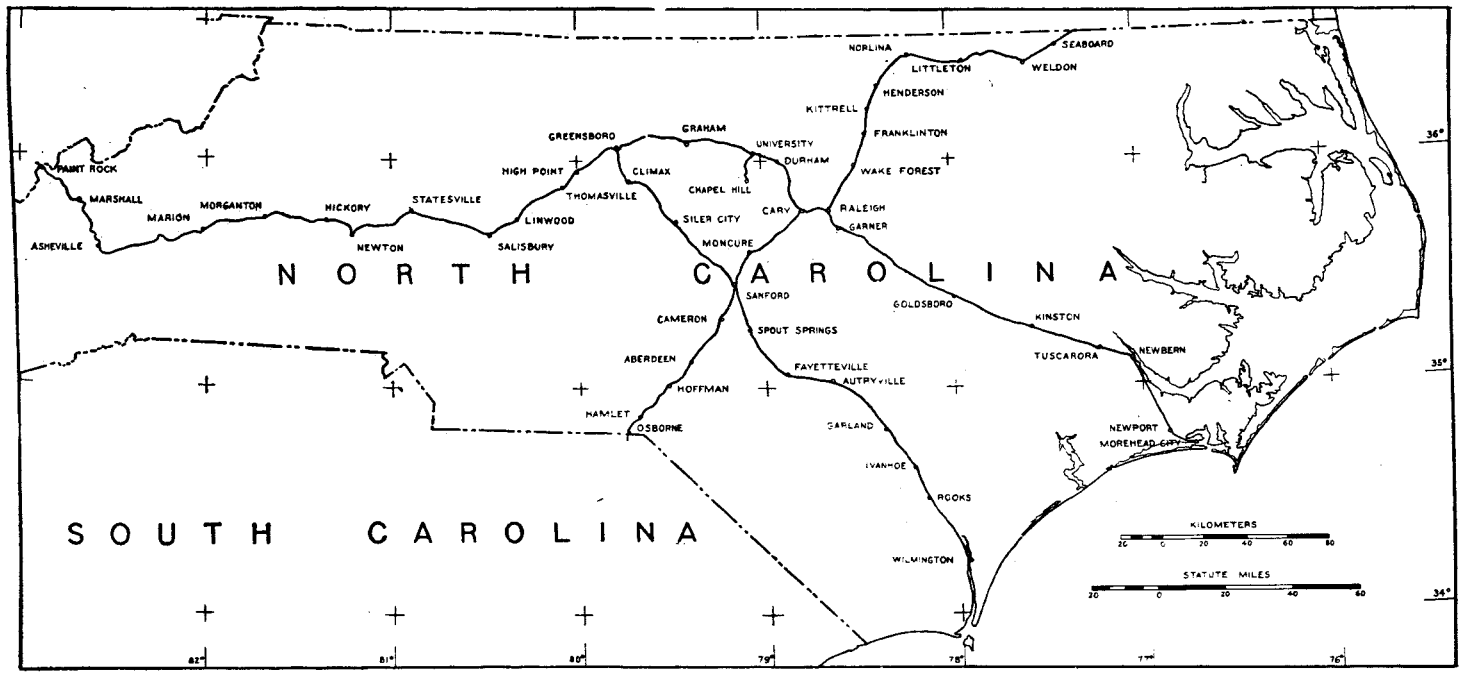

FIG. 3.—Map of North Carolina, showing location of precise leveling lines

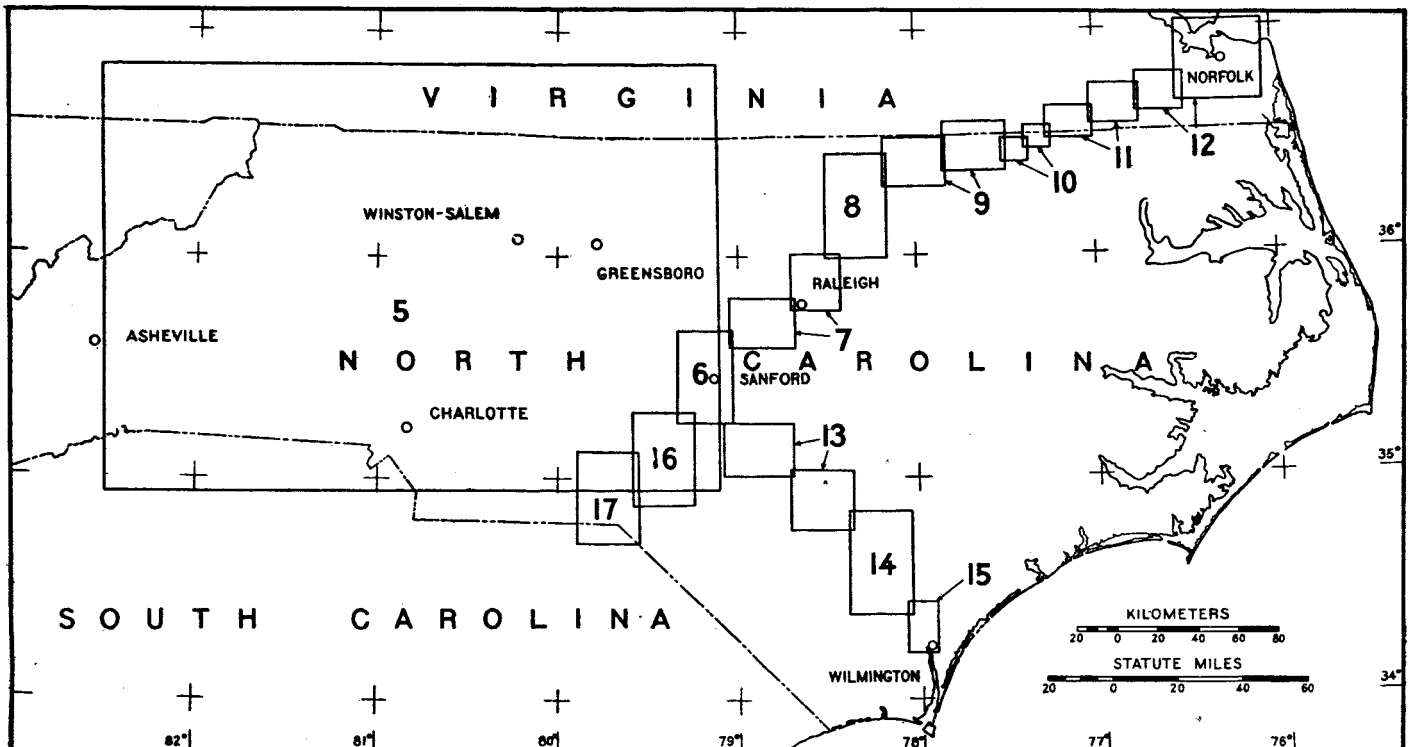

FIG. 4.—Map of North Carolina, showing the boundaries of the sketches, Figs. 5 to 17

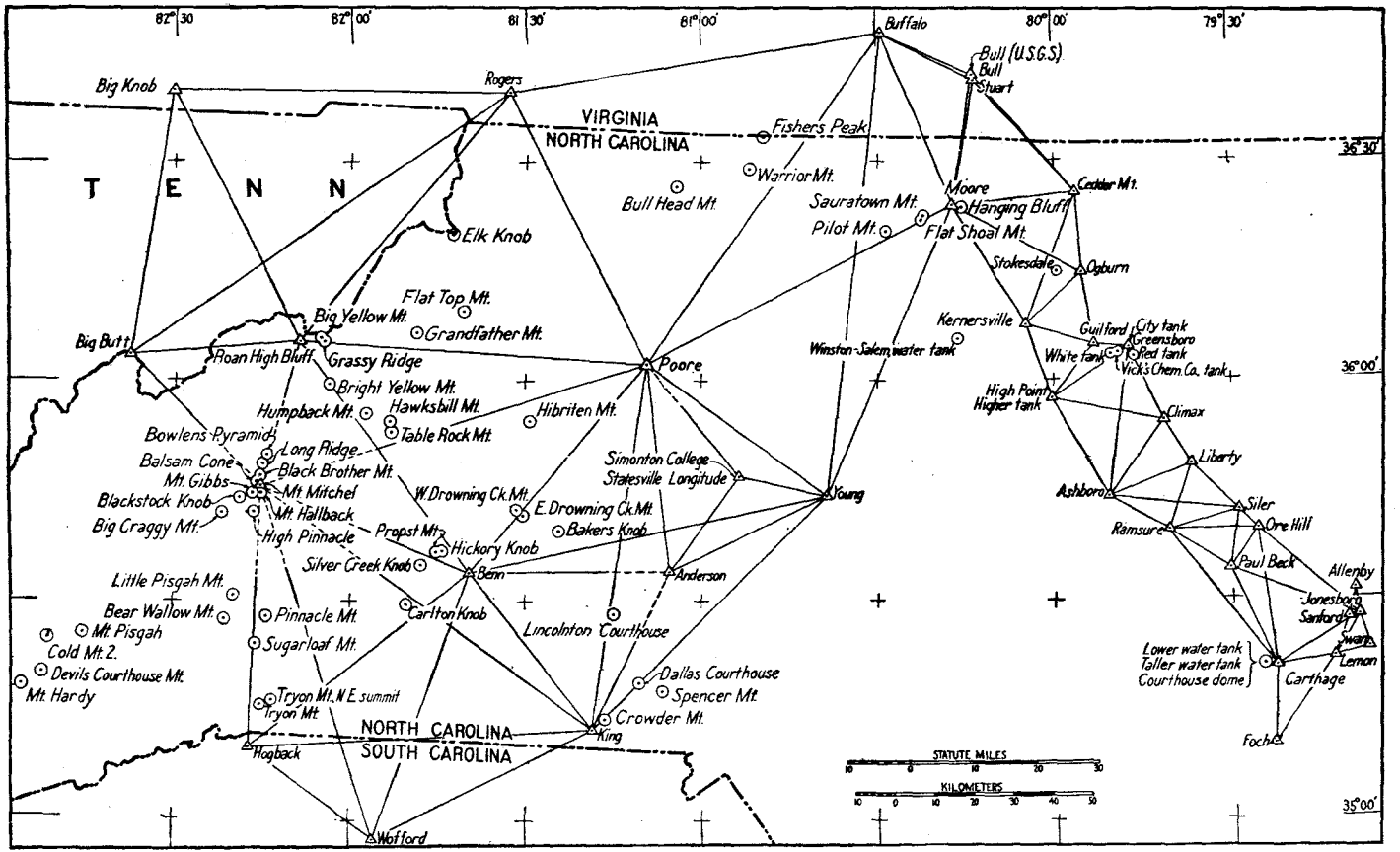

FIG. 5.—Precise triangulation, eastern oblique arc and eastern oblique arc to Sanford

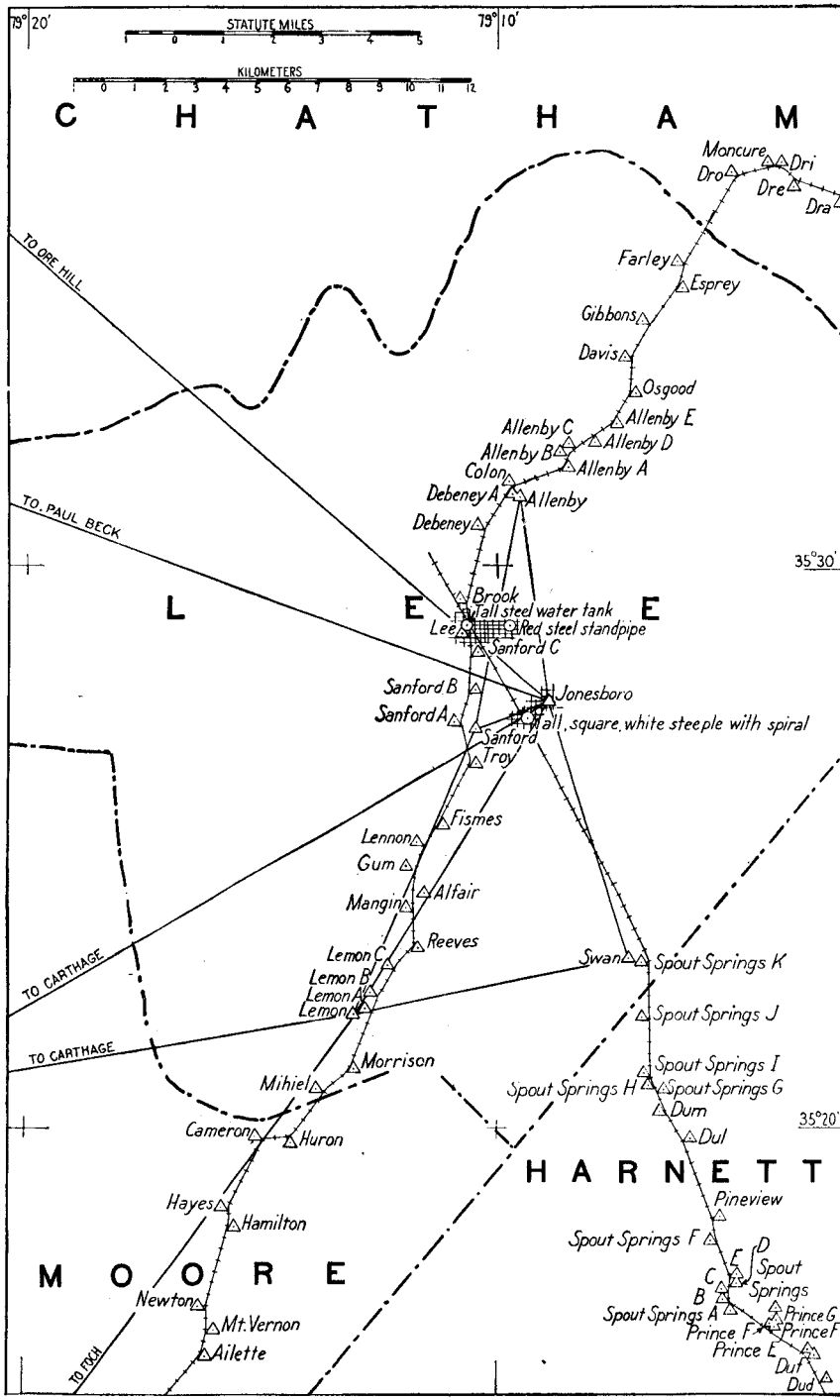

FIG. 6.—Precise traverse, Sanford to Moncure, Spout Springs, and Vass

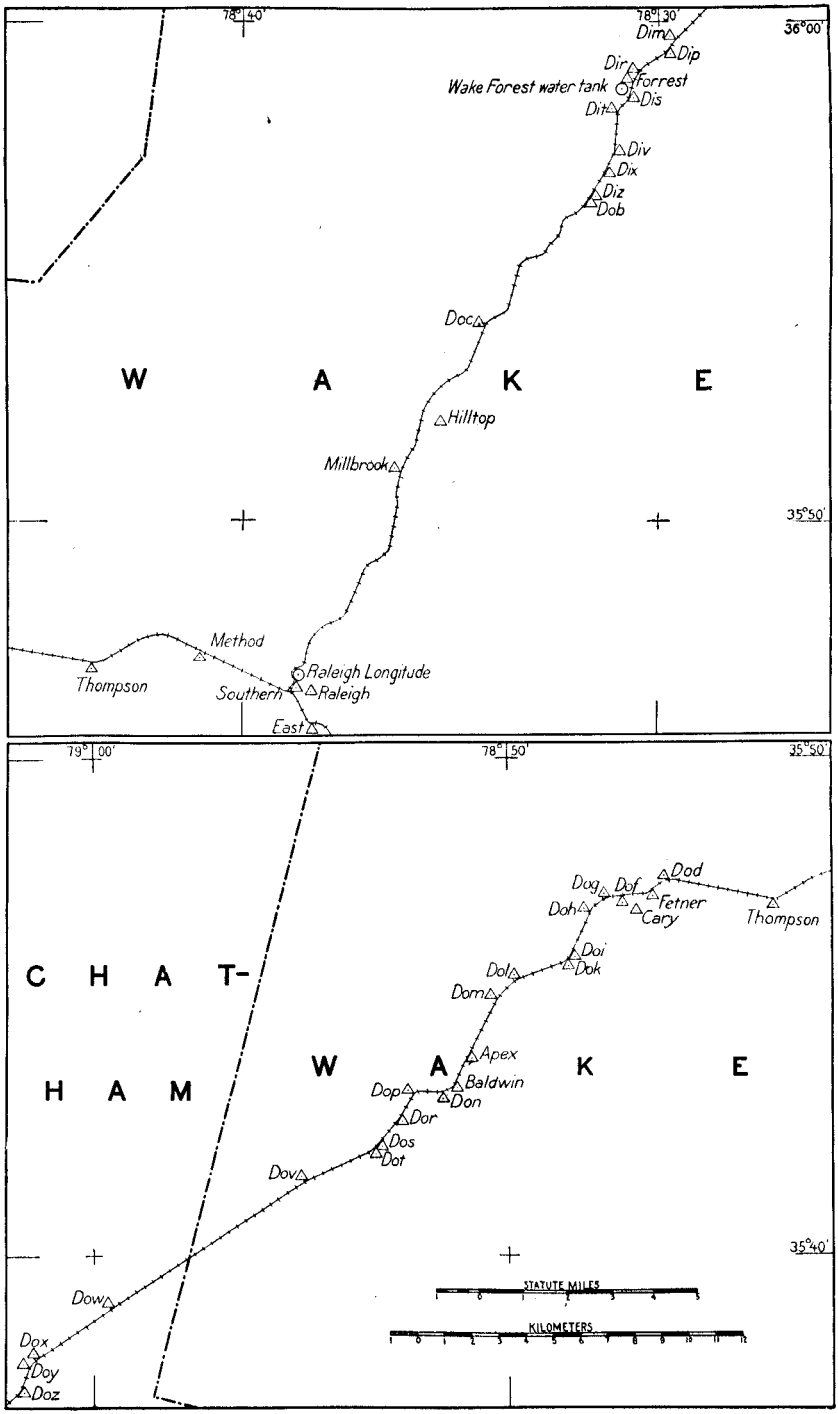

FIG. 7.—Precise traverse, Moncure to Wake Forest

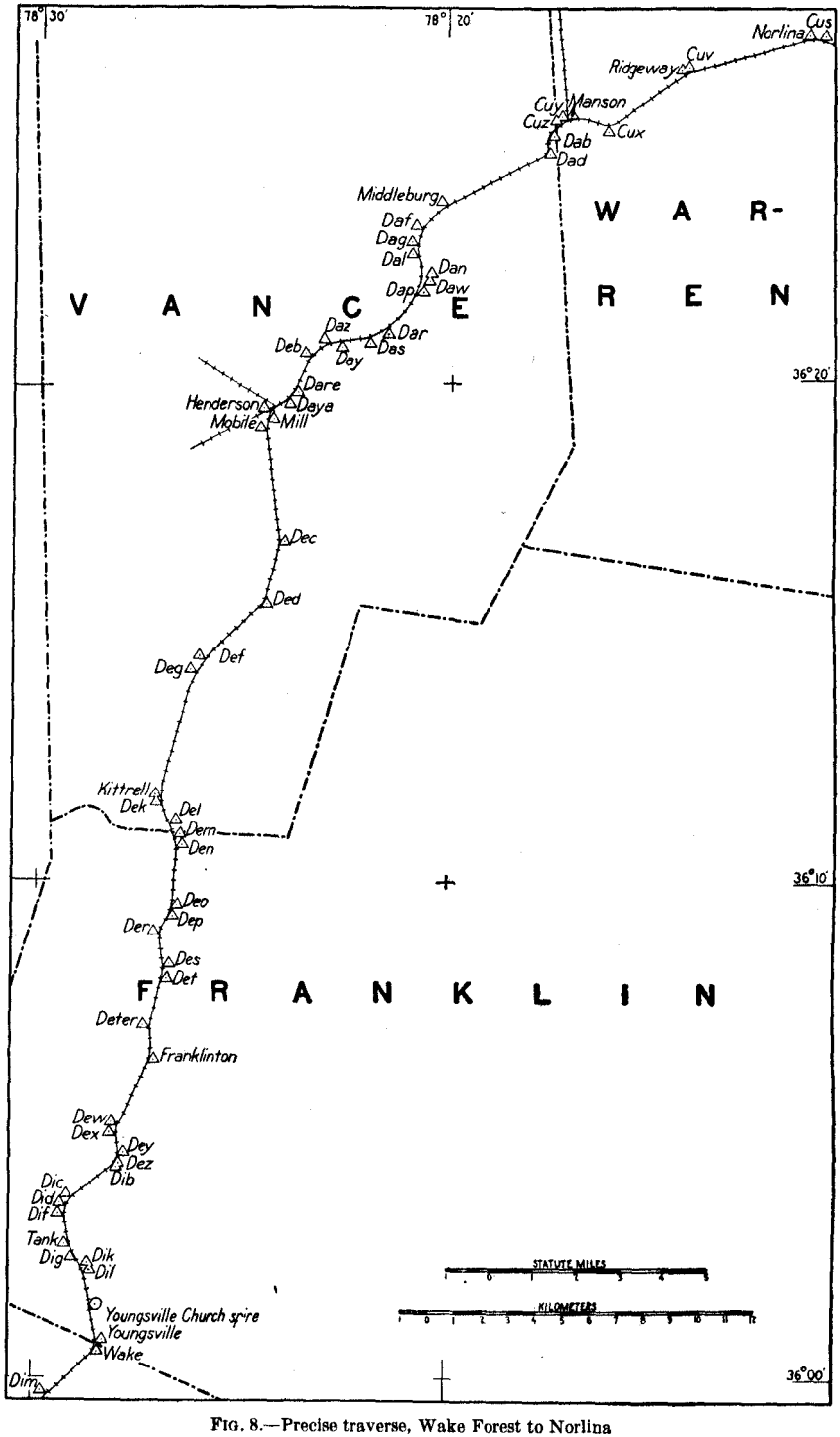

FIG. 8.—Precise traverse, Wake Forest to Norlina

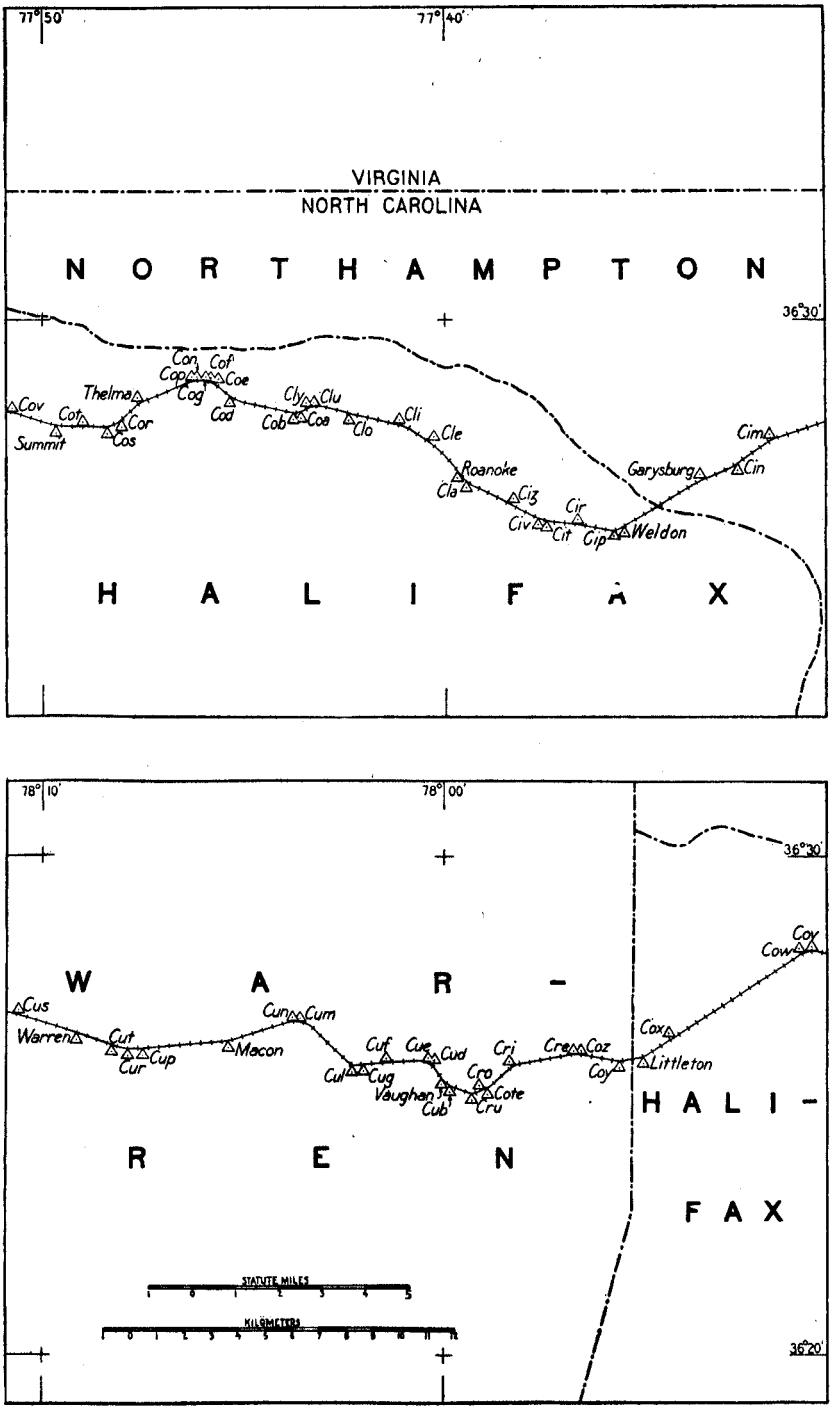

FIG. 9.—Precise traverse, Norlina to Garysburg

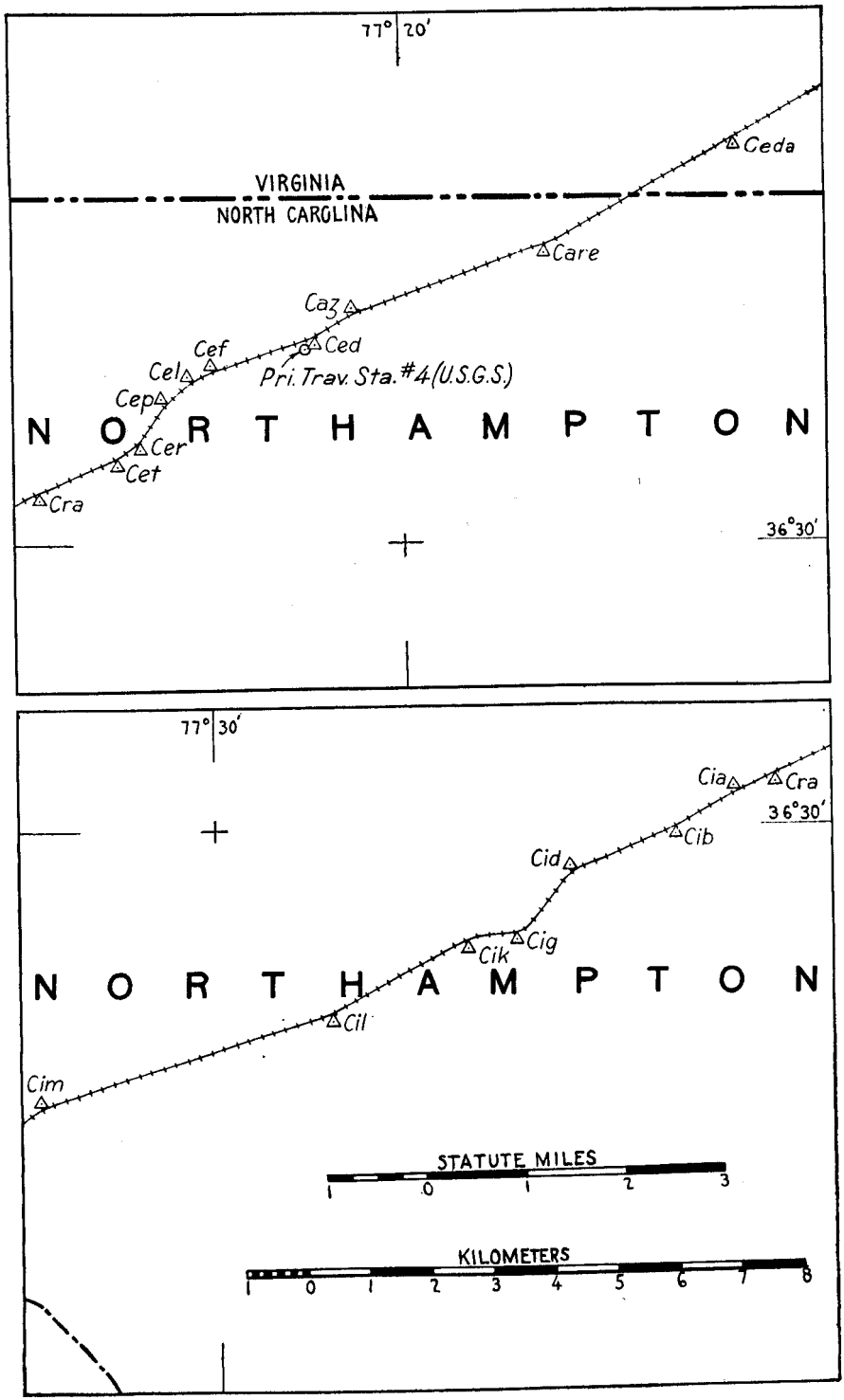

FIG. 10.—Precise traverse, Garysburg to North Carolina-Virginia State line

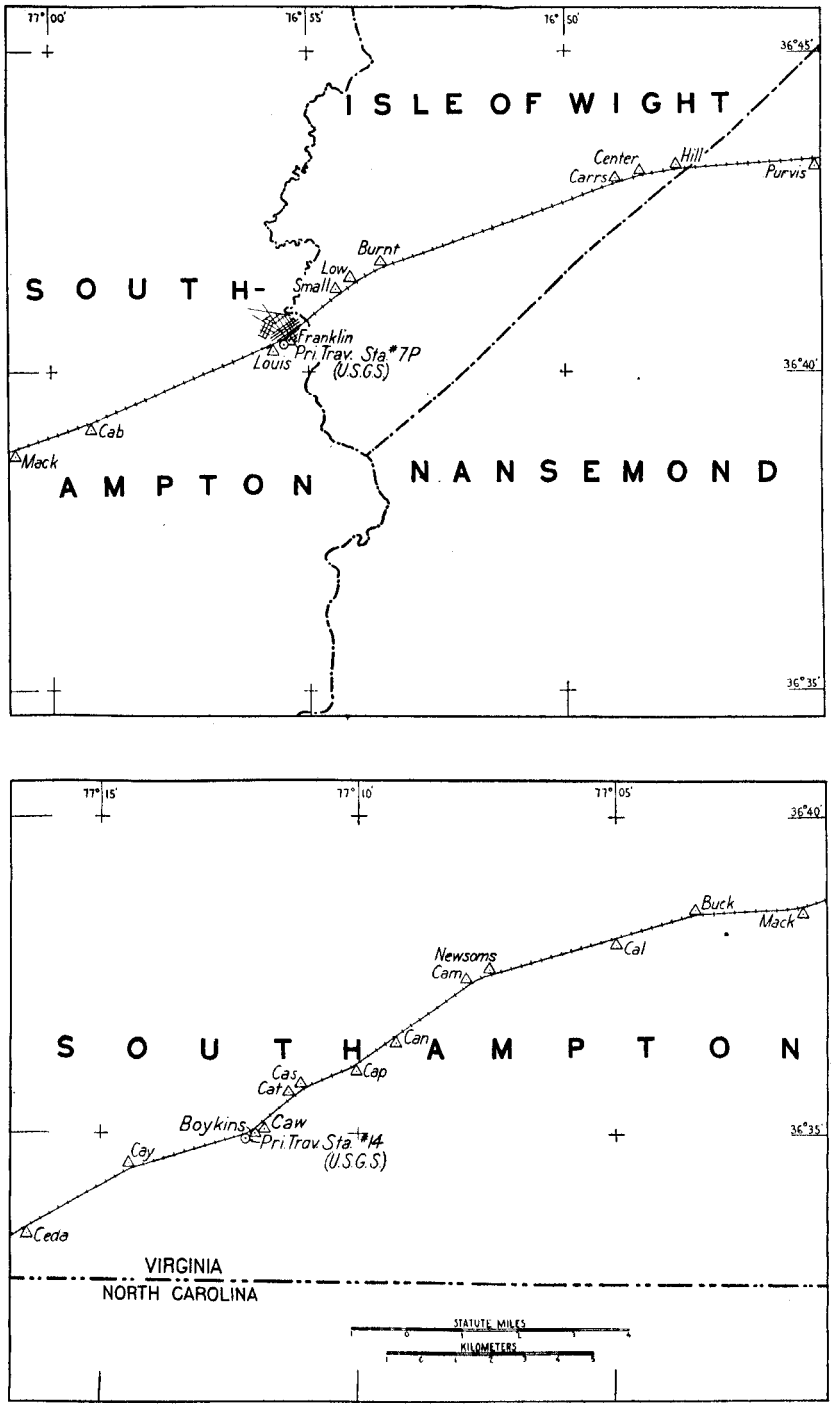

FIG. 11.—Precise traverse, North Carolina-Virginia State line to Purvis, Va.

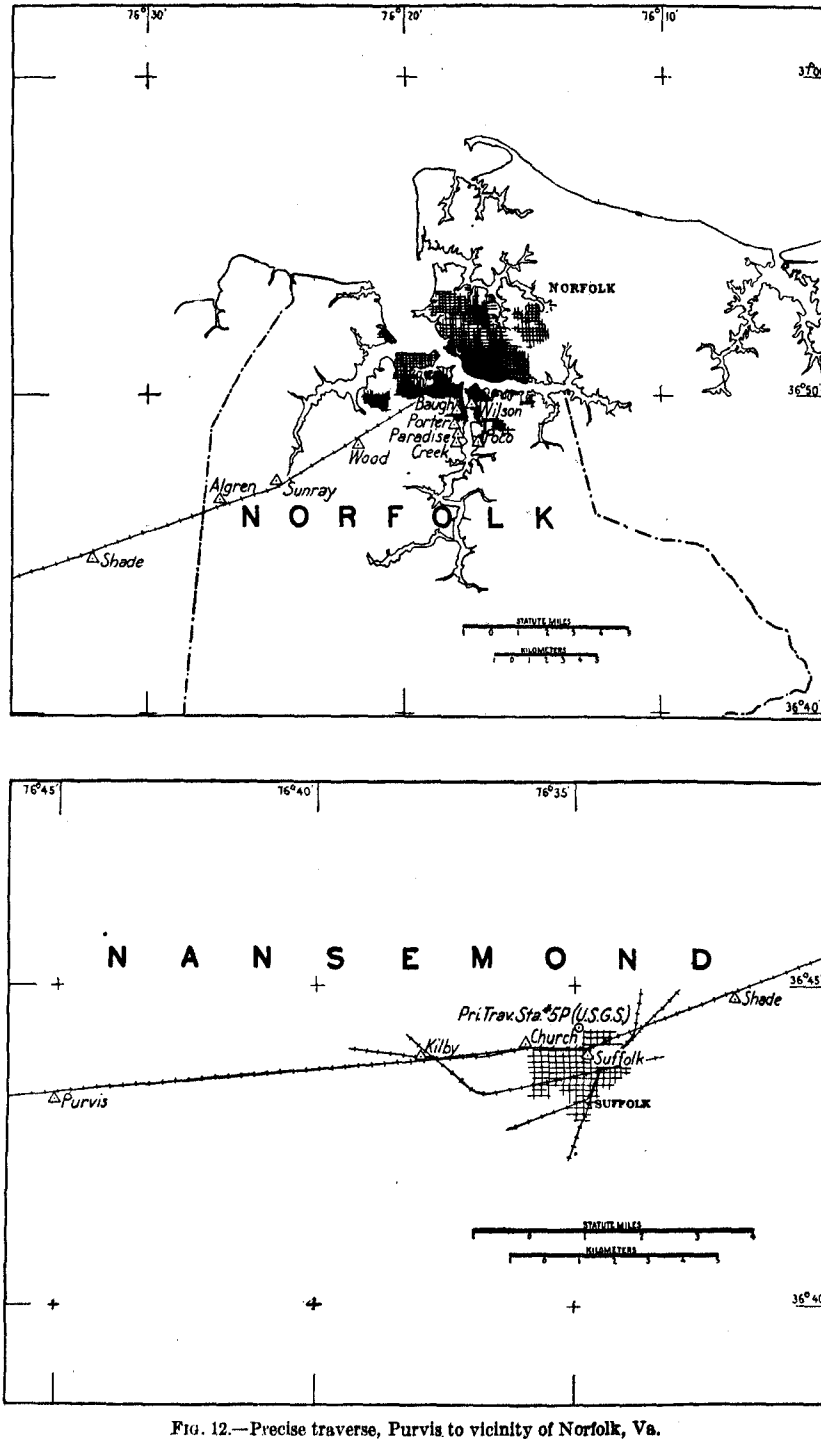

FIG. 12.—Precise traverse, Purvis to vicinity of Norfolk, Va.

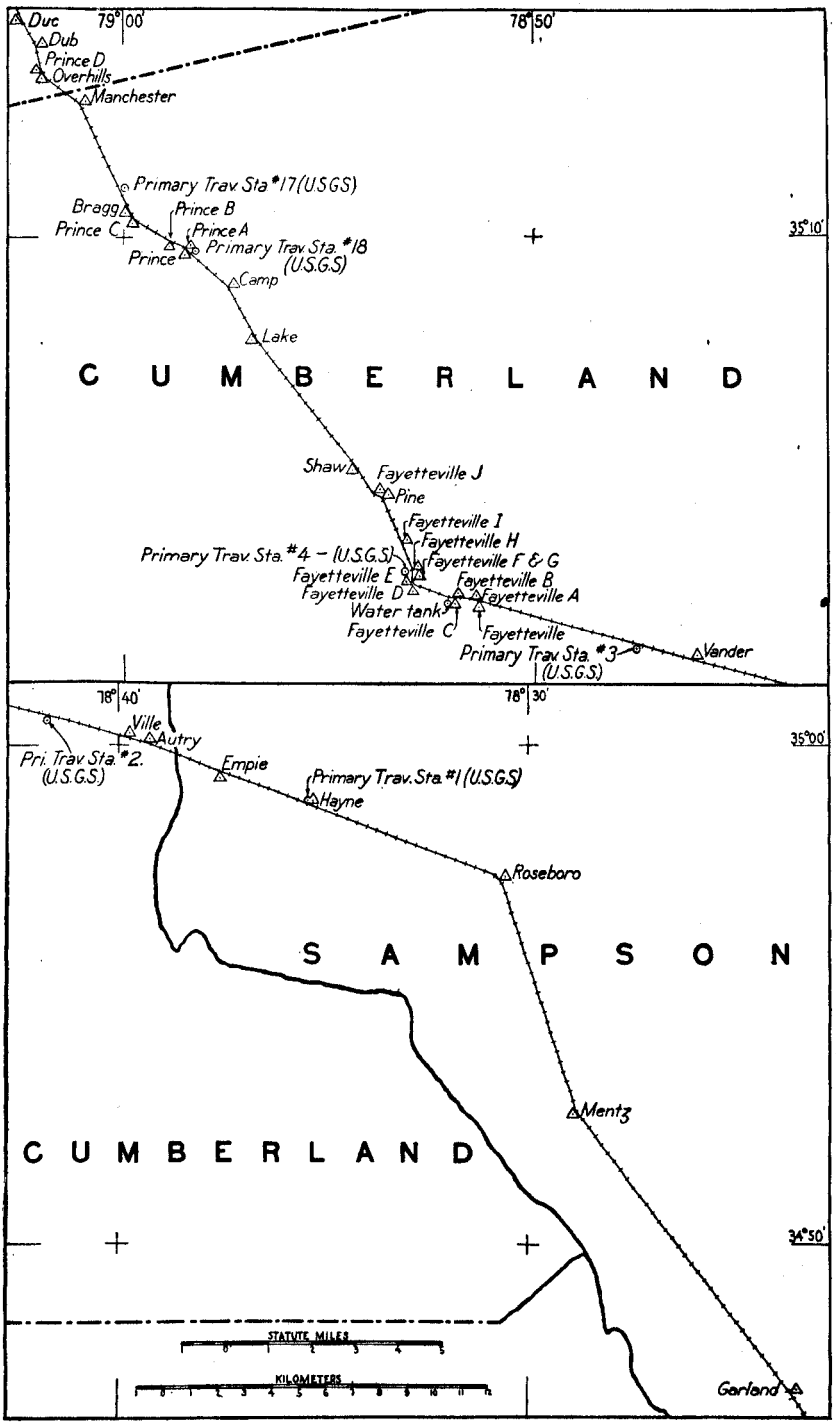

FIG. 13.—Precise traverse, Spout Springs to Garland

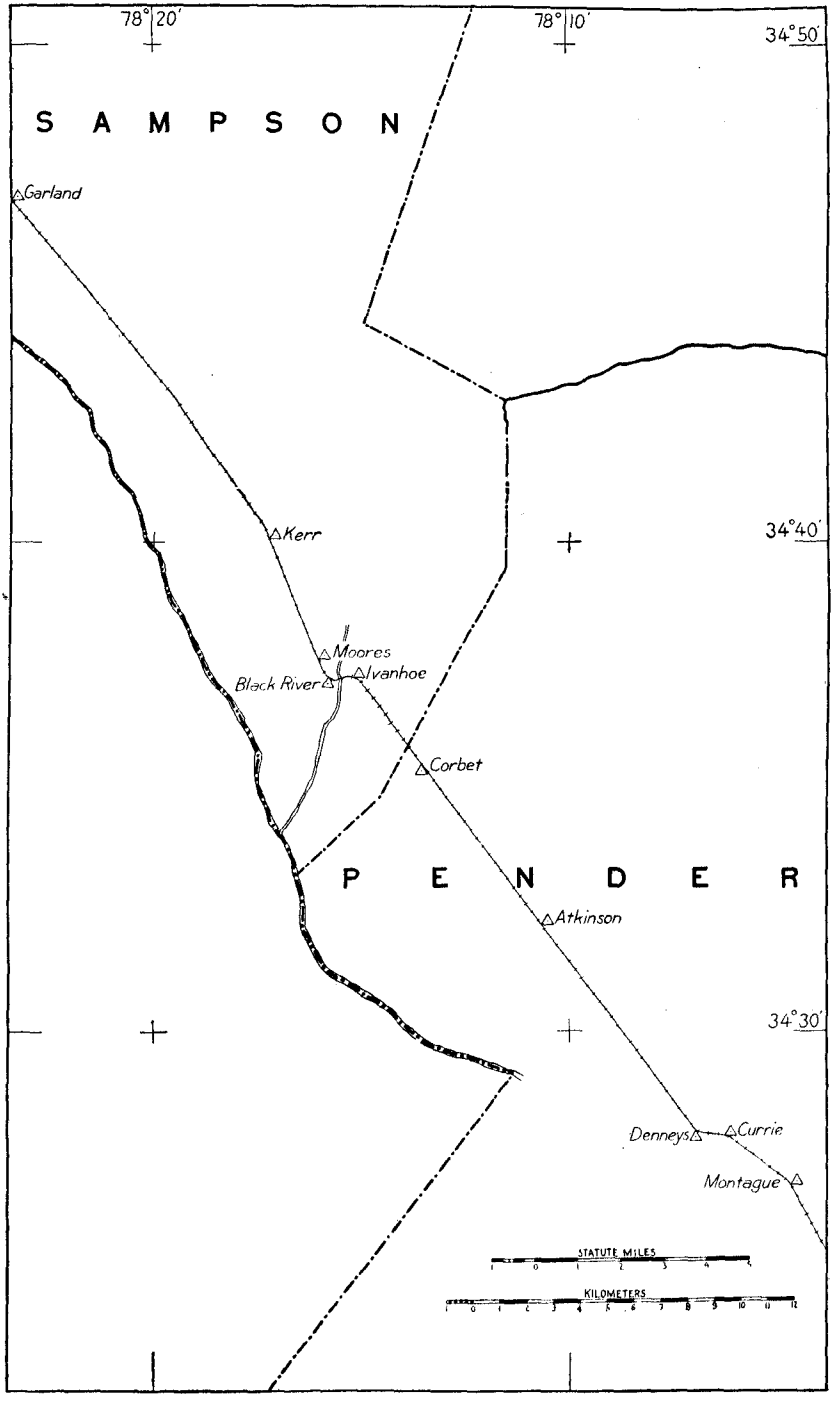

FIG. 14.—Precise traverse, Garland to Montague

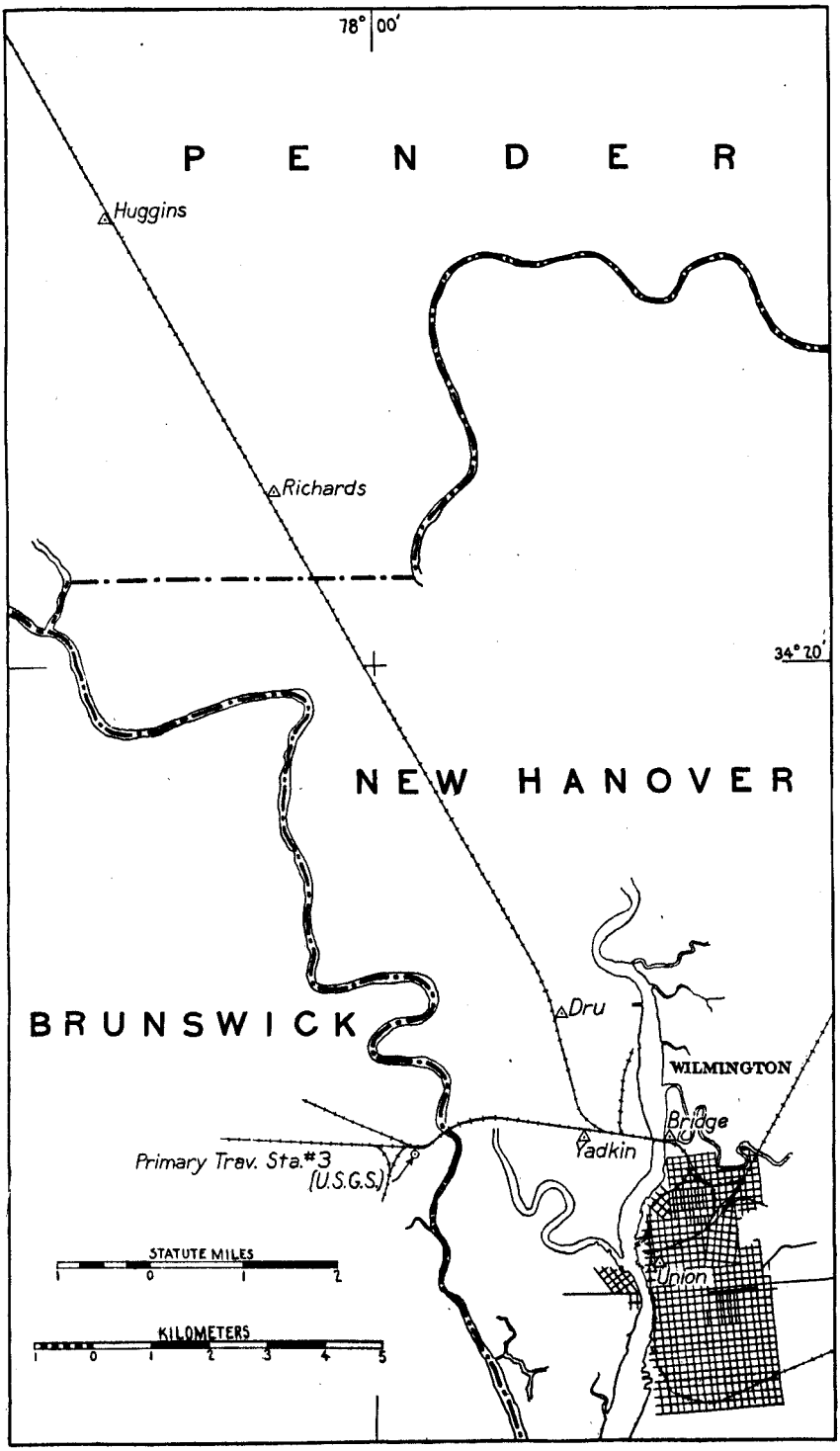

FIG. 15.—Precise traverse, Montague to Wilmington

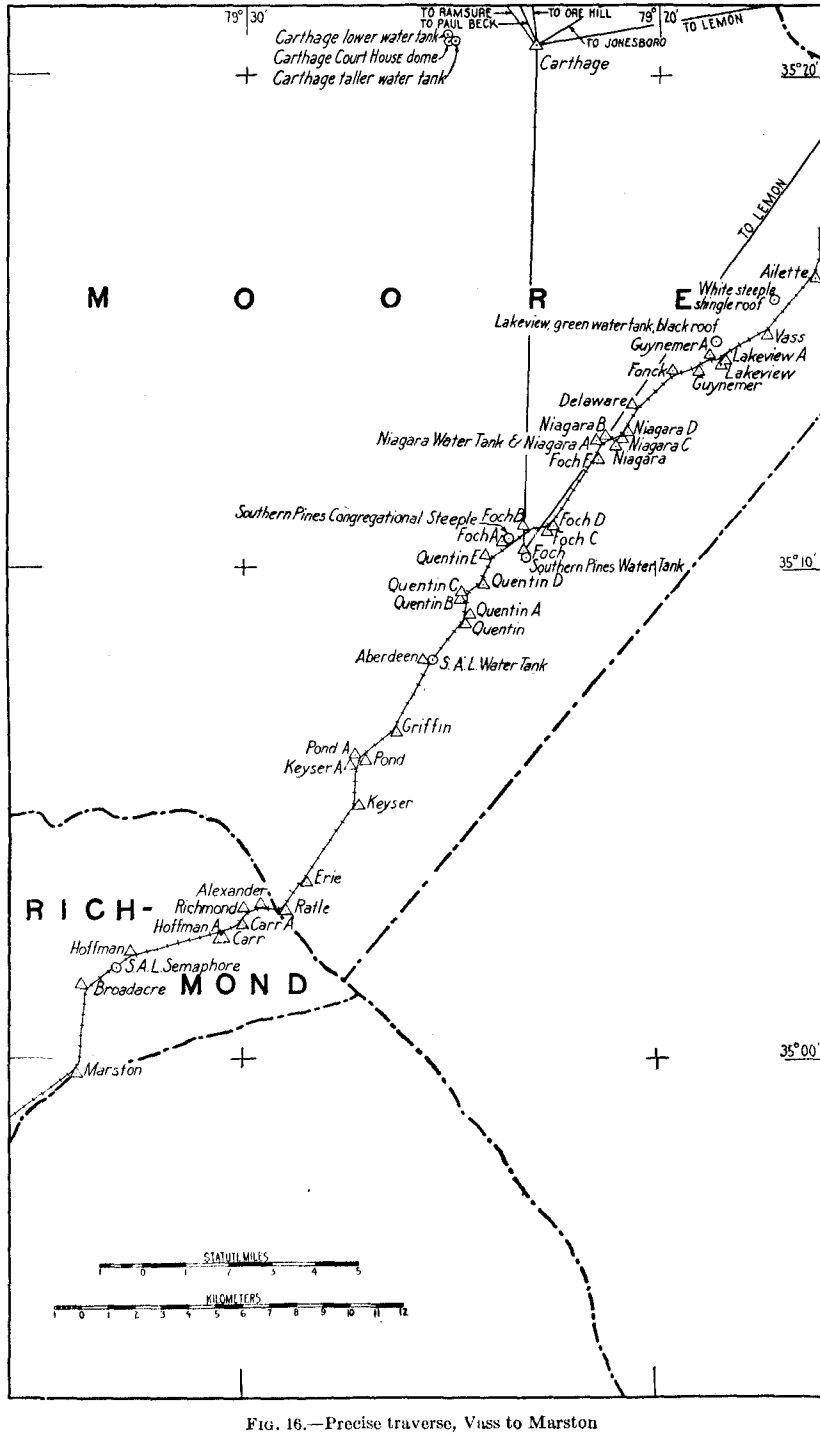

FIG. 16.—Precise traverse, Vass to Marston

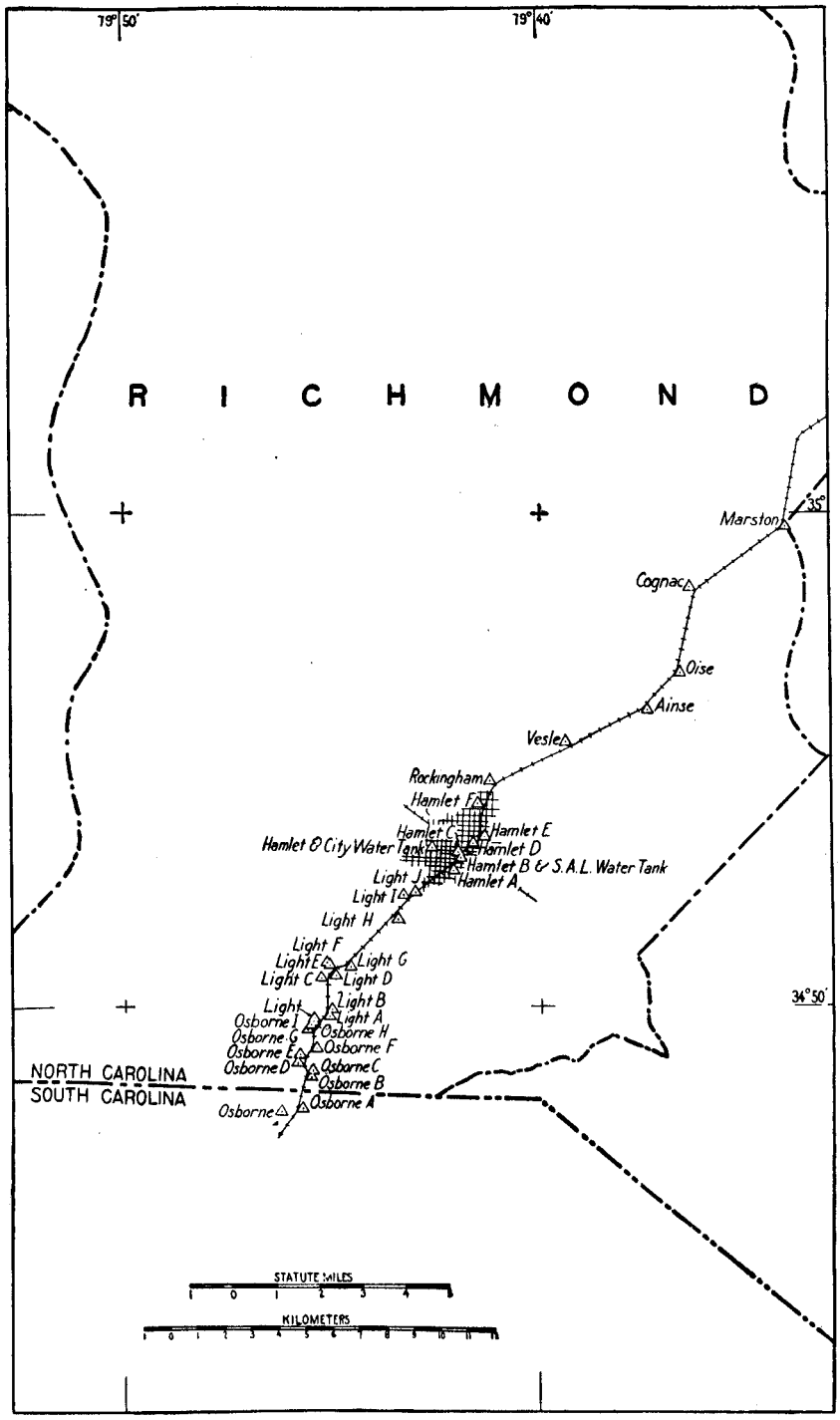

FIG. 17.—Precise traverse, Marston to Osborne (North Carolina-South Carolina State line)

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INDEX TO POSITIONS, DESCRIPTIONS, ELEVATIONS, AND SKETCHES OF TRIANGULATION AND TRAVERSE STATIONS.

Index to positions, descriptions, elevations, and sketches of triangulation and traverse stations—Continued.

Index to positions, descriptions, elevations, and sketches of triangulation and traverse stations—Continued.

Index to positions, descriptions, elevations, and sketches of triangulation and traverse stations—Continued.

Index to positions, descriptions, elevations, and sketches of triangulation and traverse stations—Continued.

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INDEX TO BENCH MARKS BY CITIES, TOWNS, AND COUNTIES.

Index to bench marks by cities, towns, and counties—Continued.