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E. LESTER JONES, SUPERINTENDENT

GEODESY

# TRIANGULATION ALONG THE COLUMBIA RIVER AND THE COASTS OF OREGON AND NORTHERN CALIFORNIA

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BY

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Computer, U. S. Coast and Geodetic Survey

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# CONTENTS.

| | Page. |
|---|---|
| General statement | 5 |
| The secondary triangulation | 6 |
| The tertiary triangulation | 6 |
| Adjustment of the triangulation | 7 |
| The North American datum | 8 |
| Explanation of tables of positions | 10 |
| Conversion tables, meters to feet and feet to meters | 12 |
| Table of positions, azimuths, and lengths: | |
| Mouth of the Columbia River to Portland | 16 |
| Columbia River from the mouth of the Willamette River to Cascade Locks | 45 |
| The secondary triangulation | 49 |
| Columbia River to Tillamook Bay | 53 |
| Tillamook Bay | 55 |
| Nestugga Bay | 56 |
| Yaquina Bay and Yaquina River | 58 |
| Heceta Head and Siuslaw River | 63 |
| Umpqua River | 64 |
| Umpqua River to Coos Bay | 65 |
| Coos Bay | 66 |
| Port Orford | 70 |
| San Sebastian to Chetko River | 71 |
| Chetko River to Trinidad Head | 73 |
| Table of positions of lost points | 78 |
| Descriptions of stations: | |
| Mouth of the Columbia River to Portland | 82 |
| Columbia River from the mouth of the Willamette River to Cascade Locks | 101 |
| The secondary triangulation | 105 |
| Columbia River to Tillamook Bay | 111 |
| Tillamook Bay | 113 |
| Nestugga Bay | 114 |
| Yaquina Bay and Yaquina River | 115 |
| Heceta Head to Siuslaw River | 119 |
| Umpqua River | 119 |
| Coos Bay | 120 |
| Port Orford | 123 |
| San Sebastian to Chetko River | 123 |
| Chetko River to Trinidad Head | 126 |
| Computation, adjustment, and accuracy of the elevations | 131 |
| Elevations | 132 |
| Explanation of the sketches | 133 |
| Sketches | 133 |
| Index | 134 |

## ILLUSTRATIONS.

| | Facing page. |
|---|---|
| 1. The 8-inch position instrument used on the secondary triangulation | 6 |
| 2. The 7-inch Berger theodolite now generally used on all tertiary triangulation | 8 |
| 3. Standard triangulation station and reference marks | 78 |
| 4. Station Cape, showing the observing tower with the wind shield | 106 |
| 5. Station Bald, showing the 8-inch position instrument in place, protected by a wind shield | 108 |
| 6. Station Bosley, showing the type of target used for the shorter secondary lines | 110 |
| 7. A point on a rocky section of the trail between Red Mountain and Rattlesnake Mountain, showing the pack animals | 112 |
| 8. The type of combination signal and instrument stand used by one chief of party where the lines were short | 112 |

Facing page.
9. Redding Rock, California, one of the many rocks off the coasts of California and Oregon ..... 130
10. Index map showing areas covered by published triangulation which has been rigidly computed on the North American datum ..... 134
11. Index map showing the limits of each of the following sketches ..... 134
12. Triangulation, Mouth of the Columbia River ..... 134
13. Triangulation, Columbia River, Grays Bay to Three Tree Point ..... 134
14. Triangulation, Columbia River, Skumaquea to Walker Island ..... 134
15. Triangulation, Columbia River, Walker Island to Cottonwood Island ..... 134
16. Triangulation, Columbia River, Cottonwood Island to Martin Island ..... 134
17. Triangulation, Columbia River, Martin Island to Fales Landing ..... 134
18. Triangulation, Columbia River, Fales Landing to Willamette River ..... 134
19. Triangulation, Mouth of the Willamette River to Portland ..... 134
20. Triangulation, Fales Landing to Portland ..... 134
21. Triangulation, Columbia River, Vancouver to Mount Pleasant ..... 134
22. Triangulation, Columbia River, Mount Pleasant to Cascade Locks ..... 134
23. Triangulation, Mouth of the Columbia River to Tillamook Lighthouse ..... 134
24. Triangulation, Tillamook Lighthouse to Tillamook Bay ..... 134
25. Triangulation, Tillamook Bay to Siletz River ..... 134
26. Triangulation, Siletz River to Siuslaw River ..... 134
27. Triangulation, Heceta Head to Umpqua River ..... 134
28. Triangulation, Tillamook Bay ..... 134
29. Triangulation, Nestugga Bay ..... 134
30. Triangulation, Yaquina River, from the mouth to the line Caf-Rail ..... 134
31. Triangulation, Yaquina River, from the line Soft-Yaq to the line Dead-Alder ..... 134
32. Triangulation, Yaquina River, from the line Spit-Red to Toledo ..... 134
33. Triangulation, Umpqua River ..... 134
34. Triangulation, Umpqua River to Coos Bay ..... 134
35. Triangulation, Coos Bay, western half ..... 134
36. Triangulation, Coos Bay, eastern half ..... 134
37. Triangulation, Coos Bay to Port Orford, showing connection to the primary triangulation ..... 134
38. Triangulation, Port Orford to Chetko River ..... 134
39. Triangulation, Chetko River to Trinidad Head ..... 134
40. Triangulation, Cape Blanco to Port Orford ..... 134
41. Triangulation, San Sebastian to Cape Ferrelo ..... 134
42. Triangulation, Cape Ferrelo to the Winchuck River ..... 134
43. Triangulation, Winchuck River to Lake Earl ..... 134
44. Triangulation, Lake Earl to Point St. George ..... 134
45. Triangulation, Point St. George to Klamath River ..... 134

# TRIANGULATION ALONG THE COLUMBIA RIVER AND THE COASTS OF OREGON AND NORTHERN CALIFORNIA.

By Charles A. Mourhess,

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## GENERAL STATEMENT.

This publication, together with Special Publication No. 13, "The California-Washington Arc of Primary Triangulation," gives all of the data of this Bureau for the State of Oregon. The results of this work are of great practical value to the engineer and geographer. To these it gives a large number of marked and described points, determined trigonometrically and all computed and adjusted on the same standard geodetic datum, known as the North American Datum.

The triangulation contained in this publication is of two grades of accuracy, secondary and tertiary. The secondary triangulation has an average triangle closing error of 3 seconds or less, while the tertiary or general coast triangulation has a triangle closing error of about 5 seconds.

The scheme for the trigonometric control of the coast of Oregon is, perhaps, as nearly ideal as it is possible to find anywhere in the United States. The California-Washington Arc of Primary Triangulation is the backbone of this control, and from this as a base comes the secondary work, which joins the several detached pieces of tertiary work along the coast, and upon which all the coast and river triangulation in Oregon depends.

The greater portion of this volume is taken up with the actual results of the triangulation, namely, the lists of geographic positions, the descriptions of stations, and the table of elevations. The details of the field and office work are, in general, omitted as being of insufficient importance to warrant their publication.

The index at the end of the book when used in connection with the sketches makes it possible to easily and quickly locate any or all stations for any particular locality, with their geographic positions and descriptions, and elevations when known. All of the descriptions available are given as completely as possible, and the remaining stations are nearly always sufficiently described by their names, as given on the sketches and in the table of geographic positions.

The difficulties of accurately locating and permanently defining any particular point, even with the aid of monuments and other points of reference, are often great, judging from disputes arising from this source. However, this is not true when a point is located by its geographic position, that is, by means of its longitude and latitude.

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 station marks which have not been destroyed. In the case of the destruction of the chart on which the position of any such point on the earth's surface was originally plotted, this point can be replotted by its geographic position with any degree of accuracy permitted by the scale of any new chart constructed for that purpose.

If there be no question at the time of the original location and legal adoption of a geographic definition of the location of a point by a given latitude and longitude, there can be no technical or legal question afterwards as to its exact meaning, or as to the exact redetermination of the location of this point, be it either on land or water at its newly determined position, or on a new chart in its newly plotted position.

Triangulation which has been done many years prior to the date of publication of its results is greatly reduced in value to the engineer and geographer by the loss of stations, due to the changes in topography, to buildings and improvements, or to the cultivation of the land. On account of the loss of surface marks or from other causes, the engineer may in many cases fail to recover a station which still exists, when by digging at the proper place the mark could be found and the station recovered. Without the guidance of the original topography or the reference marks the station can only be recovered by locating a new point in the immediate vicinity of the old one by means of triangulation carried from the nearest available triangulation stations. Knowing the positions on the same datum of both the old and new points, a distance and direction can be computed from the new point to the old, and measurements made on the ground will show the location of the old station.

In 1852 the first triangulation was begun on the Columbia River. Following this several important detached areas were covered by triangulation, the work on which has been continued intermittently until the present time. However, it was not until after the completion of the California-Washington Arc of Primary Triangulation that any of this work could be computed on the North American Datum. Even then there remained nearly all of the coast, which it was necessary to unite by means of the secondary triangulation before it could be finally placed on the standard datum.

## THE SECONDARY TRIANGULATION.

In order to connect and control in a suitable manner the several separate pieces of triangulation along the coast, it was found necessary to use the secondary triangulation. This connects with the primary at two points in Oregon. From the primary line Mary–Roman it connects directly to the coast, a branch to the south connecting with the Umpqua River and the principal branch to the north connecting at frequent intervals with the coast triangulation as far as Tillamook Bay. Here it joins some of the older work which is considered to be of the same degree of accuracy. There are several figures of this old work reaching to the mouth of the Columbia River. From there north to Willapa Bay, Wash., and thence east to the primary triangulation just south of Tacoma there is a scheme of secondary work.

From the primary line White–Onion there is a continuous system of secondary triangulation south to the Klamath River, Cal. This joins frequently to the coast work and forms a strong control.

## THE TERTIARY TRIANGULATION.

The tertiary triangulation contained in this publication falls naturally into three general divisions—the Columbia River, the coast of Oregon, and the coast of California—and they will be taken up briefly in that order.

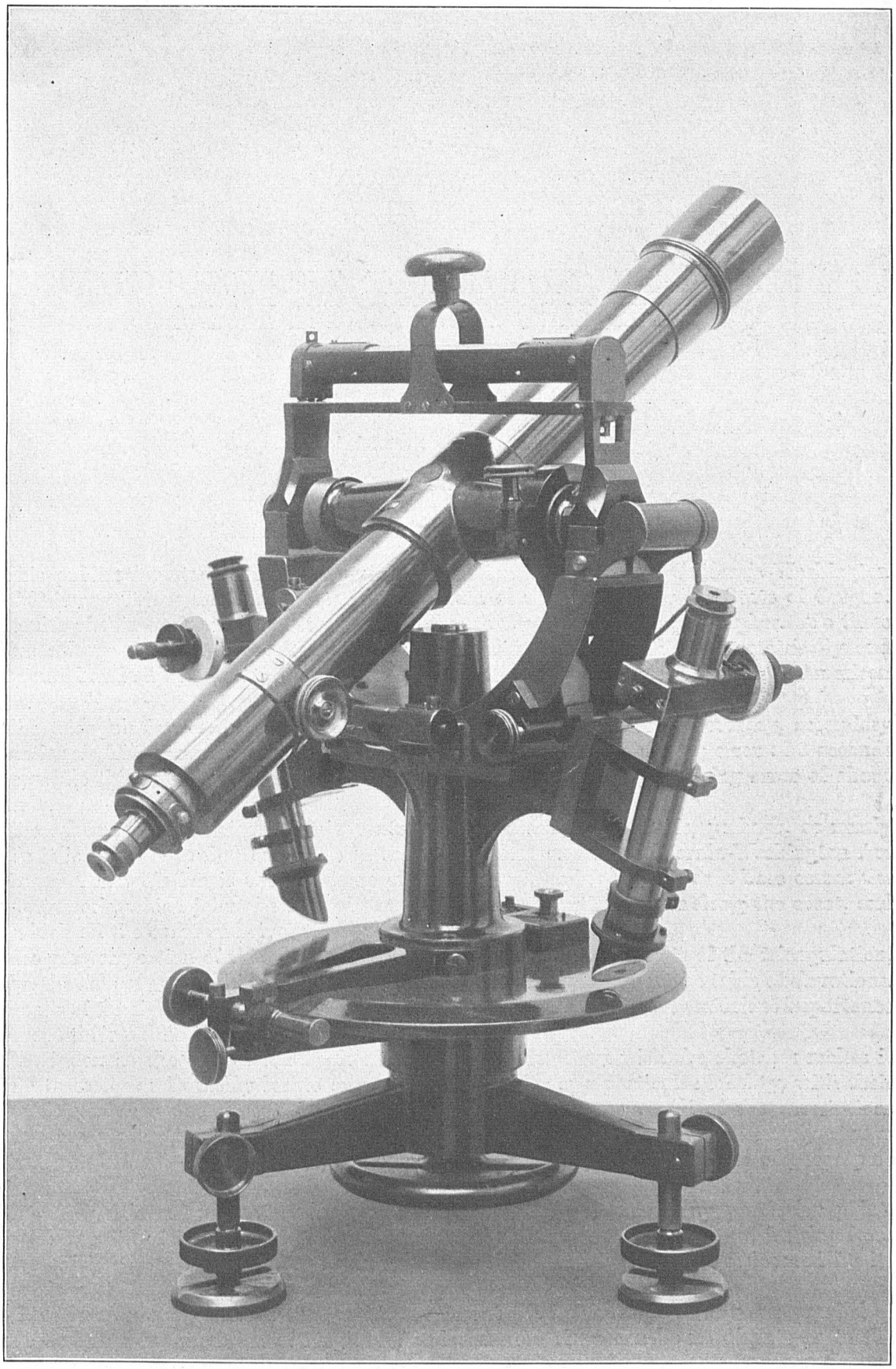

FIG. 1.—THE 8-INCH POSITION INSTRUMENT USED ON THE SECONDARY TRIANGULATION.

The original triangulation of the Columbia River consisted of rather large figures with most of the stations on the hills some distance from the river. At present these stations can generally be recovered only with great difficulty. The more recent triangulation consists of smaller figures with the stations all close to the banks of the river. It is probable that the banks have eroded or will erode in such a manner as to destroy many of the station marks, but in such places reference marks were placed well back from the banks, and their geographic positions have been computed and follow the positions of the stations in the table of positions. The United States Army Engineers' triangulation has been computed on the standard datum by this office and is included in this publication. This work consisted originally of a single chain of triangles, but in 1913 an officer of this Survey used these stations, observed enough additional lines to give a complete check on the work, located prominent objects and aids to navigation, re-marked some of the stations, and connected the scheme at several points to the triangulation of this Survey. The United States Army Engineers' triangulation of the Columbia River is well up to the standard of similar work of the Coast and Geodetic Survey.

The triangulation along the coast of Oregon consisted originally of several detached pieces, each independent of the other, and on separate astronomic data. In some cases these were expanded until they met, but it was not until they were all connected with each other by the secondary triangulation that it was possible to place them on the North American Datum. In Coos Bay the United States Army Engineers have a system of triangulation based on the work of the Coast and Geodetic Survey. This work has been computed on the standard datum by this office, and is here published along with the other results. In some places it has become necessary to replace the old work by new triangulation, and in every such case the new work depends upon two or more of the old stations. The accuracy of this work is comparable with other coast work in the United States, usually classed as tertiary. The probable error of the length is less than 1 part in 5,000, except between side points or between intersection points near together and determined from distant stations, where the error is likely to exceed this amount.

The triangulation on the coast of California south to Trinidad Head is, on the whole, of a less accurate character than other coast triangulation in the United States. This is due mainly to the unfavorable natural conditions which would not allow well-shaped figures. In some cases the triangulation was allowed to degenerate to single triangles with only two of the angles measured. The field work was done under methods now largely superseded. The work is of sufficient accuracy for topographic purposes, but in no case should other triangulation be based on this old work. When new triangulation over this section is undertaken by this Survey it will be based directly upon the secondary triangulation, which is only a short distance inland.

## ADJUSTMENT OF THE TRIANGULATION.

As has been stated, all of the positions in Oregon depend upon the California-Washington Arc of Primary Triangulation. This connects directly with the Columbia River triangulation at Portland. The positions of the stations at the mouth of the river are fixed by the secondary triangulation through Washington, not included in this publication, which is based on the primary triangle Rain–Hurst–Hal. The discrepancies produced by closing this loop were distributed along the Columbia River, as this work was considered to be very much less accurate than the secondary triangulation. The United States Army Engineer's triangulation was adjusted to fit between the stations of the old survey, with which it was connected.

The northern section of the secondary triangulation based on the primary line Mary–Roman was held fixed as computed, no discrepancies being distributed through it. The discrepancies due to the loop closure were distributed in the old work north of the Tillamook Bay and in the secondary work from the Columbia River to the primary triangle Rain–Hurst–Hal.

The southern section of the secondary work based on the line White–Onion of the primary triangulation was adjusted in several sections. As there is no loop closure with the primary there are no discrepancies due to this cause.

All tertiary work was adjusted to fit the secondary, and all discrepancies due to loop closures, measured bases, or azimuths, were eliminated.

## THE NORTH AMERICAN DATUM.

Early in the year 1913 the Superintendent of the United States Coast and Geodetic Survey was notified by the director of the Comisión Geodésica Mexicana and by the chief astronomer of the Dominion of Canada Astronomical Observatory that the 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 now adopted by the three countries, the Superintendent of the United States Coast and Geodetic Survey has changed its designation from the "United States Standard Datum" to the "North American Datum."

## EXPLANATION OF 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 Coast and Geodetic Survey for many years.

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

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

The transcontinental triangulation, of which the office computation was completed in 1899, joined all of the detached portions mentioned and made 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 heavy piece of work, and involved much preliminary study to determine the best datum to be adopted. On March 13, 1901, the Superintendent adopted what was known from that time until 1913 as the United States Standard Datum, but is now known as the North American Datum (see above), 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.

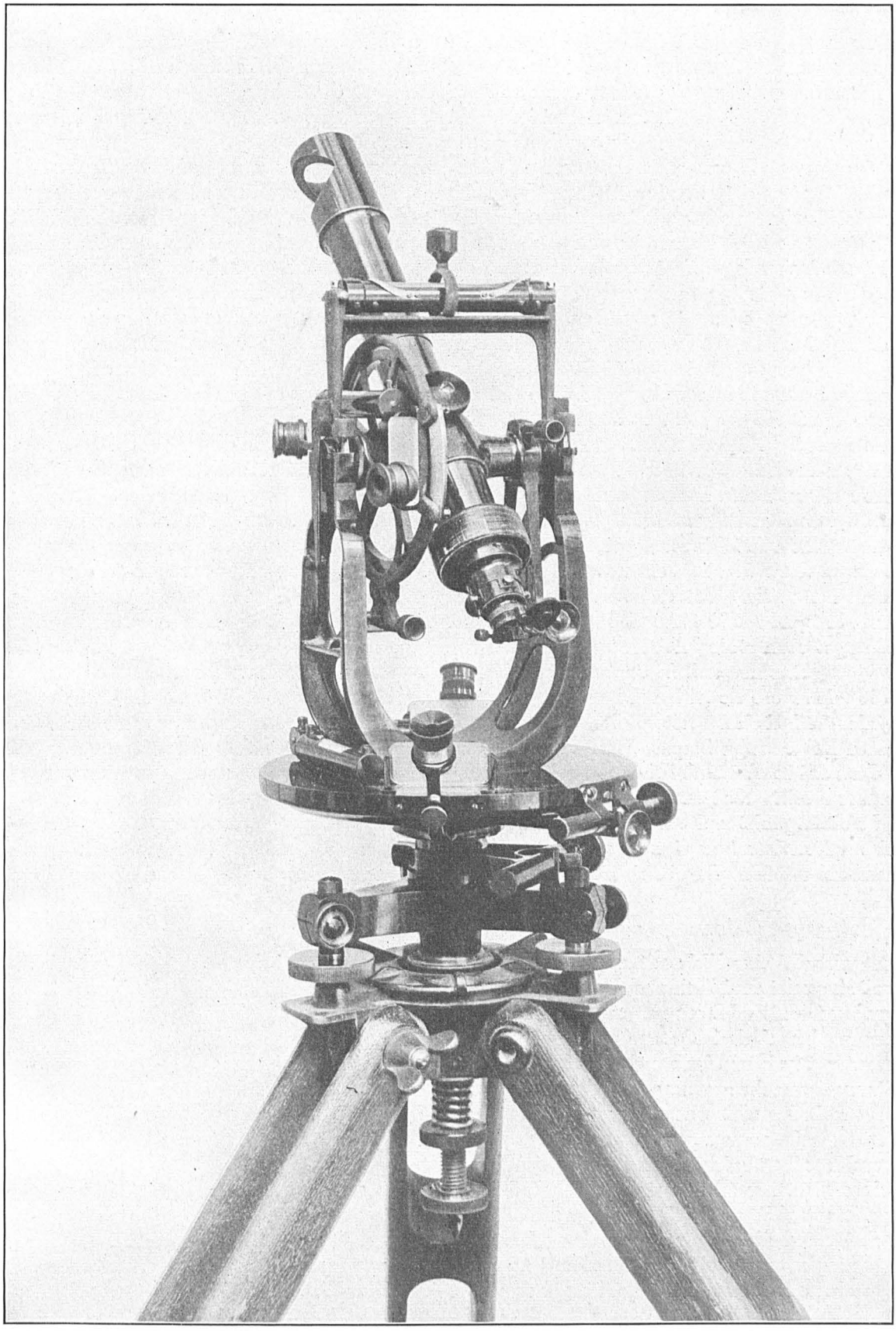

FIG. 2.—THE 7-INCH BERGER THEODOLITE NOW GENERALLY USED ON ALL TERTIARY TRIANGULATION.

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

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

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

The principles which guided in the selection of the datum to be adopted were: First, that the adopted datum should not differ widely from the ideal datum for which the sum of the station errors in latitude, longitude, and azimuth should each be zero; second, it was desirable that the adopted datum should produce minimum changes in the publications of the Survey, including its charts; and, third, it was desirable, other things being equal, to adopt that datum which allowed the maximum number of positions already in the office registers to remain unchanged, and therefore necessitated a minimum amount of new computation. These 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 available in 1903 on the United States Standard Datum at 246 latitude stations, 76 longitude stations, and 152 azimuth stations, scattered widely over the United States from Maine to Louisiana and to California, indicated that this datum approaches closely the ideal with which the algebraic sum of the station errors of each class would be zero.[1]

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

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 as follows:

| | ° | ′ | ″ |
|---|---|---|---|
| $\phi$ = | 39 | 13 | 26.686 |
| $\lambda$ = | 98 | 32 | 30.506 |
| $\alpha$ to Waldo = | 75 | 28 | 14.52 |

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

The principal lists of geographic positions published on the adopted datum throughout the whole United States are contained in the following publications of the Coast and Geodetic Survey and of other organizations:

Appendix 8 of the Report for 1885, positions in Massachusetts and Rhode Island.
Appendix 8 of the Report for 1888, positions in Connecticut.
Appendix 8 of the Report for 1893, positions in Pennsylvania, Delaware, and Maryland.
Appendix 10 of the Report for 1894, positions in Massachusetts.
Appendix 6 of the Report for 1901, positions in Kansas and Nebraska.
Appendix 3 of the Report for 1902, positions in Kansas, Missouri, Nebraska, and Colorado.
Appendix 4 of the Report for 1903, positions in Kansas, Oklahoma, and Texas.
Appendix 9 of the Report for 1904, positions in California.
Appendix 5 of the Report for 1905, positions in Texas.
Appendix 3 of the Report for 1907, positions in California.
Appendix 5 of the Report for 1910, positions in California.
Appendix 4 of the Report for 1911, positions in Nebraska, Minnesota, North Dakota, and South Dakota.
Appendix 5 of the Report for 1911, positions in Texas.
Appendix 6 of the Report for 1911, positions in Florida.
Special Publication No. 11, positions in Texas, New Mexico, Arizona, and California.
Special Publication No. 13, positions in California, Oregon, and Washington.
Special Publication No. 16, positions in Florida.
Special Publication No. 17, positions in Texas.
Special Publication No. 19, position in Colorado, Utah, Nevada, Wyoming, Montana, South Dakota, and North Dakota.
Special Publication No. 24, positions in Alabama and Mississippi.
Special Publication No. 30, positions in West Virginia, Ohio, Kentucky, Indiana, Illinois, and Missouri.
Special Publication No. 31, positions in Oregon, Washington, and California.
Appendix EEE, pages 2905–3031, Annual Report of the Chief of Engineers, 1902, positions of points on and near the Great Lakes.
Publications of the Massachusetts Harbor and Land Commission.
Various bulletins of the United States Geological Survey.

## EXPLANATION OF TABLES OF POSITIONS.

In the tables of positions the latitude and longitude of each point are given on the North American Datum (see p. 8), also the length and azimuth of each line observed over, whether in one or both ways. Along with the latitude and longitude of each point the lengths and azimuths are given of lines from that point to other points of the triangulation. No lengths or azimuths are repeated, and for a given line the length and azimuth will generally be found opposite the position of the last-mentioned of the two stations involved.

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

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

triangulation. Points, the positions of which are given to hundredths of seconds only, are marked by footnotes as being without check (observed from only two stations) or checked by verticals only.

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

These tables may be conveniently consulted by using as finders the 34 sketches and the index at the end of this publication. In the third column of the index will be found for each point a reference to the page on which its description is given, in the fourth column the page on which its elevation above sea level will be found, and in the fifth column the number of the sketch on which it appears.

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

*Lengths—Feet to meters (from 1 to 1,000 units).*

[Reduction factor: 1 foot = 0.3048006096 meter.]

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

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

*Lengths—Meters to feet (from 1 to 1,000 units).*

[Reduction factor: 1 meter = 3.280833333 feet.]

| Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. | Meters. | Feet. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | | **100** | 328.08333 | **200** | 656.16667 | **300** | 984.25000 | **400** | 1,312.33333 | **500** | 1,640.41667 | **600** | 1,968.50000 | **700** | 2,296.58333 | **800** | 2,624.66667 | **900** | 2,952.75000 |
| 1 | 3.28083 | 1 | 331.36417 | 1 | 659.44750 | 1 | 987.53083 | 1 | 1,315.61417 | 1 | 1,643.69750 | 1 | 1,971.78083 | 1 | 2,299.86417 | 1 | 2,627.94750 | 1 | 2,956.03083 |
| 2 | 6.56167 | 2 | 334.64500 | 2 | 662.72833 | 2 | 990.81167 | 2 | 1,318.89500 | 2 | 1,646.97833 | 2 | 1,975.06167 | 2 | 2,303.14500 | 2 | 2,631.22833 | 2 | 2,959.31167 |
| 3 | 9.84250 | 3 | 337.92583 | 3 | 666.00917 | 3 | 994.09250 | 3 | 1,322.17583 | 3 | 1,650.25917 | 3 | 1,978.34250 | 3 | 2,306.42583 | 3 | 2,634.50917 | 3 | 2,962.59250 |
| 4 | 13.12333 | 4 | 341.20667 | 4 | 669.29000 | 4 | 997.37333 | 4 | 1,325.45667 | 4 | 1,653.54000 | 4 | 1,981.62333 | 4 | 2,309.70667 | 4 | 2,637.79000 | 4 | 2,965.87333 |
| 5 | 16.40417 | 5 | 344.48750 | 5 | 672.57083 | 5 | 1,000.65417 | 5 | 1,328.73750 | 5 | 1,656.82083 | 5 | 1,984.90417 | 5 | 2,312.98750 | 5 | 2,641.07083 | 5 | 2,969.15417 |
| 6 | 19.68500 | 6 | 347.76833 | 6 | 675.85167 | 6 | 1,003.93500 | 6 | 1,332.01833 | 6 | 1,660.10167 | 6 | 1,988.18500 | 6 | 2,316.26833 | 6 | 2,644.35167 | 6 | 2,972.43500 |
| 7 | 22.96583 | 7 | 351.04917 | 7 | 679.13250 | 7 | 1,007.21583 | 7 | 1,335.29917 | 7 | 1,663.38250 | 7 | 1,991.46583 | 7 | 2,319.54917 | 7 | 2,647.63250 | 7 | 2,975.71583 |
| 8 | 26.24667 | 8 | 354.33000 | 8 | 682.41333 | 8 | 1,010.49667 | 8 | 1,338.58000 | 8 | 1,666.66333 | 8 | 1,994.74667 | 8 | 2,322.83000 | 8 | 2,650.91333 | 8 | 2,978.99667 |
| 9 | 29.52750 | 9 | 357.61083 | 9 | 685.69417 | 9 | 1,013.77750 | 9 | 1,341.86083 | 9 | 1,669.94417 | 9 | 1,998.02750 | 9 | 2,326.11083 | 9 | 2,654.19417 | 9 | 2,982.27750 |
| **10** | 32.80833 | **110** | 360.89167 | **210** | 688.97500 | **310** | 1,017.05833 | **410** | 1,345.14167 | **510** | 1,673.22500 | **610** | 2,001.30833 | **710** | 2,329.39167 | **810** | 2,657.47500 | **910** | 2,985.55833 |
| 1 | 36.08917 | 1 | 364.17250 | 1 | 692.25583 | 1 | 1,020.33917 | 1 | 1,348.42250 | 1 | 1,676.50583 | 1 | 2,004.58917 | 1 | 2,332.67250 | 1 | 2,660.75583 | 1 | 2,988.83917 |
| 2 | 39.37000 | 2 | 367.45333 | 2 | 695.53667 | 2 | 1,023.62000 | 2 | 1,351.70333 | 2 | 1,679.78667 | 2 | 2,007.87000 | 2 | 2,335.95333 | 2 | 2,664.03667 | 2 | 2,992.12000 |
| 3 | 42.65083 | 3 | 370.73417 | 3 | 698.81750 | 3 | 1,026.90083 | 3 | 1,354.98417 | 3 | 1,683.06750 | 3 | 2,011.15083 | 3 | 2,339.23417 | 3 | 2,667.31750 | 3 | 2,995.40083 |
| 4 | 45.93167 | 4 | 374.01500 | 4 | 702.09833 | 4 | 1,030.18167 | 4 | 1,358.26500 | 4 | 1,686.34833 | 4 | 2,014.43167 | 4 | 2,342.51500 | 4 | 2,670.59833 | 4 | 2,998.68167 |
| 5 | 49.21250 | 5 | 377.29583 | 5 | 705.37917 | 5 | 1,033.46250 | 5 | 1,361.54583 | 5 | 1,689.62917 | 5 | 2,017.71250 | 5 | 2,345.79583 | 5 | 2,673.87917 | 5 | 3,001.96250 |
| 6 | 52.49333 | 6 | 380.57667 | 6 | 708.66000 | 6 | 1,036.74333 | 6 | 1,364.82667 | 6 | 1,692.91000 | 6 | 2,020.99333 | 6 | 2,349.07667 | 6 | 2,677.16000 | 6 | 3,005.24333 |
| 7 | 55.77417 | 7 | 383.85750 | 7 | 711.94083 | 7 | 1,040.02417 | 7 | 1,368.10750 | 7 | 1,696.19083 | 7 | 2,024.27417 | 7 | 2,352.35750 | 7 | 2,680.44083 | 7 | 3,008.52417 |
| 8 | 59.05500 | 8 | 387.13833 | 8 | 715.22167 | 8 | 1,043.30500 | 8 | 1,371.38833 | 8 | 1,699.47167 | 8 | 2,027.55500 | 8 | 2,355.63833 | 8 | 2,683.72167 | 8 | 3,011.80500 |
| 9 | 62.33583 | 9 | 390.41917 | 9 | 718.50250 | 9 | 1,046.58583 | 9 | 1,374.66917 | 9 | 1,702.75250 | 9 | 2,030.83583 | 9 | 2,358.91917 | 9 | 2,687.00250 | 9 | 3,015.08583 |
| **20** | 65.61667 | **120** | 393.70000 | **220** | 721.78333 | **320** | 1,049.86667 | **420** | 1,377.95000 | **520** | 1,706.03333 | **620** | 2,034.11667 | **720** | 2,362.20000 | **820** | 2,690.28333 | **920** | 3,018.36667 |
| 1 | 68.89750 | 1 | 396.98083 | 1 | 725.06417 | 1 | 1,053.14750 | 1 | 1,381.23083 | 1 | 1,709.31417 | 1 | 2,037.39750 | 1 | 2,365.48083 | 1 | 2,693.56417 | 1 | 3,021.64750 |
| 2 | 72.17833 | 2 | 400.26167 | 2 | 728.34500 | 2 | 1,056.42833 | 2 | 1,384.51167 | 2 | 1,712.59500 | 2 | 2,040.67833 | 2 | 2,368.76167 | 2 | 2,696.84500 | 2 | 3,024.92833 |
| 3 | 75.45917 | 3 | 403.54250 | 3 | 731.62583 | 3 | 1,059.70917 | 3 | 1,387.79250 | 3 | 1,715.87583 | 3 | 2,043.95917 | 3 | 2,372.04250 | 3 | 2,700.12583 | 3 | 3,028.20917 |
| 4 | 78.74000 | 4 | 406.82333 | 4 | 734.90667 | 4 | 1,062.99000 | 4 | 1,391.07333 | 4 | 1,719.15667 | 4 | 2,047.24000 | 4 | 2,375.32333 | 4 | 2,703.40667 | 4 | 3,031.49000 |
| 5 | 82.02083 | 5 | 410.10417 | 5 | 738.18750 | 5 | 1,066.27083 | 5 | 1,394.35417 | 5 | 1,722.43750 | 5 | 2,050.52083 | 5 | 2,378.60417 | 5 | 2,706.68750 | 5 | 3,034.77083 |
| 6 | 85.30167 | 6 | 413.38500 | 6 | 741.46833 | 6 | 1,069.55167 | 6 | 1,397.63500 | 6 | 1,725.71833 | 6 | 2,053.80167 | 6 | 2,381.88500 | 6 | 2,709.96833 | 6 | 3,038.05167 |
| 7 | 88.58250 | 7 | 416.66583 | 7 | 744.74917 | 7 | 1,072.83250 | 7 | 1,400.91583 | 7 | 1,728.99917 | 7 | 2,057.08250 | 7 | 2,385.16583 | 7 | 2,713.24917 | 7 | 3,041.33250 |
| 8 | 91.86333 | 8 | 419.94667 | 8 | 748.03000 | 8 | 1,076.11333 | 8 | 1,404.19667 | 8 | 1,732.28000 | 8 | 2,060.36333 | 8 | 2,388.44667 | 8 | 2,716.53000 | 8 | 3,044.61333 |
| 9 | 95.14417 | 9 | 423.22750 | 9 | 751.31083 | 9 | 1,079.39417 | 9 | 1,407.47750 | 9 | 1,735.56083 | 9 | 2,063.64417 | 9 | 2,391.72750 | 9 | 2,719.81083 | 9 | 3,047.89417 |
| **30** | 98.42500 | **130** | 426.50833 | **230** | 754.59167 | **330** | 1,082.67500 | **430** | 1,410.75833 | **530** | 1,738.84167 | **630** | 2,066.92500 | **730** | 2,395.00833 | **830** | 2,723.09167 | **930** | 3,051.17500 |
| 1 | 101.70583 | 1 | 429.78917 | 1 | 757.87250 | 1 | 1,085.95583 | 1 | 1,414.03917 | 1 | 1,742.12250 | 1 | 2,070.20583 | 1 | 2,398.28917 | 1 | 2,726.37250 | 1 | 3,054.45583 |
| 2 | 104.98667 | 2 | 433.07000 | 2 | 761.15333 | 2 | 1,089.23667 | 2 | 1,417.32000 | 2 | 1,745.40333 | 2 | 2,073.48667 | 2 | 2,401.57000 | 2 | 2,729.65333 | 2 | 3,057.73667 |
| 3 | 108.26750 | 3 | 436.35083 | 3 | 764.43417 | 3 | 1,092.51750 | 3 | 1,420.60083 | 3 | 1,748.68417 | 3 | 2,076.76750 | 3 | 2,404.85083 | 3 | 2,732.93417 | 3 | 3,061.01750 |
| 4 | 111.54833 | 4 | 439.63167 | 4 | 767.71500 | 4 | 1,095.79833 | 4 | 1,423.88167 | 4 | 1,751.96500 | 4 | 2,080.04833 | 4 | 2,408.13167 | 4 | 2,736.21500 | 4 | 3,064.29833 |
| 5 | 114.82917 | 5 | 442.91250 | 5 | 770.99583 | 5 | 1,099.07917 | 5 | 1,427.16250 | 5 | 1,755.24583 | 5 | 2,083.32917 | 5 | 2,411.41250 | 5 | 2,739.49583 | 5 | 3,067.57917 |
| 6 | 118.11000 | 6 | 446.19333 | 6 | 774.27667 | 6 | 1,102.36000 | 6 | 1,430.44333 | 6 | 1,758.52667 | 6 | 2,086.61000 | 6 | 2,414.69333 | 6 | 2,742.77667 | 6 | 3,070.86000 |
| 7 | 121.39083 | 7 | 449.47417 | 7 | 777.55750 | 7 | 1,105.64083 | 7 | 1,433.72417 | 7 | 1,761.80750 | 7 | 2,089.89083 | 7 | 2,417.97417 | 7 | 2,746.05750 | 7 | 3,074.14083 |
| 8 | 124.67167 | 8 | 452.75500 | 8 | 780.83833 | 8 | 1,108.92167 | 8 | 1,437.00500 | 8 | 1,765.08833 | 8 | 2,093.17167 | 8 | 2,421.25500 | 8 | 2,749.33833 | 8 | 3,077.42167 |
| 9 | 127.95250 | 9 | 456.03583 | 9 | 784.11917 | 9 | 1,112.20250 | 9 | 1,440.28583 | 9 | 1,768.36917 | 9 | 2,096.45250 | 9 | 2,424.53583 | 9 | 2,752.61917 | 9 | 3,080.70250 |
| **40** | 131.23333 | **140** | 459.31667 | **240** | 787.40000 | **340** | 1,115.48333 | **440** | 1,443.56667 | **540** | 1,771.65000 | **640** | 2,099.73333 | **740** | 2,427.81667 | **840** | 2,755.90000 | **940** | 3,083.98333 |
| 1 | 134.51417 | 1 | 462.59750 | 1 | 790.68083 | 1 | 1,118.76417 | 1 | 1,446.84750 | 1 | 1,774.93083 | 1 | 2,103.01417 | 1 | 2,431.09750 | 1 | 2,759.18083 | 1 | 3,087.26417 |
| 2 | 137.79500 | 2 | 465.87833 | 2 | 793.96167 | 2 | 1,122.04500 | 2 | 1,450.12833 | 2 | 1,778.21167 | 2 | 2,106.29500 | 2 | 2,434.37833 | 2 | 2,762.46167 | 2 | 3,090.54500 |
| 3 | 141.07583 | 3 | 469.15917 | 3 | 797.24250 | 3 | 1,125.32583 | 3 | 1,453.40917 | 3 | 1,781.49250 | 3 | 2,109.57583 | 3 | 2,437.65917 | 3 | 2,765.74250 | 3 | 3,093.82583 |
| 4 | 144.35667 | 4 | 472.44000 | 4 | 800.52333 | 4 | 1,128.60667 | 4 | 1,456.69000 | 4 | 1,784.77333 | 4 | 2,112.85667 | 4 | 2,440.94000 | 4 | 2,769.02333 | 4 | 3,097.10667 |
| 5 | 147.63750 | 5 | 475.72083 | 5 | 803.80417 | 5 | 1,131.88750 | 5 | 1,459.97083 | 5 | 1,788.05417 | 5 | 2,116.13750 | 5 | 2,444.22083 | 5 | 2,772.30417 | 5 | 3,100.38750 |
| 6 | 150.91833 | 6 | 479.00167 | 6 | 807.08500 | 6 | 1,135.16833 | 6 | 1,463.25167 | 6 | 1,791.33500 | 6 | 2,119.41833 | 6 | 2,447.50167 | 6 | 2,775.58500 | 6 | 3,103.66833 |
| 7 | 154.19917 | 7 | 482.28250 | 7 | 810.36583 | 7 | 1,138.44917 | 7 | 1,466.53250 | 7 | 1,794.61583 | 7 | 2,122.69917 | 7 | 2,450.78250 | 7 | 2,778.86583 | 7 | 3,106.94917 |
| 8 | 157.48000 | 8 | 485.56333 | 8 | 813.64667 | 8 | 1,141.73000 | 8 | 1,469.81333 | 8 | 1,797.89667 | 8 | 2,125.98000 | 8 | 2,454.06333 | 8 | 2,782.14667 | 8 | 3,110.23000 |
| 9 | 160.76083 | 9 | 488.84417 | 9 | 816.92750 | 9 | 1,145.01083 | 9 | 1,473.09417 | 9 | 1,801.17750 | 9 | 2,129.26083 | 9 | 2,457.34417 | 9 | 2,785.42750 | 9 | 3,113.51083 |



| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **50** | 164.04167 | **150** | 492.12500 | **250** | 820.20833 | **350** | 1,148.29167 | **450** | 1,476.37500 | **550** | 1,804.45833 | **650** | 2,132.54167 | **750** | 2,460.62500 | **850** | 2,788.70833 | **950** | 3,116.79167 |
| 1 | 167.32250 | 1 | 495.40583 | 1 | 823.48917 | 1 | 1,151.57250 | 1 | 1,479.65583 | 1 | 1,807.73917 | 1 | 2,135.82250 | 1 | 2,463.90583 | 1 | 2,791.98917 | 1 | 3,120.07250 |
| 2 | 170.60333 | 2 | 498.68667 | 2 | 826.77000 | 2 | 1,154.85333 | 2 | 1,482.93667 | 2 | 1,811.02000 | 2 | 2,139.10333 | 2 | 2,467.18667 | 2 | 2,795.27000 | 2 | 3,123.35333 |
| 3 | 173.88417 | 3 | 501.96750 | 3 | 830.05083 | 3 | 1,158.13417 | 3 | 1,486.21750 | 3 | 1,814.30083 | 3 | 2,142.38417 | 3 | 2,470.46750 | 3 | 2,798.55083 | 3 | 3,126.63417 |
| 4 | 177.16500 | 4 | 505.24833 | 4 | 833.33167 | 4 | 1,161.41500 | 4 | 1,489.49833 | 4 | 1,817.58167 | 4 | 2,145.66500 | 4 | 2,473.74833 | 4 | 2.801.83167 | 4 | 3,129.91500 |
| 5 | 180.44583 | 5 | 508.52917 | 5 | 836.61250 | 5 | 1,164.69583 | 5 | 1,492.77917 | 5 | 1,820.86250 | 5 | 2,148.94583 | 5 | 2,477.02917 | 5 | 2,805.11250 | 5 | 3,133.19583 |
| 6 | 183.72667 | 6 | 511.81000 | 6 | 839.89333 | 6 | 1,167.97667 | 6 | 1,496.06000 | 6 | 1,824.14333 | 6 | 2,152.22667 | 6 | 2,480.31000 | 6 | 2,808.39333 | 6 | 3,136.47667 |
| 7 | 187.00750 | 7 | 515.09083 | 7 | 843.17417 | 7 | 1,171.25750 | 7 | 1,499.34083 | 7 | 1,827.42417 | 7 | 2,155.50750 | 7 | 2,483.59083 | 7 | 2,811.67417 | 7 | 3,139.75750 |
| 8 | 190.28833 | 8 | 518.37167 | 8 | 846.45500 | 8 | 1,174.53833 | 8 | 1,502.62167 | 8 | 1,830.70500 | 8 | 2,158.78833 | 8 | 2,486.87167 | 8 | 2,814.95500 | 8 | 3,143.03833 |
| 9 | 193.56917 | 9 | 521.65250 | 9 | 849.73583 | 9 | 1,177.81917 | 9 | 1,505.90250 | 9 | 1,833.98583 | 9 | 2,162.06917 | 9 | 2,490.15250 | 9 | 2,818.23583 | 9 | 3,146.31917 |
| **60** | 196.85000 | **160** | 524.93333 | **260** | 853.01667 | **360** | 1,181.10000 | **460** | 1,509.18333 | **560** | 1,837.26667 | **660** | 2,165.35000 | **760** | 2,493.43333 | **860** | 2,821.51667 | **960** | 3,149.60000 |
| 1 | 200.13083 | 1 | 528.21417 | 1 | 856.29750 | 1 | 1,184.38083 | 1 | 1,512.46417 | 1 | 1,840.54750 | 1 | 2,168.63083 | 1 | 2,496.71417 | 1 | 2,824.79750 | 1 | 3,152.88083 |
| 2 | 203.41167 | 2 | 531.49500 | 2 | 859.57833 | 2 | 1,187.66167 | 2 | 1,515.74500 | 2 | 1,843.82833 | 2 | 2,171.91167 | 2 | 2,499.99500 | 2 | 2,828.07833 | 2 | 3,156.16167 |
| 3 | 206.69250 | 3 | 534.77583 | 3 | 862.85917 | 3 | 1,190.94250 | 3 | 1,519.02583 | 3 | 1,847.10917 | 3 | 2,175.19250 | 3 | 2,503.27583 | 3 | 2,831.35917 | 3 | 3,159.44250 |
| 4 | 209.97333 | 4 | 538.05667 | 4 | 866.14000 | 4 | 1,194.22333 | 4 | 1,522.30667 | 4 | 1,850.39000 | 4 | 2,178.47333 | 4 | 2,506.55667 | 4 | 2,834.64000 | 4 | 3,162.72333 |
| 5 | 213.25417 | 5 | 541.33750 | 5 | 869.42083 | 5 | 1,197.50417 | 5 | 1,525.58750 | 5 | 1,853.67083 | 5 | 2,181.75417 | 5 | 2,509.83750 | 5 | 2,837.92083 | 5 | 3,166.00417 |
| 6 | 216.53500 | 6 | 544.61833 | 6 | 872.70167 | 6 | 1,200.78500 | 6 | 1,528.86833 | 6 | 1,856.95167 | 6 | 2,185.03500 | 6 | 2,513.11833 | 6 | 2,841.20167 | 6 | 3,169.28500 |
| 7 | 219.81583 | 7 | 547.89917 | 7 | 875.98250 | 7 | 1,204.06583 | 7 | 1,532.14917 | 7 | 1,860.23250 | 7 | 2,188.31583 | 7 | 2,516.39917 | 7 | 2,844.48250 | 7 | 3,172.56583 |
| 8 | 223.09667 | 8 | 551.18000 | 8 | 879.26333 | 8 | 1,207.34667 | 8 | 1,535.43000 | 8 | 1,863.51333 | 8 | 2,191.59667 | 8 | 2,519.68000 | 8 | 2,847.76333 | 8 | 3,175.84667 |
| 9 | 226.37750 | 9 | 554.46083 | 9 | 882.54417 | 9 | 1,210.62750 | 9 | 1,538.71083 | 9 | 1,866.79417 | 9 | 2,194.87750 | 9 | 2,522.96083 | 9 | 2,851.04417 | 9 | 3,179.12750 |
| **70** | 229.65833 | **170** | 557.74167 | **270** | 885.82500 | **370** | 1,213.90833 | **470** | 1,541.99167 | **570** | 1,870.07500 | **670** | 2,198.15833 | **770** | 2,526.24167 | **870** | 2,854.32500 | **970** | 3,182.40833 |
| 1 | 232.93917 | 1 | 561.02250 | 1 | 889.10583 | 1 | 1,217.18917 | 1 | 1,545.27250 | 1 | 1,873.35583 | 1 | 2,201.43917 | 1 | 2,529.52250 | 1 | 2,857.60583 | 1 | 3,185.68917 |
| 2 | 236.22000 | 2 | 564.30333 | 2 | 892.38667 | 2 | 1,220.47000 | 2 | 1,548.55333 | 2 | 1,876.63667 | 2 | 2,204.72000 | 2 | 2,532.80333 | 2 | 2,860.88667 | 2 | 3,188.97000 |
| 3 | 239.50083 | 3 | 567.58417 | 3 | 895.66750 | 3 | 1,223.75083 | 3 | 1,551.83417 | 3 | 1,879.91750 | 3 | 2,208.00083 | 3 | 2,536.08417 | 3 | 2,864.16750 | 3 | 3,192.25083 |
| 4 | 242.78167 | 4 | 570.86500 | 4 | 898.94833 | 4 | 1,227.03167 | 4 | 1,555.11500 | 4 | 1,883.19833 | 4 | 2,211.28167 | 4 | 2,539.36500 | 4 | 2,867.44833 | 4 | 3,195.53167 |
| 5 | 246.06250 | 5 | 574.14583 | 5 | 902.22917 | 5 | 1,230.31250 | 5 | 1,558.39583 | 5 | 1,886.47917 | 5 | 2,214.56250 | 5 | 2.542.64583 | 5 | 2,870.72917 | 5 | 3,198.81250 |
| 6 | 249.34333 | 6 | 577.42667 | 6 | 905.51000 | 6 | 1,233.59333 | 6 | 1,561.67667 | 6 | 1,889.76000 | 6 | 2,217.84333 | 6 | 2,545.92667 | 6 | 2,874.01000 | 6 | 3,202.09333 |
| 7 | 252.62417 | 7 | 580.70750 | 7 | 908.79083 | 7 | 1,236.87417 | 7 | 1,564.95750 | 7 | 1,893.04083 | 7 | 2,221.12417 | 7 | 2,549.20750 | 7 | 2,877.29083 | 7 | 3,205.37417 |
| 8 | 255.90500 | 8 | 583.98833 | 8 | 912.07167 | 8 | 1,240.15500 | 8 | 1,568.23833 | 8 | 1,896.32167 | 8 | 2,224.40500 | 8 | 2,552.48833 | 8 | 2,880.57167 | 8 | 3,208.65500 |
| 9 | 259.18583 | 9 | 587.26917 | 9 | 915.35250 | 9 | 1,243.43583 | 9 | 1,571.51917 | 9 | 1,899.60250 | 9 | 2,227.68583 | 9 | 2,555.76917 | 9 | 2,883.85250 | 9 | 3,211.93583 |
| **80** | 262.46667 | **180** | 590.55000 | **280** | 918.63333 | **380** | 1,246.71667 | **480** | 1,574.80000 | **580** | 1,902.88333 | **680** | 2,230.96667 | **780** | 2,559.05000 | **880** | 2,887.13333 | **980** | 3,215.21667 |
| 1 | 265.74750 | 1 | 593.83083 | 1 | 921.91417 | 1 | 1,249.99750 | 1 | 1,578.08083 | 1 | 1,906.16417 | 1 | 2,234.24750 | 1 | 2,562.33083 | 1 | 2,890.41417 | 1 | 3,218.49750 |
| 2 | 269.02833 | 2 | 597.11167 | 2 | 925.19500 | 2 | 1,253.27833 | 2 | 1,581.36167 | 2 | 1,909.44500 | 2 | 2,237.52833 | 2 | 2,565.61167 | 2 | 2,893.69500 | 2 | 3,221.77833 |
| 3 | 272.30917 | 3 | 600.39250 | 3 | 928.47583 | 3 | 1,256.55917 | 3 | 1,584.64250 | 3 | 1,912.72583 | 3 | 2,240.80917 | 3 | 2,568.89250 | 3 | 2,896.97583 | 3 | 3,225.05917 |
| 4 | 275.59000 | 4 | 603.67333 | 4 | 931.75667 | 4 | 1,259.84000 | 4 | 1,587.92333 | 4 | 1,916.00667 | 4 | 2,244.09000 | 4 | 2,572.17333 | 4 | 2,900.25667 | 4 | 3,228.34000 |
| 5 | 278.87083 | 5 | 606.95417 | 5 | 935.03750 | 5 | 1,263.12083 | 5 | 1,591.20417 | 5 | 1,919.28750 | 5 | 2,247.37083 | 5 | 2,575.45417 | 5 | 2.903.53750 | 5 | 3,231.62083 |
| 6 | 282.15167 | 6 | 610.23500 | 6 | 938.31833 | 6 | 1,266.40167 | 6 | 1,594.48500 | 6 | 1,922.56833 | 6 | 2,250.65167 | 6 | 2,578.73500 | 6 | 2,906.81833 | 6 | 3,234.90167 |
| 7 | 285.43250 | 7 | 613.51583 | 7 | 941.59917 | 7 | 1,269.68250 | 7 | 1,597.76583 | 7 | 1,925.84917 | 7 | 2,253.93250 | 7 | 2,582.01583 | 7 | 2,910.09917 | 7 | 3,238.18250 |
| 8 | 288.71333 | 8 | 616.79667 | 8 | 944.88000 | 8 | 1,272.96333 | 8 | 1,601.04667 | 8 | 1,929.13000 | 8 | 2,257 21333 | 8 | 2,585.29667 | 8 | 2,913.38000 | 8 | 3,241.46333 |
| 9 | 291.99417 | 9 | 620.07750 | 9 | 948.16083 | 9 | 1,276.24417 | 9 | 1,604.32750 | 9 | 1,932.41083 | 9 | 2,260.49417 | 9 | 2,588.57750 | 9 | 2,916.66083 | 9 | 3,244.74417 |
| **90** | 295.27500 | **190** | 623.35833 | **290** | 951.44167 | **390** | 1,279.52500 | **490** | 1,607.60833 | **590** | 1,935.69167 | **690** | 2,263.77500 | **790** | 2,591.85833 | **890** | 2,919.94167 | **990** | 3,248.02500 |
| 1 | 298.55583 | 1 | 626.63917 | 1 | 954.72250 | 1 | 1,282.80583 | 1 | 1,610.88917 | 1 | 1,938.97250 | 1 | 2,267.05583 | 1 | 2,595.13917 | 1 | 2,923.22250 | 1 | 3,251.30583 |
| 2 | 301.83667 | 2 | 629.92000 | 2 | 958.00333 | 2 | 1,286.08667 | 2 | 1,614.17000 | 2 | 1,942.25333 | 2 | 2,270.33667 | 2 | 2,598.42000 | 2 | 2,926.50333 | 2 | 3,254.58667 |
| 3 | 305.11750 | 3 | 633.20083 | 3 | 961.28417 | 3 | 1,289.36750 | 3 | 1,617.45083 | 3 | 1,945.53417 | 3 | 2,273.61750 | 3 | 2,601.70083 | 3 | 2,929.78417 | 3 | 3,257.86750 |
| 4 | 308.39833 | 4 | 636.48167 | 4 | 964.56500 | 4 | 1,292.64833 | 4 | 1,620.73167 | 4 | 1,948.81500 | 4 | 2,276.89833 | 4 | 2,604.98167 | 4 | 2,933.06500 | 4 | 3,261.14833 |
| 5 | 311.67917 | 5 | 639.76250 | 5 | 967.84583 | 5 | 1,295.92917 | 5 | 1,624.01250 | 5 | 1,952.09583 | 5 | 2,280.17917 | 5 | 2,608.26250 | 5 | 2,936.34583 | 5 | 3,264.42917 |
| 6 | 314.96000 | 6 | 643.04333 | 6 | 971.12667 | 6 | 1,299.21000 | 6 | 1,627.29333 | 6 | 1,955.37667 | 6 | 2,283.46000 | 6 | 2,611.54333 | 6 | 2,939.62667 | 6 | 3,267.71000 |
| 7 | 318.24083 | 7 | 646.32417 | 7 | 974.40750 | 7 | 1,302.49083 | 7 | 1,630.57417 | 7 | 1,958.65750 | 7 | 2,286.74083 | 7 | 2,614.82417 | 7 | 2,942.90750 | 7 | 3,270.99083 |
| 8 | 321.52167 | 8 | 649.60500 | 8 | 977.68833 | 8 | 1,305.77167 | 8 | 1,633.85500 | 8 | 1,961.93833 | 8 | 2,290.02167 | 8 | 2,618.10500 | 8 | 2,946.18833 | 8 | 3,274.27167 |
| 9 | 324.80250 | 9 | 652.88583 | 9 | 980.96917 | 9 | 1,309.05250 | 9 | 1,637.13583 | 9 | 1,965.21917 | 9 | 2,293.30250 | 9 | 2,621.38583 | 9 | 2,949.46917 | 9 | 3,277.55250 |

46-18 1852.61



## GEOGRAPHIC POSITIONS.

*Mouth of the Columbia River to Portland.*

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points.* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Scarboro Hill 2, 1873 | 46 15 29.576 | 913.2 | 330 47 02.6 | 150 57 02.8 | Saddle Mountain 2 | 36736.3 | 4.565095 |
| | 123 54 57.105 | 1223.1 | 6 45 52.0 | 186 43 42.8 | Tillamook Head | 32774.5 | 4.515536 |
| East Battery, 1911 | 46 16 46.107 | 1423.6 | 283 22 29.1 | 103 28 03.3 | Scarboro Hill 2 | 10180.9 | 4.007786 |
| | 124 02 39.557 | 846.9 | 320 57 34.9 | 141 13 08.6 | Saddle Mountain 2 | 44275.6 | 4.646164 |
| | | | 350 05 33.4 | 170 08 57.6 | Tillamook Head | 35436.0 | 4.549445 |
| East Battery reference mark No. 1,[1] 1911. | 46 16 45.893 | 1417.0 | 225 23 | 45 23 | East Battery | 9.42 | 0.97405 |
| | 124 02 39.870 | 853.6 | | | | | |
| East Battery reference mark No. 2,[1] 1911. | 46 16 46.040 | 1421.6 | 244 09 | 64 09 | East Battery | 4.71 | 0.67302 |
| | 124 02 39.755 | 851.2 | | | | | |
| East Battery reference mark No. 3,[1] 1911. | 46 16 46.214 | 1426.9 | 300 25 | 120 25 | East Battery | 6.54 | 0.81558 |
| | 124 02 39.820 | 852.5 | | | | | |
| Battery, 1873 | 46 16 37.486 | 1157.5 | 281 36 22.4 | 101 42 05.4 | Scarboro Hill 2 | 10380.3 | 4.016212 |
| | 124 02 51.852 | 1110.2 | 320 28 30.6 | 140 44 13.3 | Saddle Mountain 2 | 44236.0 | 4.645776 |
| | | | 349 35 37.6 | 169 39 10.6 | Tillamook Head | 35220.4 | 4.546794 |
| Fort Stevens Longitude, 1911 | 46 12 27.600 | 852.2 | 141 12 57.4 | 321 09 20.9 | East Battery | 10243.8 | 4.010461 |
| | 123 57 39.853 | 854.3 | 211 48 35.6 | 31 50 33.1 | Scarboro Hill 2 | 6613.0 | 3.820398 |
| North Head Lighthouse, 1909 | 46 17 57.855 | 1786.4 | 317 35 47.7 | 137 37 04.2 | Battery | 3360.1 | 3.526349 |
| | 124 04 37.681 | 806.5 | 346 53 47.8 | 166 58 37.1 | Tillamook Head | 38112.2 | 4.581064 |
| | | | 353 29 34.8 | 173 32 08.2 | Tillamook Rock Lighthouse | 40456.7 | 4.606990 |
| Point Adams (unused) Lighthouse, 1909. | 46 11 37.388 | 1154.5 | 148 48 27.2 | 328 45 17.9 | Battery | 10834.9 | 4.034825 |
| | 123 58 29.760 | 638.1 | 212 25 19.6 | 32 27 53.1 | Scarboro Hill 2 | 8495.0 | 3.929165 |
| Desdemona Sands Lighthouse, 1909 | 46 13 32.471 | 1002.6 | 24 11 43.5 | 204 10 49.8 | Point Adams (unused) Lighthouse. | 3895.3 | 3.590543 |
| | 123 57 15.307 | 328.0 | | | | | |
| | | | 128 25 41.0 | 308 21 37.9 | Battery | 9198.0 | 3.963695 |
| | | | 219 17 57.0 | 39 19 36.8 | Scarboro Hill 2 | 4673.4 | 3.669634 |
| Fort Stevens Wharf Light, 1909 | 46 12 32.543 | 1004.9 | 135 35 08.6 | 315 30 58.6 | Battery | 10594.2 | 4.025070 |
| | 123 57 05.562 | 119.2 | 206 42 54.1 | 26 44 26.9 | Scarboro Hill 2 | 6120.0 | 3.786755 |
| Cape Disappointment Lighthouse, 1873. | 46 16 34.750 | 1073.0 | 280 51 40.4 | 100 57 32.7 | Scarboro Hill 2 | 10632.2 | 4.026623 |
| | 124 03 04.629 | 99.1 | 320 07 50.0 | 140 23 41.8 | Saddle Mountain 2 | 44345.8 | 4.646853 |
| | | | 314 14 07.4 | 134 19 35.6 | Tansey Point 2 | 13600.7 | 4.133562 |
| Island (U. S. E.), 1913 | 46 15 37.690 | 1163.8 | 109 20 24.2 | 289 17 00.8 | East Battery | 6387.8 | 3.805349 |
| | 123 57 58.035 | 1242.9 | 346 40 31.7 | 166 41 02.6 | Desdemona Sands Light | 3973.2 | 3.599141 |
| | | | 356 12 02.0 | 176 12 15.1 | Fort Stevens Longitude | 5882.2 | 3.769540 |
| Island (U. S. E.) reference mark,[1] 1913. | 46 15 36.498 | 1126.9 | 224 03 11 | 44 03 12 | Island (U. S. E.) | 51.22 | 1.70944 |
| | 123 57 59.698 | 1278.6 | | | | | |
| Astoria, St. Mary's Hospital cross, 1909. | 46 11 19.887 | 614.1 | 102 59 13.4 | 282 53 44.7 | Fort Stevens Wharf Light | 10017.1 | 4.000741 |
| | 123 49 30.236 | 648.4 | 119 48 09.3 | 299 38 30.5 | Battery | 19779.0 | 4.296204 |
| | | | 137 46 22.1 | 317 42 26.1 | Scarboro Hill 2 | 10416.8 | 4.017735 |
| Tansy Point 2, 1873 | 46 11 27.210 | 840.2 | 135 23 45.8 | 315 18 26.9 | Battery | 13466.0 | 4.129239 |
| | 123 55 30.208 | 647.8 | 185 24 44.2 | 5 25 08.1 | Scarboro Hill 2 | 7516.9 | 3.876040 |
| Smith Point, 1851 | 46 10 50.120 | 1547.6 | 102 38 17.7 | 282 35 25.5 | Tansy Point 2 | 5244.0 | 3.719662 |
| | 123 51 31.590 | 677.5 | 126 24 42.8 | 306 16 31.6 | Battery | 18098.1 | 4.257632 |
| | | | 152 58 36.7 | 332 56 08.3 | Scarboro Hill 2 | 9687.9 | 3.986228 |
| Scarboro Hill, 1851 | 46 15 22.608 | 698.1 | 331 23 55.2 | 151 26 29.6 | Smith Point | 9580.9 | 3.981405 |
| | 123 55 05.431 | 116.3 | 4 10 51.6 | 184 10 33.7 | Tansy Point 2 | 7287.6 | 3.862585 |
| | | | 103 04 45.9 | 282 59 09.0 | Battery | 10252.3 | 4.010822 |
| Tansy Point, 1851 | 46 11 24.702 | 762.8 | 183 26 39.2 | 3 26 54.1 | Scarboro Hill | 7359.0 | 3.866817 |
| | 123 55 26.072 | 559.1 | 281 57 51.6 | 102 00 40.8 | Smith Point | 5140.9 | 3.711036 |
| Point Adams, 1851 | 46 12 32.595 | 1006.5 | 213 20 30.4 | 33 22 26.9 | Scarboro Hill | 6284.8 | 3.798291 |
| | 123 57 46.707 | 1001.4 | 304 47 35.5 | 124 49 17.0 | Tansy Point | 3672.4 | 3.564950 |
| Cape Disappointment, 1851 | 46 16 46.255 | 1428.3 | 284 52 03.2 | 104 57 30.4 | Scarboro Hill | 10035.8 | 4.001550 |
| | 124 02 38.297 | 819.9 | 321 23 43.1 | 141 27 13.7 | Point Adams | 10018.2 | 4.000790 |
| Baker east base, 1851 | 46 18 14.932 | 461.1 | 319 59 31.7 | 140 02 02.3 | Scarboro Hill | 6944.5 | 3.841639 |
| | 123 58 33.873 | 725.0 | 62 23 58.3 | 242 21 01.6 | Cape Disappointment | 5905.0 | 3.771222 |
| Baker west base, 1851 | 46 18 54.303 | 1676.8 | 293 09 15.6 | 113 10 51.6 | Baker east base | 3090.0 | 3.489954 |
| | 124 00 46.633 | 997.7 | 31 09 46.6 | 211 08 25.9 | Cape Disappointment | 4619.9 | 3.664634 |
| Point Ellice, 1851 | 46 14 30.663 | 946.8 | 34 56 48.4 | 214 54 33.4 | Tansy Point | 7003.3 | 3.845300 |
| | 123 52 19.003 | 407.1 | 62 35 58.7 | 242 32 02.1 | Point Adams | 7912.7 | 3.898325 |
| Astor Point, 1851 | 46 11 29.759 | 918.9 | 88 39 20.4 | 268 35 41.5 | Tansy Point | 6508.3 | 3.813465 |
| | 123 50 22.660 | 485.9 | 101 33 45.8 | 281 28 25.3 | Point Adams | 9716.2 | 3.987498 |
| | | | 139 54 01.5 | 319 50 37.3 | Scarboro Hill | 9402.9 | 3.973262 |
| | | | 155 57 11.7 | 335 55 47.7 | Point Ellice | 6117.0 | 3.786539 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Grays Point, 1851 | 46 16 27.321 | 843.6 | 32 09 58.7 | 212 06 44.2 | Astor Point | 10850.4 | 4.035444 |
| | 123 45 53.282 | 1140.9 | 66 28 52.4 | 246 24 13.7 | Point Ellice | 9012.5 | 3.954843 |
| Tongue Point, 1851 | 46 12 48.310 | 1491.6 | 109 37 34.3 | 289 32 35.0 | Point Ellice | 9428.1 | 3.974426 |
| | 123 45 24.501 | 525.2 | 174 47 34.5 | 354 47 13.7 | Grays Point | 6790.3 | 3.831892 |
| Rocky Point, 1851 | 46 15 38.304 | 1182.7 | 64 55 32.4 | 244 49 15.2 | Tongue Point | 12361.2 | 4.092059 |
| | 123 36 42.175 | 903.3 | 97 21 47.4 | 277 15 09.2 | Grays Point | 11898.2 | 4.075483 |
| Indian Point, 1852 | 46 10 45.884 | 1416.7 | 111 47 42.8 | 291 42 23.9 | Tongue Point | 10200.6 | 4.008625 |
| | 123 38 02.611 | 56.6 | 190 48 20.8 | 10 49 18.9 | Rocky Point | 9192.1 | 3.963415 |
| Cathlamet Point, 1851 | 46 14 00.036 | 1.1 | 56 40 26.8 | 236 35 20.3 | Indian Point | 10899.0 | 4.037388 |
| | 123 30 58.054 | 1244.0 | 112 24 21.5 | 292 20 12.9 | Rocky Point | 7971.9 | 3.901560 |
| Jim Crow Point, 1851 | 46 15 39.931 | 1232.9 | 310 09 40.5 | 130 11 43.7 | Cathlamet Point | 4780.8 | 3.679499 |
| | 123 33 48.564 | 1040.1 | 30 58 49.0 | 210 55 45.6 | Indian Point | 10587.0 | 4.024772 |
| Three Tree Point, 1851 | 46 16 03.673 | 113.4 | 356 12 49.6 | 176 12 58.1 | Cathlamet Point | 3825.9 | 3.582728 |
| | 123 31 09.843 | 210.8 | 77 50 42.6 | 257 48 47.9 | Jim Crow Point | 3477.2 | 3.541234 |
| Aldrich, 1871 | 46 14 06.665 | 205.8 | 125 45 38.9 | 305 43 24.0 | Jim Crow Point | 4929.9 | 3.692836 |
| | 123 30 41.774 | 895.1 | 170 33 15.2 | 350 32 54.9 | Three Tree Point | 3662.5 | 3.563778 |
| Skumaquea, 1871 | 46 16 18.907 | 583.8 | 48 36 06.9 | 228 33 30.8 | Aldrich | 6172.0 | 3.790423 |
| | 123 27 05.700 | 122.1 | 84 52 59.9 | 264 50 03.5 | Three Tree Point | 5249.0 | 3.720080 |
| Quinn, 1871 | 46 13 36.188 | 1117.3 | 147 34 15.1 | 327 32 37.5 | Three Tree Point | 5396.0 | 3.732069 |
| | 123 28 54.716 | 1172.6 | 204 55 06.7 | 24 56 25.4 | Skumaquea | 5540.4 | 3.743540 |
| Lokamin, 1871 | 46 14 32.240 | 995.4 | 76 27 49.4 | 256 23 47.8 | Quinn | 7376.2 | 3.867833 |
| | 123 23 20.081 | 430.3 | 124 17 55.7 | 304 15 12.7 | Skumaquea | 5848.0 | 3.767007 |
| Hunts Mill Point, 1871 | 46 11 39.722 | 1226.5 | 134 20 44.4 | 314 18 40.5 | Quinn | 5146.2 | 3.711490 |
| | 123 26 02.984 | 64.0 | 213 13 40.0 | 33 15 37.6 | Lokamin | 6369.1 | 3.804075 |
| Birnie, 1871 | 46 11 56.792 | 1753.5 | 82 48 52.9 | 262 46 32.6 | Hunts Mill Point | 4202.6 | 3.623513 |
| | 123 22 48.533 | 1040.6 | 171 59 04.2 | 351 58 41.4 | Lokamin | 4847.0 | 3.685477 |
| Westport, 1871 | 46 07 56.489 | 1744.2 | 148 27 19.8 | 328 24 57.5 | Hunts Mill Point | 8089.3 | 3.907913 |
| | 123 22 45.620 | 979.3 | 179 31 03.6 | 359 31 01.5 | Birnie | 7419.9 | 3.870397 |
| Anderson, 1872 | 46 09 54.059 | 1669.1 | 47 47 59.9 | 227 45 45.4 | Westport | 5402.2 | 3.732572 |
| | 123 19 39.194 | 840.9 | 111 39 30.0 | 291 34 53.1 | Hunts Mill Point | 8854.6 | 3.947171 |
| Woods, 1873 | 46 06 46.373 | 1431.8 | 115 10 53.8 | 295 08 19.1 | Westport | 5092.0 | 3.706892 |
| | 123 19 10.958 | 235.3 | 174 01 56.6 | 354 01 36.3 | Anderson | 5826.6 | 3.765413 |
| Cape Horn, 1873 | 46 09 09.977 | 308.0 | 29 02 21.9 | 209 00 59.3 | Woods | 5070.9 | 3.705083 |
| | 123 17 16.335 | 350.5 | 72 14 01.0 | 252 10 03.6 | Westport | 7422.7 | 3.870563 |
| Clatskanie, 1873 | 46 07 13.156 | 406.2 | 82 46 27.6 | 262 42 49.6 | Woods | 6547.3 | 3.816059 |
| | 123 14 08.493 | 182.4 | 131 50 00.4 | 311 47 45.0 | Cape Horn | 5410.0 | 3.733194 |
| Cooper, 1873 | 46 09 30.963 | 956.0 | 342 02 46.9 | 162 03 33.2 | Clatskanie | 4472.6 | 3.650557 |
| | 123 15 12.701 | 272.5 | 45 12 22.4 | 225 09 30.6 | Woods | 7209.8 | 3.857924 |
| Bradbury, 1873 | 46 09 11.460 | 353.8 | 59 44 28.8 | 239 40 58.8 | Clatskanie | 7242.6 | 3.859892 |
| | 123 09 17.138 | 367.8 | 94 32 54.7 | 274 28 38.3 | Cooper | 7653.3 | 3.883849 |
| Abernathy, 1873 | 46 11 16.009 | 494.3 | 331 49 28.6 | 151 50 37.8 | Bradbury | 4362.1 | 3.639697 |
| | 123 10 53.120 | 1139.2 | 59 48 22.4 | 239 45 15.1 | Cooper | 6444.0 | 3.809156 |
| Nequally, 1873 | 46 11 24.019 | 741.6 | 22 49 37.2 | 202 48 39.3 | Bradbury | 4440.4 | 3.647425 |
| | 123 07 56.859 | 1219.3 | 86 16 26.9 | 266 14 19.7 | Abernathy | 3788.0 | 3.578407 |
| Stoughton, 1873 | 46 10 06.131 | 189.3 | 121 36 59.9 | 301 35 01.9 | Abernathy | 4117.6 | 3.614642 |
| | 123 08 09.614 | 206.2 | 186 29 20.2 | 6 29 29.4 | Nequally | 2420.4 | 3.383887 |
| Greens Point, 1873 | 46 10 00.249 | 7.7 | 93 23 07.9 | 273 21 24.2 | Stoughton | 3088.3 | 3.489722 |
| | 123 05 45.907 | 984.8 | 132 39 13.7 | 312 37 39.2 | Nequally | 3818.3 | 3.581867 |
| Coal Creek Ridge, 1873 | 46 10 52.624 | 1624.8 | 69 04 56.5 | 249 02 34.4 | Greens Point | 4525.4 | 3.655658 |
| | 123 02 28.868 | 619.1 | 97 52 45.1 | 277 48 48.5 | Nequally | 7100.6 | 3.851295 |
| Mount Solo, 1873 | 46 09 23.903 | 738.0 | 99 45 19.7 | 279 41 39.6 | Greens Point | 6643.6 | 3.822403 |
| | 123 00 40.710 | 873.5 | 139 44 45.2 | 319 43 27.2 | Coal Creek Ridge | 3589.9 | 3.555088 |
| Rinearson, 1873 | 46 07 57.555 | 1777.1 | 180 27 00.1 | 0 27 01.5 | Coal Creek Ridge | 5405.6 | 3.732843 |
| | 123 02 30.846 | 662.2 | 221 32 58.7 | 41 34 18.1 | Mount Solo | 3563.1 | 3.551822 |
| Huntington, 1873 | 46 09 09.530 | 294.2 | 72 06 39.3 | 252 02 48.5 | Rinearson | 7222.1 | 3.858662 |
| | 122 57 10.680 | 229.2 | 115 01 55.5 | 294 58 06.0 | Coal Creek Ridge | 7531.9 | 3.876903 |
| Rainier, 1873 | 46 05 11.963 | 369.4 | 119 26 33.8 | 299 21 29.4 | Rinearson | 10414.9 | 4.017654 |
| | 122 55 28.342 | 608.9 | 163 20 00.6 | 343 18 46.9 | Huntington | 7657.1 | 3.884066 |
| Coweman, 1873 | 46 06 26.688 | 824.0 | 57 56 33.7 | 237 54 30.2 | Rainier | 4344.8 | 3.637968 |
| | 122 52 36.950 | 793.6 | 130 34 41.4 | 310 31 24.2 | Huntington | 7733.8 | 3.888392 |

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Mount Coffin, 1873 | 46 07 47.153 | 1455.9 | 226 03 28.0 | 46 04 56.7 | Huntington | 3666.1 | 3.564208 |
| | 122 59 13.693 | 294.0 | 286 13 07.6 | 106 17 53.5 | Coweman | 8873.8 | 3.948112 |
| Mount Coffin reference mark,[1] 1913 | 46 07 46.158 | 1425.2 | 176 00 43 | 356 00 43 | Mount Coffin | 30.8 | 1.48855 |
| | 122 59 13.593 | 291.8 | | | | | |
| Warren, 1873 | 46 05 03.563 | 110.0 | 132 38 35.0 | 312 35 30.9 | Mount Coffin | 7459.7 | 3.872720 |
| | 122 54 58.090 | 1248.2 | 229 44 13.8 | 49 45 55.5 | Coweman | 3972.3 | 3.599042 |
| Carrolls Point, 1873 | 46 04 09.408 | 290.5 | 114 01 02.4 | 293 58 56.5 | Warren | 4111.0 | 3.613947 |
| | 122 52 03.317 | 71.3 | 170 19 45.6 | 350 19 21.4 | Coweman | 4299.8 | 3.633444 |
| Galloway, 1873 | 46 04 00.965 | 29.8 | 197 01 18.5 | 17 02 04.7 | Coweman | 4705.6 | 3.672614 |
| | 122 53 41.088 | 883.1 | 262 55 05.4 | 82 56 15.8 | Carrolls Point | 2117.4 | 3.325800 |
| Carr, 1873 | 46 02 44.830 | 1384.3 | 160 16 30.0 | 340 16 01.8 | Galloway | 2497.3 | 3.397467 |
| | 122 53 01.871 | 40.2 | 205 43 41.9 | 25 44 24.1 | Carrolls Point | 2898.9 | 3.462232 |
| Carr reference mark,[1] 1913 | 46 02 44.056 | 1360.2 | 180 30 50 | 0 30 50 | Carr | 23.9 | 1.37840 |
| | 122 53 01.881 | 40.4 | | | | | |
| Drays Mound, 1873 | 46 02 38.690 | 1194.6 | 95 52 40.8 | 275 51 39.1 | Carr | 1853.8 | 3.268059 |
| | 122 51 36.103 | 776.3 | 133 24 26.7 | 313 22 56.7 | Galloway | 3697.5 | 3.567909 |
| | | | 344 33 47.9 | 164 34 35.2 | Rocky Ridge | 5313.1 | 3.725346 |
| Gobles Point, 1873 | 46 01 04.653 | 143.7 | 167 50 31.7 | 347 50 09.4 | Carr | 3164.0 | 3.500237 |
| | 122 52 30.877 | 664.2 | 202 04 41.2 | 22 05 20.6 | Drays Mound | 3133.3 | 3.496002 |
| | | | 310 32 19.2 | 130 33 45.9 | Rocky Ridge | 3411.9 | 3.532994 |
| | | | 343 45 17.2 | 163 45 45.9 | Hunter | 3068.2 | 3.486885 |
| Rocky Ridge, 1878 | 45 59 52.811 | 1630.5 | 332 42 48.2 | 152 43 34.2 | Hoffman | 3002.0 | 3.477413 |
| | 122 50 30.382 | 653.7 | 25 29 33.4 | 205 28 25.3 | Merrill | 4740.1 | 3.675790 |
| | | | 67 16 28.2 | 247 15 30.2 | Hunter | 1881.1 | 3.274419 |
| Hunter, 1873 | 45 59 29.266 | 903.6 | 301 56 42.5 | 121 58 26.4 | Hoffman | 3667.3 | 3.564343 |
| | 122 51 51.003 | 1097.6 | 307 26 38.7 | 127 28 58.4 | Martins Bluff | 5270.2 | 3.721826 |
| | | | 4 53 32.4 | 184 53 22.2 | Merrill | 3565.0 | 3.552059 |
| Hoffman, 1878 | 45 58 26.395 | 814.9 | 319 42 50.4 | 139 43 26.2 | Martins Bluff | 1657.5 | 3.219446 |
| | 122 49 26.454 | 569.5 | 64 46 15.8 | 244 44 21.7 | Merrill | 3777.0 | 3.577149 |
| Martins Bluff, 1878 | 45 57 45.441 | 1402.9 | 308 55 50.1 | 128 58 10.2 | Burnt Hill | 5399.4 | 3.732346 |
| | 122 48 36.682 | 789.8 | 359 46 04.9 | 179 46 05.9 | Adams | 7054.1 | 3.848442 |
| Martins Bluff reference mark,[1] 1913 | 45 57 45.523 | 1405.5 | 75 00 50 | 255 00 50 | Martins Bluff | 9.78 | 0.99034 |
| | 122 48 36.243 | 780.4 | | | | | |
| Merrill, 1878 | 45 57 34.222 | 1056.6 | 265 33 58.1 | 85 36 27.9 | Martins Bluff | 4501.7 | 3.653381 |
| | 122 52 05.122 | 110.3 | 289 17 23.1 | 109 22 13.0 | Burnt Hill | 9207.9 | 3.964162 |
| | | | 333 32 27.4 | 153 33 57.0 | Maple Hill | 6030.1 | 3.780321 |
| Burnt Hill, 1878 | 45 55 55.504 | 1713.7 | 331 07 42.1 | 151 09 17.8 | Lewis River Hills | 5951.6 | 3.774631 |
| | 122 45 21.726 | 468.1 | 356 53 22.0 | 176 53 54.0 | Fales | 17801.9 | 4.250467 |
| | | | 35 21 22.2 | 215 18 52.3 | Table Cliff | 7777.7 | 3.890850 |
| Maple Hill, 1878 | 45 54 39.354 | 1215.0 | 197 25 52.9 | 17 26 53.1 | Martins Bluff | 6022.2 | 3.779757 |
| | 122 50 00.463 | 10.0 | 248 35 42.5 | 68 39 02.8 | Burnt Hill | 6450.2 | 3.809570 |
| | | | 287 48 55.8 | 107 53 51.8 | Lewis River Hills | 9331.5 | 3.969951 |
| Lewis River Hills, 1878 | 45 53 06.677 | 206.1 | 14 04 12.3 | 194 03 22.0 | Reed | 6224.2 | 3.794082 |
| | 122 43 08.454 | 182.3 | 81 18 13.3 | 261 14 07.8 | Table Cliff | 7460.6 | 3.872774 |
| Reed, 1878 | 45 49 51.122 | 1578.4 | 3 29 49.6 | 183 29 36.4 | Fales | 6537.8 | 3.815435 |
| | 122 44 18.560 | 400.6 | 38 21 29.8 | 218 15 34.1 | Bouser | 17302.7 | 4.238113 |
| | | | 57 25 44.3 | 237 19 04.9 | Scappoose | 14285.7 | 4.154901 |
| Table Cliff, 1878 | 45 52 29.999 | 926.2 | 309 52 46.2 | 129 56 01.3 | Reed | 7646.0 | 3.883436 |
| | 122 48 50.409 | 1087.1 | 334 24 10.6 | 154 27 12.4 | Fales | 12672.2 | 4.102852 |
| | | | 14 43 34.4 | 194 40 53.5 | Bouser | 19108.0 | 4.281216 |
| | | | 26 03 38.1 | 206 00 13.6 | Scappoose | 14031.0 | 4.147088 |
| Scappoose, 1878 | 45 45 41.648 | 1285.8 | 298 54 26.7 | 110 02 43.1 | Secrist | 17136.5 | 4.233923 |
| | 122 53 35.646 | 770.4 | 335 59 43.2 | 156 03 58.4 | Willamet | 18992.7 | 4.278596 |
| | | | 347 24 16.3 | 167 24 59.8 | Bouser | 6019.5 | 3.779560 |
| Fales, 1878 | 45 46 19.758 | 610.0 | 12 01 18.2 | 191 59 07.9 | Willamet | 18945.7 | 4.277510 |
| | 122 44 37.017 | 799.8 | 55 44 10.3 | 235 38 28.0 | Bouser | 12509.3 | 4.097233 |
| | | | 84 16 51.9 | 264 10 25.9 | Scappoose | 11698.3 | 4.068121 |
| Secrist, 1881 | 45 41 12.753 | 393.7 | 2 02 43.4 | 186 02 23.1 | Balch | 17243.6 | 4.236628 |
| | 122 42 02.400 | 51.9 | 38 52 54.6 | 218 48 53.8 | Willamet | 11624.2 | 4.065363 |
| Bouser, 1878 | 45 42 31.365 | 968.3 | 279 59 36.5 | 100 07 09.2 | Secrist | 13899.1 | 4.142986 |
| | 122 52 34.962 | 756.2 | 330 48 38.2 | 150 52 09.8 | Willamet | 13146.2 | 4.118709 |
| Willamet, 1881 | 45 36 19.521 | 602.7 | 261 20 00.8 | 81 26 59.2 | Harney | 12832.3 | 4.108305 |
| | 122 47 39.108 | 847.5 | 320 42 18.7 | 140 45 58.9 | Balch | 10564.8 | 4.023861 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Harney, 1881 | 45 37 21.734 | 671.0 | 328 15 53.08 | 148 18 43.96 | Rocky Butte | 9866.53 | 3.9941643 |
| | 122 37 53.538 | 1159.9 | 40 59 24.33 | 220 54 19.74 | Barnes | 14110.22 | 4.1495337 |
| Warren, 1903 | 45 48 33.229 | 1025.9 | 225 52 07.84 | 46 03 54.50 | Davis | 29504.23 | 4.4698843 |
| | 122 52 08.079 | 187.4 | 296 26 15.40 | 116 59 49.58 | Larch | 68230.27 | 4.8339771 |
| | | | 343 29 22.08 | 163 34 28.69 | Barnes | 32731.73 | 4.5149689 |
| Barnes, 1903 | 45 31 36.526 | 1127.6 | 357 18 16.35 | 177 19 51.87 | Hult | 62686.70 | 4.7971754 |
| | 122 45 00.031 | 0.7 | 30 59 06.87 | 210 42 21.69 | Yam | 60103.71 | 4.7789013 |
| Rocky Butte, 1889 | 45 32 49.861 | 1539.3 | 81 09 27.93 | 261 01 32.80 | Barnes | 14620.66 | 4.1649670 |
| | 122 33 54.303 | 1177.8 | 140 59 23.21 | 320 46 20.26 | Warren | 37539.95 | 4.5744937 |
| | | | 177 15 37.04 | 357 14 17.96 | Davis | 49689.84 | 4.6962679 |
| Fir, 1903 | 45 31 23.055 | 711.8 | 295 11 01.5 | 115 11 39.9 | Cem | 1293.0 | 3.111594 |
| | 122 44 46.238 | 1003.6 | 8 09 29.8 | 188 09 23.5 | Hill | 1343.7 | 3.128313 |
| Monument, General Land Survey, 1903. | 45 31 11.933 | 368.4 | 23 58 29.5 | 203 58 15.0 | Hill | 1079.9 | 3.033393 |
| | 122 44 34.806 | 755.4 | 144 09 14.0 | 324 09 05.8 | Fir | 423.6 | 2.626968 |
| Hill, 1903 | 45 30 39.970 | 1234.0 | 176 26 18.0 | 356 26 14.4 | Barnes | 1749.4 | 3.242892 |
| | 122 44 55.023 | 1194.3 | 240 10 43.2 | 60 11 27.9 | Cem | 1568.4 | 3.195468 |
| Cem, 1903 | 45 31 05.230 | 161.5 | 123 20 05.0 | 303 19 16.7 | Barnes | 1758.5 | 3.245153 |
| | 122 43 52.328 | 1135.8 | 198 44 43.5 | 18 45 53.8 | River | 6640.3 | 3.822185 |
| River, 1903 | 45 34 28.89 | 891.9 | 285 42 28.7 | 105 48 25.4 | Rocky Butte | 11258.5 | 4.0514797 |
| | 122 42 13.91 | 301.6 | 34 07 13.5 | 214 05 14.9 | Barnes | 6426.7 | 3.8079902 |
| Oregonian, 1903 | 45 31 13.21 | 407.8 | 161 11 03.4 | 341 09 55.6 | River | 6382.8 | 3.8050088 |
| | 122 40 38.97 | 845.8 | 251 11 25.6 | 71 16 14.4 | Rocky Butte | 9273.7 | 3.9672517 |
| Portland longitude station, 1887 | 45 31 08.82 | 272.3 | | | | | |
| | 122 40 39.75 | 862.7 | | | | | |
| Portland latitude station, 1887 | 45 31 08.83 | 272.6 | 187 56 52 | 7 56 53 | Oregonian | 136.6 | 2.13537 |
| | 122 40 39.84 | 864.5 | | | | | |
| Portland bench mark (U. S. G. S.) | 45 31 09.07 | 280.0 | ..... | ..... | Oregonian | 128.7 | 2.10969 |
| | 122 40 39.77 | 863.1 | | | | | |
| Balch, 1881 | 45 31 54.574 | 1684.8 | 80 15 16.28 | 260 13 29.77 | Barnes | 3286.69 | 3.5167584 |
| | 122 42 30.763 | 667.4 | 210 43 44.61 | 30 47 02.60 | Harney | 11753.53 | 4.0701684 |
| | | | 261 17 15.30 | 81 23 23.91 | Rocky Butte | 11334.39 | 4.0543981 |
| S. (U. S. E.), 1913 | 46 15 23.539 | 726.8 | 31 52 36.3 | 211 50 42.1 | Gun (U. S. E.) | 6419.2 | 3.807480 |
| | 123 55 02.654 | 56.8 | 96 39 10.5 | 276 37 03.8 | Island (U. S. E.) | 3781.6 | 3.577677 |
| Baker (new), 1913 | 46 17 37.805 | 1167.3 | 316 33 08.8 | 136 35 21.2 | S. (U. S. E.) | 5708.6 | 3.756527 |
| | 123 58 05.940 | 127.2 | 357 23 11.0 | 177 23 16.7 | Island (U. S. E.) | 3712.6 | 3.569677 |
| H. (U. S. E.), 1913 | 46 16 03.574 | 110.3 | 228 02 50.6 | 48 04 39.9 | Baker (new) | 4353.5 | 3.638843 |
| | 124 00 37.203 | 796.7 | 279 45 18.6 | 99 49 20.3 | S. (U. S. E.) | 7270.8 | 3.861580 |
| | | | 330 30 28.6 | 150 32 36.1 | Gun (U. S. E.) | 7682.5 | 3.885501 |
| | | | 116 38 11.0 | 296 36 42.7 | East Battery | 2930.4 | 3.466933 |
| I (U. S. E.), 1913 | 46 17 21.098 | 651.4 | 262 50 10.3 | 82 52 29.3 | Baker (new) | 4147.8 | 3.617822 |
| | 124 01 18.213 | 389.9 | 339 51 11.6 | 159 51 41.3 | H (U. S. E.) | 2549.6 | 3.406475 |
| | | | 58 11 22.2 | 238 10 23.6 | East Battery | 2049.3 | 3.311600 |
| Wallicut (U. S. E.), 1913 | 46 18 41.990 | 1296.5 | 321 13 22.4 | 141 14 16.2 | Baker (new) | 2541.8 | 3.405149 |
| | 123 59 20.314 | 434.8 | 45 18 11.8 | 225 16 46.6 | I (U. S. E.) | 3550.4 | 3.550272 |
| Bluff (U. S. E.), 1913 | 46 18 28.384 | 876.4 | 262 23 09.3 | 82 24 55.7 | Wallicut (U. S. E.) | 3176.7 | 3.501983 |
| | 124 01 47.471 | 1015.8 | 343 13 26.9 | 163 13 48.1 | I (U. S. E.) | 2169.9 | 3.336437 |
| Point (U. S. E.), 1913 | 46 17 47.159 | 1456.1 | 227 51 05.8 | 47 51 53.3 | Bluff (U. S. E.) | 1897.1 | 3.278093 |
| | 124 02 53.201 | 1138.9 | 291 34 57.5 | 111 36 06.2 | I (U. S. E.) | 2186.6 | 3.339772 |
| | | | 351 11 20.3 | 171 11 30.4 | East Battery | 1907.6 | 3.280492 |
| Chinook (U. S. E.), 1913 | 46 16 50.516 | 1559.8 | 100 30 45.8 | 280 27 53.6 | I (U. S. E.) | 5187.0 | 3.714915 |
| | 123 57 19.965 | 427.6 | 143 12 06.8 | 323 10 39.8 | Wallicut (U. S. E.) | 4299.1 | 3.633374 |
| Sands, 1913 | 46 12 35.471 | 1095.2 | 300 18 05.5 | 120 20 19.9 | St. Marys Hospital | 4622.9 | 3.664912 |
| | 123 52 36.355 | 779.4 | 106 25 47.9 | 286 22 26.6 | Desdemona Sands Lighthouse | 6232.6 | 3.794669 |
| Point Ellice (U. S. E.), 1913 | 46 14 31.104 | 960.4 | 328 41 03.3 | 148 43 04.2 | St. Marys Hospital | 6909.7 | 3.839457 |
| | 123 52 17.703 | 379.3 | 6 23 23.4 | 186 23 09.9 | Sands | 3592.6 | 3.555411 |
| | | | 74 10 50.6 | 254 07 15.7 | Desdemona Sands Lighthouse | 6628.9 | 3.821440 |
| Point Ellice (U. S. E.) reference mark No. 1,[1] 1913. | 46 14 31.288 | 966.0 | 71 31 11 | 251 31 10 | Point Ellice (U. S. E.) | 17.925 | 1.25346 |
| | 123 52 16.909 | 362.3 | | | | | |
| Point Ellice (U. S. E.) reference mark No. 2,[1] 1913. | 46 14 31.742 | 980.1 | 8 43 10 | 188 43 10 | Point Ellice (U. S. E.) | 19.93 | 1.29951 |
| | 123 52 17.562 | 376.3 | | | | | |
| Harrington (U. S. E.), 1913 | 46 16 03.367 | 104.0 | 338 24 13.6 | 158 25 32.9 | Water | 6398.3 | 3.806066 |
| | 123 40 04.735 | 101.4 | 49 03 33.4 | 228 59 39.0 | Tongue (U. S. E.) | 9209.3 | 3.964226 |
| | | | 95 08 32.9 | 275 04 08.3 | Grays (U. S. E.) | 7872.0 | 3.896085 |
| Harrington (U. S. E.) reference mark,[1] 1913. | 46 16 02.897 | 89.4 | 123 10 43 | 303 10 43 | Harrington (U. S. E.) | 26.5 | 1.42325 |
| | 123 40 03.699 | 79.2 | | | | | |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Taylor, 1913 | 46 13 31.917 | 985.5 | 36 53 48.4 | 216 52 05.4 | St. Marys Hospital | 5096.6 | 3.707280 |
| | 123 47 07.551 | 161.8 | 105 24 23.8 | 285 20 39.8 | Point Ellice (U. S. E.) | 6892.5 | 3.838374 |
| Grays (U. S. E.), 1913 | 46 16 26.056 | 804.5 | 12 43 23.9 | 192 42 43.0 | Taylor | 5512.0 | 3.741311 |
| | 123 46 10.903 | 233.5 | 24 20 06.1 | 204 17 42.2 | St. Marys Hospital | 10373.6 | 4.015929 |
| | | | 65 43 26.0 | 245 39 01.0 | Point Ellice (U. S. E.) | 8620.7 | 3.935542 |
| Tongue (U. S. E.), 1913 | 46 12 47.794 | 1475.7 | 110 03 54.0 | 289 58 59.0 | Point Ellice (U. S. E.) | 9315.8 | 3.969218 |
| | 123 45 29.272 | 627.4 | 122 54 11.8 | 302 53 00.8 | Taylor | 2508.6 | 3.399426 |
| | | | 172 27 55.0 | 352 27 24.9 | Grays (U. S. E.) | 6797.9 | 3.832375 |
| Tongue (U. S. E.) reference mark, 1913. | 46 12 47.430 | 1464.4 | 206 30 24 | 26 30 24 | Tongue (U. S. E.) | 12.57 | 1.09934 |
| | 123 45 29.534 | 633.1 | | | | | |
| Water, 1913 | 46 12 50.676 | 1564.7 | 89 29 45.5 | 269 24 31.9 | Tongue (U. S. E.) | 9312.0 | 3.969042 |
| | 123 38 14.869 | 318.7 | 123 09 19.9 | 303 03 36.1 | Grays (U. S. E.) | 12175.0 | 4.085468 |
| Rocky Point 2, 1913 | 46 15 38.408 | 1185.9 | 21 01 00.1 | 200 59 53.0 | Water | 5547.7 | 3.744112 |
| | 123 36 42.048 | 900.5 | 65 03 05.1 | 244 56 44.3 | Tongue (U. S. E.) | 12464.4 | 4.095670 |
| | | | 96 56 36.5 | 276 49 45.4 | Grays (U. S. E.) | 12270.2 | 4.088852 |
| Rocky Point 2 reference mark,[1] 1913 | 46 15 38.886 | 1200.7 | 38 31 20 | 218 31 20 | Rocky Point 2 | 18.87 | 1.27577 |
| | 123 36 41.499 | 888.8 | | | | | |
| Wharf, 1913 | 46 13 40.309 | 1244.6 | 65 40 55.4 | 245 39 01.1 | Water | 3719.1 | 3.570440 |
| | 123 35 36.758 | 787.7 | 159 01 13.4 | 339 00 26.2 | Rocky Point 2 | 3905.6 | 3.591683 |
| | | | 130 39 27 | 310 39 27 | Jim Crow Point | 2.20 | 0.34242 |
| Jim Crow (U. S. E.), 1913 | 46 15 39.885 | 1231.5 | 32 08 59.2 | 212 07 41.0 | Wharf | 4360.2 | 3.639510 |
| | 123 33 48.486 | 1038.4 | 47 53 22.8 | 227 30 10.3 | Water | 7737.7 | 3.888610 |
| | | | 89 18 52.8 | 269 16 47.4 | Rocky Point 2 | 3717.4 | 3.570244 |
| Raspberry (U. S. E.), 1913 | 46 14 08.773 | 270.9 | 81 58 31.4 | 261 55 02.0 | Wharf | 6273.0 | 3.797478 |
| | 123 30 46.898 | 1004.9 | 125 53 34.4 | 305 51 23.2 | Jim Crow (U. S. E.) | 4800.6 | 3.681295 |
| Three Tree Point (U. S. E.), 1913 | 46 16 03.406 | 105.2 | 352 08 21.9 | 172 08 38.4 | Raspberry (U. S. E.) | 3573.0 | 3.553035 |
| | 123 31 09.704 | 207.8 | 52 20 49.4 | 232 17 36.5 | Wharf | 7228.4 | 3.859041 |
| | | | 77 57 36.1 | 257 55 41.4 | Jim Crow (U. S. E.) | 3477.1 | 3.541216 |
| | | | 160 04 51 | 340 04 51 | Three Tree Point | 8.77 | 0.94300 |
| Lower Skumaquea Light, June, 1913 | 46 16 04.654 | 143.7 | 48 12 08.6 | 228 09 53.7 | Raspberry (U. S. E.) | 5366.4 | 3.729680 |
| | 123 27 40.184 | 860.5 | 89 31 44.3 | 269 29 12.9 | Three Tree Point (U. S. E.) | 4486.9 | 3.651942 |
| Ten, 1913 | 46 14 39.622 | 1223.4 | 78 37 55.8 | 258 35 16.4 | Raspberry (U. S. E.) | 4823.1 | 3.683328 |
| | 123 27 06.215 | 133.1 | 116 24 27.7 | 296 21 31.8 | Three Tree Point (U. S. E.) | 5821.6 | 3.765043 |
| | | | 164 30 51.3 | 344 30 26.8 | Lower Skumaquea Light | 2724.5 | 3.435279 |
| Ten reference mark [1] | 46 14 39.638 | 1223.9 | 296 24 28 | 116 24 28 | Ten | 1.1 | 0.04139 |
| | 123 27 06.261 | 134.1 | | | | | |
| Stump, 1913 | 46 15 24.775 | 765.0 | 15 21 00.0 | 195 20 47.1 | Ten | 1445.7 | 3.160085 |
| | 123 26 48.351 | 1035.6 | 137 58 11.8 | 317 57 34.4 | Lower Skumaquea Light | 1657.8 | 3.219545 |
| Dike, 1913 | 46 13 43.613 | 1346.6 | 127 14 22.2 | 307 13 05.5 | Ten | 2858.5 | 3.456131 |
| | 123 25 19.992 | 428.4 | 145 25 24.4 | 325 23 43.2 | Lower Skumaquea Light | 5290.0 | 3.723454 |
| | | | 148 47 27.9 | 328 46 24.1 | Stump | 3652.4 | 3.562575 |
| Dike reference mark,[1] 1913 | 46 13 44.053 | 1360.2 | 67 06 22 | 247 06 21 | Dike | 34.94 | 1.54332 |
| | 123 25 18.490 | 396.2 | | | | | |
| Mud, 1913 | 46 13 46.094 | 1423.2 | 162 47 50.7 | 342 47 18.9 | Stump | 3189.7 | 3.503745 |
| | 123 26 04.307 | 92.3 | 274 36 28.4 | 94 37 00.4 | Dike | 952.7 | 2.978969 |
| Tree, 1913 | 46 07 09.447 | 291.7 | 116 05 15.6 | 296 03 33.7 | Rinearson | 3379.5 | 3.528855 |
| | 123 00 09.454 | 203.0 | 225 47 41.7 | 45 48 21.9 | Mount Coffin | 1669.9 | 3.222694 |
| Barlow, 1913 | 46 08 42.274 | 1305.4 | 324 55 42.6 | 144 56 50.1 | Tree | 3501.5 | 3.544260 |
| | 123 01 43.157 | 926.2 | 36 33 21.6 | 216 32 47.2 | Rinearson | 1718.8 | 3.235222 |
| Barlow reference mark, No. 1,[1] 1913 | 46 08 43.731 | 1350.2 | 319 02 58 | 139 02 59 | Barlow | 59.58 | 1.77510 |
| | 123 01 44.976 | 965.3 | | | | | |
| Barlow reference mark, No. 2,[1] 1913 | 46 08 44.046 | 1360.0 | 345 50 54 | 165 50 54 | Barlow | 56.435 | 1.75155 |
| | 123 01 43.800 | 940.1 | | | | | |
| Quarry (U. S. E.), 1913 | 46 07 42.832 | 1322.5 | 46 46 25.9 | 226 45 49.1 | Tree | 1504.9 | 3.177522 |
| | 122 59 18.383 | 394.6 | 96 17 52.0 | 276 15 33.3 | Rinearson | 4156.6 | 3.618742 |
| Slaughter 2 (U. S. E.), 1913 | 46 07 06.669 | 205.9 | 91 55 49.3 | 271 54 23.4 | Tree | 2561.9 | 3.408555 |
| | 122 58 10.209 | 219.1 | 105 42 34.3 | 285 39 26.5 | Rinearson | 5812.1 | 3.764333 |
| | | | 122 52 23.1 | 302 49 49.7 | Barlow | 5441.6 | 3.735726 |
| | | | 127 20 41.1 | 307 19 52.0 | Quarry (U. S. E.) | 1841.0 | 3.265045 |
| | | | 132 31 46.4 | 312 31 00.7 | Mount Coffin | 1849.4 | 3.267020 |
| Slaughter 2 (U. S. E.) reference mark, No. 1,[1] 1913. | 46 07 10.164 | 313.8 | 350 46 53 | 170 46 54 | Slaughter 2 (U. S. E.) | 109.32 | 2.03870 |
| | 122 58 11.025 | 236.7 | | | | | |
| Slaughter 2 (U. S. E.) reference mark, No. 2,[1] 1913. | 46 07 08.272 | 255.4 | 40 42 05 | 220 42 04 | Slaughter 2 (U. S. E.) | 65.30 | 1.81491 |
| | 122 58 08.226 | 176.6 | | | | | |
| Curve (U. S. E.), 1912 | 46 06 34.724 | 1072.1 | 176 56 19.7 | 356 56 15.9 | Quarry (U. S. E.) | 2105.9 | 3.323442 |
| | 122 59 13.144 | 282.3 | 233 52 13.4 | 53 52 58.7 | Slaughter 2 (U. S. E.) | 1673.1 | 3.223526 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Tangent (U. S. E.), 1912 | 46 06 06.453 | 199.2 | 122 37 50.0 | 302 37 04.3 | Curve (U. S. E.) | 1619.1 | 3.209273 |
| | 122 58 09.651 | 207.3 | 179 37 51.2 | 359 37 50.8 | Slaughter 2 (U. S. E.) | 1859.3 | 3.269345 |
| Beach 2 (U. S. E.), 1912 | 46 06 39.452 | 1218.1 | 36 20 19.7 | 216 19 54.6 | Tangent (U. S. E.) | 1264.8 | 3.102024 |
| | 122 57 34.757 | 746.4 | 137 49 49.3 | 317 49 23.8 | Slaughter 2 (U. S. E.) | 1133.9 | 3.054577 |
| Bourne (U. S. E.), 1912 | 46 05 50.121 | 1547.5 | 122 25 37.9 | 302 25 11.3 | Tangent (U. S. E.) | 940.5 | 2.973349 |
| | 122 57 32.692 | 702.2 | 178 19 55.3 | 358 19 53.8 | Beach 2 (U. S. E.) | 1523.8 | 3.182924 |
| A 2 (U. S. E.), 1912 | 46 06 22.442 | 692.9 | 28 43 32.0 | 208 43 13.6 | Bourne (U. S. E.) | 1138.0 | 3.056128 |
| | 122 57 07.231 | 155.3 | 69 47 26.3 | 249 46 41.3 | Tangent (U. S. E.) | 1428.7 | 3.154930 |
| Hut (U. S. E.), 1912 | 46 06 09.338 | 288.3 | 62 59 11.2 | 242 58 32.2 | Bourne (U. S. E.) | 1306.1 | 3.115972 |
| | 122 56 38.523 | 827.5 | 123 16 32.6 | 303 16 12.0 | A 2 (U. S. E.) | 737.5 | 2.867754 |
| Mill (U. S. E.), 1912 | 46 05 37.624 | 1161.7 | 114 38 17.6 | 294 37 49.4 | Bourne (U. S. E.) | 925.7 | 2.966457 |
| | 122 56 53.522 | 1149.8 | 198 12 42.4 | 18 12 53.2 | Hut (U. S. E.) | 1030.8 | 3.013185 |
| Wood 2 (U. S. E.), 1912 | 46 05 59.851 | 1847.9 | 51 39 54.7 | 231 39 25.6 | Mill (U. S. E.) | 1106.3 | 3.043875 |
| | 122 56 13.126 | 281.9 | 118 14 16.2 | 298 13 57.9 | Hut (U.S. E.) | 619.2 | 2.791811 |
| Dock (U. S. E.), 1912 | 46 05 35.092 | 1083.5 | 170 14 04.9 | 350 13 58.8 | Hut (U. S. E.) | 1072.9 | 3.030570 |
| | 122 56 30.050 | 645.6 | 205 25 55.6 | 25 26 07.8 | Wood 2 (U. S. E.) | 846.5 | 2.927624 |
| Net 2 (U. S. E.), 1912 | 46 05 55.825 | 1723.6 | 54 13 08.6 | 234 12 38.8 | Dock (U. S. E.) | 1094.7 | 3.039313 |
| | 122 55 48.708 | 1046.2 | 103 20 07.3 | 283 19 49.7 | Wood 2 (U. S. E.) | 539.0 | 2.731610 |
| Ranier 2 (U. S. E.), 1912 | 46 05 23.782 | 734.3 | 159 23 49.7 | 339 23 35.7 | Wood 2 (U. S. E.) | 1189.8 | 3.075458 |
| | 122 55 53.635 | 1152.3 | 186 06 21.4 | 6 06 25.0 | Net 2 (U. S. E.) | 995.0 | 2.997818 |
| Bluff (U. S. E.), 1912 | 46 05 12.591 | 388.8 | 112 07 44.8 | 292 07 16.3 | Ranier 2 (U. S. E.) | 917.5 | 2.962587 |
| | 122 55 14.075 | 302.4 | 150 52 14.7 | 330 51 49.8 | Net 2 (U. S. E.) | 1528.2 | 3.184185 |
| Cowlitz 2 (U. S. E.), 1912 | 46 090 0.078 | 2.4 | 23 54 49.3 | 203 54 27.5 | Bluff (U. S. E.) | 1603.9 | 3.205165 |
| | 122 54 43.814 | 941.1 | 84 37 27.6 | 264 36 40.9 | Net 2 (U. S. E.) | 1400.1 | 3.146148 |
| D 10 (U. S. E.), 1912 | 46 05 08.188 | 252.8 | 93 32 42.4 | 273 31 28.6 | Bluff (U. S. E.) | 2204.9 | 3.343388 |
| | 122 53 31.644 | 679.9 | 135 56 53.8 | 315 56 01.8 | Cowlitz 2 (U. S. E.) | 2229.5 | 3.348202 |
| D 9 (U. S. E.), 1912 | 46 04 45.917 | 1417.7 | 167 06 09.6 | 347 05 52.0 | Cowlitz 2 (U. S. E.) | 2349.1 | 3.370897 |
| | 122 54 19.403 | 416.9 | 236 10 08.9 | 56 10 43.3 | D 10 (U. S. E.) | 1235.3 | 3.091758 |
| D 8 (U. S. E.), 1912 | 46 04 42.860 | 1323.3 | 93 34 55.6 | 273 34 05.0 | D 9 (U. S. E.) | 1513.6 | 3.180025 |
| | 122 53 09.098 | 195.5 | 148 13 30.7 | 328 13 14.5 | D 10 (U. S. E.) | 919.9 | 2.963748 |
| D 7 (U. S. E.), 1912 | 46 04 23.417 | 723.0 | 199 12 01.5 | 19 12 17.7 | D 10 (U. S. E.) | 1463.8 | 3.165479 |
| | 122 53 54.051 | 1161.6 | 238 08 09.9 | 58 08 42.3 | D 8 (U. S. E.) | 1137.3 | 3.055885 |
| D 6 (U. S. E.), 1912 | 46 04 13.175 | 406.8 | 102 00 31.1 | 281 59 41.2 | D 7 (U. S. E.) | 1520.7 | 3.182035 |
| | 122 52 44.837 | 963.5 | 150 22 11.7 | 330 21 54.2 | D 8 (U. S. E.) | 1054.4 | 3.023020 |
| D 5 (U. S. E.), 1912 | 46 03 52.049 | 1607.0 | 199 51 11.7 | 19 51 30.7 | D 8 (U. S. E.) | 1668.0 | 3.222186 |
| | 122 53 35.460 | 762.1 | 239 03 05.4 | 59 03 41.9 | D 6 (U. S. E.) | 1268.5 | 3.103302 |
| D 4 (U. S. E.), 1912 | 46 03 08.083 | 249.6 | 125 23 34.6 | 305 22 30.6 | D 5 (U. S. E.) | 2344.3 | 3.370012 |
| | 122 52 06.546 | 140.7 | 157 43 58.2 | 337 43 30.7 | D 6 (U. S. E.) | 2171.8 | 3.336810 |
| D 3 (U. S. E.), 1912 | 46 02 54.549 | 1684.2 | 189 53 23.7 | 9 53 36.9 | D 6 (U. S. E.) | 2464.2 | 3.391681 |
| | 122 53 04.532 | 97.4 | 251 27 48.7 | 71 28 30.4 | D 4 (U. S. E.) | 1314.8 | 3.118854 |
| D 1 (U. S. E.), 1912 | 46 02 18.043 | 557.1 | 167 25 02.7 | 347 24 54.3 | D 3 (U. S. E.) | 1154.9 | 3.062541 |
| | 122 52 52.830 | 1136.0 | 212 46 50.5 | 32 47 23.8 | D 4 (U. S. E.) | 1837.7 | 3.264286 |
| D 2 (U. S. E.), 1912 | 46 02 26.711 | 824.7 | 65 25 04.7 | 245 24 45.1 | D 1 (U. S. E.) | 643.3 | 2.808396 |
| | 122 52 25.626 | 551.0 | 135 46 52.3 | 315 46 24.3 | D 3 (U. S. E.) | 1199.4 | 3.078959 |
| Kalama (U. S. E.), 1912 | 46 02 13.622 | 420.6 | 100 56 13.6 | 280 55 49.9 | D 1 (U. S. E.) | 719.6 | 2.857092 |
| | 122 52 19.974 | 429.5 | 163 15 33.5 | 343 15 29.4 | D 2 (U. S. E.) | 422.0 | 2.625316 |
| Coffin Rock (U. S. E.), 1912 | 46 02 03.873 | 119.6 | 167 46 27.0 | 347 46 23.8 | D 1 (U. S. E.) | 447.6 | 2.650931 |
| | 122 52 48.422 | 1041.3 | 243 47 57.0 | 63 48 17.5 | Kalama (U. S. E.) | 681.8 | 2.833659 |
| H 27 (U. S. E.), 1912 | 46 01 43.734 | 1350.3 | 122 27 31.4 | 302 26 58.7 | Coffin Rock (U. S. E.) | 1158.7 | 3.063986 |
| | 122 52 02.957 | 63.6 | 158 22 13.1 | 338 22 00.9 | Kalama (U. S. E.) | 992.7 | 2.996827 |
| H $30_2$ (U. S. E.), 1912 | 46 01 09.920 | 306.3 | 68 15 14.3 | 248 15 12.4 | Knight | 61.6 | 1.789845 |
| | 122 52 28.212 | 606.9 | 165 22 40.4 | 345 22 25.9 | Coffin Rock (U. S. E.) | 1721.6 | 3.235930 |
| | | | 207 29 10.7 | 27 29 28.9 | H 27 (U. S. E.) | 1176.9 | 3.070731 |
| | | | 302 58 48.6 | 123 00 07.0 | Kalama | 2794.0 | 3.446224 |
| | | | 357 14 58.7 | 177 15 00.4 | H 28 (U. S. E.) | 1103.0 | 3.042576 |
| Mill (U. S. E.), 1912 | 46 01 22.971 | 709.2 | 30 38 04.3 | 210 37 34.4 | H 28 (U. S. E.) | 1748.7 | 3.242709 |
| | 122 51 44.336 | 953.7 | 66 53 03.1 | 246 52 31.5 | H $30_2$ (U. S. E.) | 1026.2 | 3.011233 |
| | | | 66 57 44.2 | 246 57 10.7 | Knight | 1087.8 | 3.036559 |
| | | | 148 00 24.8 | 328 00 11.4 | H 27 (U. S. E.) | 755.9 | 2.878454 |
| | | | 323 57 57.5 | 143 58 44.3 | Kalama | 2379.4 | 3.376467 |
| | | | 330 48 55.6 | 150 49 47.8 | H $23_2$ (U. S. E.) | 3204.3 | 3.505738 |
| H 28 (U. S. E.), 1912 | 46 00 34.237 | 1057.1 | 297 46 45.3 | 117 48 07.3 | H $23_2$ (U. S. E.) | 2773.4 | 3.443011 |
| | 122 52 25.751 | 554.0 | 332 06 03.4 | 152 06 46.1 | Sluc | 2733.3 | 3.436694 |
| Bank, 1913 | 46 01 42.453 | 1310.7 | 28 57 02.9 | 208 56 43.9 | Knight | 1174.0 | 3.069662 |
| | 122 52 04.455 | 95.8 | 147 20 34.9 | 327 19 53.6 | Carr | 2287.7 | 3.359398 |

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Bank reference mark,[1] 1913 | 46 01 42.509 | 1312.5 | 86 58 21 | 266 58 20 | Bank | 33.0 | 1.51851 |
| | 122 52 02.923 | 62.9 | | | | | |
| Cable, 1913 | 46 02 21.121 | 652.1 | 336 21 14.7 | 156 21 32.2 | Bank | 1303.3 | 3.115042 |
| | 122 52 28.760 | 618.5 | 1 10 21.0 | 181 10 19.5 | Knight | 2221.7 | 3.346678 |
| | | | 135 48 02.2 | 315 47 38.4 | Carr | 1021.1 | 3.009083 |
| Dock, 1913 | 46 03 12.334 | 380.8 | 331 22 28.8 | 151 22 57.7 | Cable | 1801.3 | 3.255591 |
| | 122 53 08.892 | 191.1 | 349 55 05.8 | 169 55 10.9 | Carr | 862.5 | 2.935757 |
| | | | 155 01 49.7 | 335 01 30.6 | D 5 (U. S. E.) | 1352.7 | 3.131195 |
| Rail, 1913 | 46 04 09.421 | 290.9 | 8 58 12.5 | 188 57 54.8 | Cable | 3385.2 | 3.529582 |
| | 122 52 04.214 | 90.6 | 25 23 30.6 | 205 22 49.1 | Carr | 2890.9 | 3.461036 |
| | | | 38 16 15.3 | 218 15 28.7 | Dock | 2244.9 | 3.351193 |
| Cotton, 1913 | 46 04 15.526 | 479.4 | 281 29 06.5 | 101 29 37.6 | Rail | 946.3 | 2.976051 |
| | 122 52 47.366 | 1018.0 | 353 32 16.4 | 173 32 29.8 | Cable | 3554.9 | 3.550824 |
| | | | 6 21 16.5 | 186 21 06.1 | Carr | 2817.6 | 3.449876 |
| | | | 13 20 35.8 | 193 20 20.3 | Dock | 2005.2 | 3.302159 |
| | | | 54 57 48.3 | 234 57 13.7 | D 5 (U. S. E.) | 1262.5 | 3.101222 |
| Cotton reference mark No. 1,[1] 1913 | 46 04 15.525 | 479.3 | 90 02 46 | 270 02 45 | Cotton | 20.0 | 1.30103 |
| | 122 52 46.435 | 997.9 | | | | | |
| Cotton reference mark No. 2,[1] 1913 | 46 04 15.525 | 479.3 | 90 02 46 | 270 02 45 | Cotton | 50.0 | 1.69897 |
| | 122 52 45.039 | 967.9 | | | | | |
| Cut, 1913 | 46 04 03.863 | 119.3 | 252 48 10.5 | 72 48 49.5 | Cotton | 1218.3 | 3.085758 |
| | 122 53 41.521 | 892.4 | 265 17 58.5 | 85 19 08.6 | Rail | 2098.3 | 3.321875 |
| | | | 336 12 27.3 | 156 12 50.8 | Dock | 1738.7 | 3.240231 |
| Cut reference mark,[1] 1913 | 46 04 03.979 | 122.9 | 72 48 10 | 252 48 10 | Cut | 12.17 | 1.08529 |
| | 122 53 40.980 | 880.7 | | | | | |
| Cottonwood Island, 1913 | 46 04 43.040 | 1328.9 | 329 25 37.2 | 149 25 54.0 | Cotton | 986.6 | 2.994162 |
| | 122 53 10.718 | 230.3 | 359 11 50.8 | 179 11 52.1 | Dock | 2800.9 | 3.447293 |
| | | | 28 41 36.6 | 208 41 14.4 | Cut | 1378.9 | 3.139531 |
| Cottonwood Island reference mark No. 1,[1] 1913. | 46 04 43.538 | 1344.3 | 59 10 56 | 239 10 55 | Cottonwood Island | 30.0 | 1.47712 |
| | 122 53 09.519 | 204.5 | | | | | |
| Cottonwood Island reference mark No. 2,[1] 1913. | 46 04 44.036 | 1359.6 | 59 10 57 | 239 10 55 | Cottonwood Island | 60.0 | 1.77815 |
| | 122 53 08.320 | 178.8 | | | | | |
| Old, 1913 | 46 04 43.324 | 1337.6 | 270 21 10.7 | 90 21 57.6 | Cottonwood Island | 1397.5 | 3.145363 |
| | 122 54 15.755 | 338.5 | 294 18 27.3 | 114 19 31.0 | Cotton | 2084.3 | 3.318965 |
| Knight, 1913 | 46 01 09.180 | 283.4 | 167 16 59.7 | 347 16 37.4 | Carr | 3027.5 | 3.481088 |
| | 122 52 30.873 | 664.1 | 203 04 42.4 | 23 05 21.8 | Drays Mound | 3004.2 | 3.477728 |
| Knight reference mark No. 1,[1] 1913 | 46 01 08.591 | 265.2 | 181 22 23 | 1 22 23 | Knight | 18.2 | 1.26007 |
| | 122 52 30.893 | 664.6 | | | | | |
| Knight reference mark No. 2,[1] 1913 | 46 01 09.313 | 287.5 | 36 53 19 | 216 53 19 | Knight | 5.14 | 0.71096 |
| | 122 52 30.730 | 661.0 | | | | | |
| Kalama, 1913 | 46 00 20.646 | 637.4 | 121 58 59.2 | 301 57 38.9 | Knight | 2830.0 | 3.451791 |
| | 122 50 39.281 | 845.2 | 145 27 03.0 | 325 25 20.4 | Carr | 5405.9 | 3.732867 |
| | | | 164 00 19.6 | 343 59 38.7 | Drays Mound | 4433.9 | 3.646789 |
| Kalama reference mark [1], 1913 | 46 00 19.945 | 615.8 | 160 13 24 | 340 13 24 | Kalama | 22.99 | 1.36154 |
| | 122 50 38.919 | 837.4 | | | | | |
| Slue, 1913 | 45 59 15.993 | 493.8 | 158 20 00.1 | 338 19 13.7 | Knight | 3760.5 | 3.575250 |
| | 122 51 26.328 | 566.7 | 178 04 35.5 | 358 04 28.6 | Drays Mound | 6261.9 | 3.796704 |
| | | | 206 53 20.4 | 26 53 54.3 | Kalama | 2238.2 | 3.349908 |
| Slue reference mark No. 1,[1] 1913 | 45 59 14.496 | 447.6 | 219 36 49 | 39 36 50 | Slue | 60.0 | 1.77815 |
| | 122 51 28.106 | 604.9 | | | | | |
| Slue reference mark No. 2,[1] 1913 | 45 59 15.245 | 470.7 | 219 36 49 | 39 36 50 | Slue | 30.0 | 1.47712 |
| | 122 51 27.217 | 585.8 | | | | | |
| H $26_2$ (U. S. E.), 1912 | 45 59 15.652 | 483.3 | 109 55 21 | 289 55 20 | Slue | 30.90 | 1.48996 |
| | 122 51 24.978 | 537.6 | | | | | |
| Rock, 1913 | 45 59 43.290 | 1336.6 | 58 34 21.9 | 238 33 35.8 | Slue | 1616.1 | 3.208462 |
| | 122 50 22.257 | 479.0 | 162 22 54.0 | 342 22 41.8 | Kalama | 1210.1 | 3.082838 |
| Rock reference mark, No. 1,[1] 1913 | 45 59 43.588 | 1345.8 | 305 40 35 | 125 40 35 | Rock | 15.8 | 1.19866 |
| | 122 50 22.853 | 491.8 | | | | | |
| Rock reference mark, No. 2, [1] 1913 | 45 59 42.841 | 1322.7 | 225 33 42 | 45 33 42 | Rock | 19.8 | 1.29667 |
| | 122 50 22.914 | 493.1 | | | | | |
| Flat, 1913 | 45 58 45.361 | 1400.5 | 128 01 56.9 | 308 01 16.5 | Slue | 1535.3 | 3.186185 |
| | 122 50 30.143 | 648.9 | 176 10 36.1 | 356 10 29.6 | Kalama | 2948.5 | 3.469603 |
| | | | 185 25 12.7 | 5 25 18.4 | Rock | 1796.6 | 3.254454 |
| Flat reference mark, No. 1,[1] 1913 | 45 58 44.896 | 1386.2 | 226 51 21 | 46 51 21 | Flat | 21.00 | 1.32222 |
| | 122 50 30.855 | 664.2 | | | | | |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Flat reference mark, No. 2,[1] 1913 | 45 58 44.561<br>122 50 31.367 | 1375.8<br>675.2 | 226 51 22 | 46 51 21 | Flat | 36.10 | 1.55751 |
| H 21 (U. S. E.), 1912 | 45 59 19.566<br>122 50 05.616 | 604.1<br>120.9 | 26 33 43.3<br>86 22 27.3<br>153 56 47.4 | 206 33 25.6<br>266 21 29.2<br>333 56 35.4 | Flat<br>Slue<br>Rock | 1180.7<br>1740.6<br>815.3 | 3.072137<br>3.240710<br>2.911340 |
| H 21 (U. S. E.) reference mark,[1] 1913 | 45 59 18.917<br>122 50 04.718 | 584.1<br>101.5 | 136 01 33 | 316 01 32 | H 21 (U. S. E.) | 27.83 | 1.44451 |
| H $23_2$ (U. S. E.), 1912 | 45 59 52.356<br>122 50 31.724 | 1616.5<br>682.6 | 330 58 02.9<br>359 03 25.1<br>46 18 43.1<br>169 27 22.9 | 150 58 21.7<br>179 03 26.2<br>226 18 03.8<br>349 27 17.5 | H 21 (U. S. E.)<br>Flat<br>Slue<br>Kalama | 1157.9<br>2068.8<br>1625.2<br>888.5 | 3.063657<br>3.315712<br>3.210918<br>2.948037 |
| H $23_2$ (U. S. E.) reference mark,[1] 1913 | 45 59 52.432<br>122 50 30.839 | 1618.8<br>663.6 | 82 55 42 | 262 55 41 | H $23_2$ (U. S. E.) | 19.18 | 1.28285 |
| H 22 (U. S. E.), 1912 | 45 58 14.588<br>122 49 53.515 | 450.4<br>1152.2 | 140 18 46.2<br>172 36 08.4 | 320 18 19.8<br>352 35 59.7 | Flat<br>H 21 (U. S. E.) | 1234.7<br>2023.1 | 3.091571<br>3.306009 |
| H 22 (U. S. E.) reference mark,[1] 1913 | 45 58 14.175<br>122 49 54.514 | 437.6<br>1173.8 | 239 20 09 | 59 20 10 | H 22 (U. S. E.) | 25.0 | 1.39794 |
| H 19 (U. S. E.), 1912 | 45 58 26.590<br>122 49 26.614 | 821.0<br>572.9 | 57 23 14.1<br>152 50 01.6 | 237 22 54.8<br>332 49 33.6 | H 22 (U. S. E.)<br>H 21 (U. S. E.) | 687.5<br>1838.5 | 2.837288<br>3.264467 |
| H 19 (U. S. E.) reference mark,[1] 1913 | 45 58 26.462<br>122 49 25.692 | 817.0<br>553.1 | 101 16 05 | 281 16 04 | H 19 (U. S. E.) | 20.25 | 1.30642 |
| Hill (U. S. E.), 1912 | 45 58 07.963<br>122 48 57.032 | 245.9<br>1227.9 | 99 33 14.7<br>132 05 10.1<br>327 46 49.5 | 279 32 34.1<br>312 04 48.8<br>147 47 04.1 | H 22 (U. S. E.)<br>H 19 (U. S. E.)<br>Martins Bluff | 1233.1<br>858.1<br>821.9 | 3.091004<br>2.933552<br>2.914806 |
| Hill (U. S. E.) reference mark,[1] 1913 | 45 58 08.246<br>122 48 57.442 | 254.6<br>1236.7 | 314 38 11 | 134 38 11 | Hill (U. S. E.) | 12.42 | 1.09412 |
| H 20 (U. S. E.), 1912 | 45 57 42.247<br>122 49 47.817 | 1304.4<br>1029.7 | 172 59 53.1<br>198 26 18.1<br>234 00 42.4<br>266 18 29.9 | 352 59 49.0<br>18 26 33.3<br>54 01 18.9<br>86 19 21.0 | H 22 (U. S. E.)<br>H 19 (U. S. E.)<br>Hill (U. S. E.)<br>Martins Bluff | 1006.0<br>1443.2<br>1351.3<br>1534.9 | 3.002608<br>3.159326<br>3.130761<br>3.186084 |
| H 20 (U. S. E.) reference mark,[1] 1913 | 45 57 42.776<br>122 49 47.564 | 1320.7<br>1024.2 | 18 26 18 | 198 26 18 | H 20 (U. S. E.) | 17.22 | 1.23603 |
| Connel 2 (U. S. E.), 1912 | 45 56 59.120<br>122 49 17.342 | 1825.3<br>373.5 | 153 45 57.7<br>191 37 30.5<br>211 28 21.7 | 333 45 35.8<br>11 37 45.1<br>31 28 50.9 | H 20 (U. S. E.)<br>Hill (U. S. E.)<br>Martins Bluff | 1484.5<br>2170.1<br>1677.0 | 3.171583<br>3.336473<br>3.224524 |
| Connel 2 (U. S. E.) reference mark,[1] 1913 | 45 56 59.837<br>122 49 19.282 | 1847.4<br>415.3 | 297 54 36 | 117 54 37 | Connel 2 (U. S. E.) | 47.27 | 1.67459 |
| Martin 3 (U. S. E.), 1912 | 45 56 47.850<br>122 48 10.923 | 1477.4<br>235.3 | 103 40 30.4<br>158 07 54.0<br>162 40 29.8 | 283 39 42.7<br>338 07 20.8<br>342 40 11.3 | Connel 2 (U. S. E.)<br>Hill (U. S. E.)<br>Martins Bluff | 1472.3<br>2665.3<br>1862.6 | 3.167989<br>3.425748<br>3.270129 |
| Martin 3 (U. S. E.) reference mark,[1] 1913 | 45 56 47.863<br>122 48 10.165 | 1477.7<br>218.9 | 88 36 44 | 268 36 44 | Martin 3 (U. S. E.) | 16.33 | 1.21299 |
| H $16_2$ (U. S. E.), 1912 | 45 55 45.844<br>122 49 05.836 | 1415.3<br>125.7 | 173 45 53.4<br>211 42 26.0 | 353 44 45.2<br>31 43 05.5 | Connel 2 (U. S. E.)<br>Martin 3 (U. S. E.) | 2275.9<br>2250.4 | 3.357145<br>3.352262 |
| H $13_3$ (U. S. E.), 1912 | 45 55 36.925<br>122 47 47.471 | 1400.6<br>1022.8 | 99 16 13.0<br>142 40 04.7<br>167 00 35.4 | 279 15 16.7<br>322 39 00.2<br>347 00 18.6 | H $16_2$ (U. S. E.)<br>Connel 2 (U. S. E.)<br>Martin 3 (U. S. E.) | 1710.8<br>3191.9<br>2247.3 | 3.233198<br>3.504048<br>3.351663 |
| H $13_3$ (U. S. E.) reference mark,[1] 1913 | 45 55 36.218<br>122 47 46.850 | 1118.2<br>1009.4 | 148 29 58 | 328 29 58 | H $13_3$ (U. S. E.) | 25.6 | 1.40824 |
| H 11 (U. S. E.), 1912 | 45 54 57.741<br>122 48 05.196 | 1782.8<br>112.0 | 138 39 43.2<br>197 31 11.9 | 318 38 59.6<br>17 31 24.6 | H $16_2$ (U. S. E.)<br>H $13_3$ (U. S. E.) | 1978.2<br>1268.6 | 3.296260<br>3.103327 |
| H 11 (U. S. E.) reference mark,[1] 1913 | 45 54 56.978<br>122 48 03.684 | 1759.1<br>79.4 | 125 51 58 | 305 51 57 | H 11 (U. S. E.) | 40.2 | 1.60423 |
| H $14_2$ (U. S. E.), 1912 | 45 54 35.794<br>122 49 00.246 | 1105.1<br>5.3 | 176 48 40.5<br>219 43 02.7<br>240 15 47.1 | 356 48 36.5<br>39 43 55.0<br>60 16 26.7 | H $16_2$ (U. S. E.)<br>H $13_3$ (U. S. E.)<br>H 11 (U. S. E.) | 2166.1<br>2453.9<br>1366.3 | 3.335670<br>3.389854<br>3.135543 |
| H $14_2$ (U. S. E.) reference mark,[1] 1913 | 45 54 35.511<br>122 49 03.980 | 1096.4<br>85.8 | 263 48 37 | 83 48 40 | H $14_2$ (U. S. E.) | 80.95 | 1.90822 |
| H $9_2$ (U. S. E.), 1912 | 45 54 28.026<br>122 48 09.050 | 865.3<br>195.1 | 102 16 02.2<br>185 10 16.9 | 282 15 25.4<br>5 10 19.7 | H $14_2$ (U. S. E.)<br>H 11 (U. S. E.) | 1129.2<br>921.2 | 3.052787<br>2.964342 |
| H $9_2$ (U. S. E.) reference mark,[1] 1913 | 45 54 28.871<br>122 48 08.811 | 891.4<br>189.9 | 11 11 26 | 191 11 26 | H $9_2$ (U. S. E.) | 26.59 | 1.42472 |
| Dock (U. S. E.), 1912 | 45 54 04.730<br>122 48 37.205 | 146.0<br>802.0 | 152 37 29.9<br>202 51 10.9<br>220 09 14.7 | 332 37 13.3<br>22 51 33.9<br>40 09 34.9 | H $14_2$ (U. S. E.)<br>H 11 (U. S. E.)<br>H $9_2$ (U. S. E.) | 1080.1<br>1776.1<br>941.1 | 3.033448<br>3.249477<br>2.973630 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| H $7_2$ (U. S. E.), 1912 | 45 54 10.374 | 320.3 | 76 40 19.6 | 256 39 55.1 | Dock (U. S. E.) | 755.9 | 2.878492 |
| | 122 48 03.081 | 66.4 | 166 43 02.0 | 346 42 57.7 | H $9_2$ (U. S. E.) | 559.9 | 2.748132 |
| H $7_2$ (U. S. E.) reference mark,[1] 1913 | 45 54 10.718 | 330.9 | 71 13 08 | 251 13 07 | H $7_2$ (U. S. E.) | 33.00 | 1.51851 |
| | 122 48 01.632 | 35.2 | | | | | |
| H $8_2$ (U. S. E.), 1912 | 45 53 33.049 | 1020.4 | 159 36 18.1 | 339 36 06.0 | Dock (U. S. E.) | 1043.5 | 3.018493 |
| | 122 48 20.336 | 438.4 | 188 09 20.3 | 8 09 28.4 | H $9_2$ (U. S. E.) | 1714.7 | 3.234183 |
| | | | 197 53 13.7 | 17 53 26.1 | H $7_2$ (U. S. E.) | 1210.9 | 3.083118 |
| H $8_2$ (U. S. E.) reference mark,[1] 1913 | 45 53 31.924 | 985.6 | 221 46 13 | 41 46 14 | H $8_2$ (U. S. E.) | 46.57 | 1.66811 |
| | 122 48 21.775 | 469.5 | | | | | |
| H $5_2$ (U. S. E.), 1912 | 45 53 06.263 | 193.4 | 116 05 49.8 | 296 04 53.6 | H $8_2$ (U. S. E.) | 1880.5 | 3.274283 |
| | 122 47 02.005 | 43.2 | 146 22 20.4 | 326 21 36.6 | H $7_2$ (U. S. E.) | 2377.4 | 3.376098 |
| H $5_2$ (U. S. E.) reference mark,[1] 1913 | 45 53 07.471 | 230.7 | 24 03 26 | 204 03 25 | H $5_2$ (U. S. E.) | 40.84 | 1.61109 |
| | 122 47 01.233 | 26.6 | | | | | |
| H $6_2$ (U. S. E.), 1912 | 45 52 32.310 | 997.5 | 164 28 25.1 | 344 28 07.8 | H $8_2$ (U. S. E.) | 1946.3 | 3.289220 |
| | 122 47 56.173 | 1211.4 | 177 10 58.9 | 357 10 54.0 | H $7_2$ (U. S. E.) | 3031.3 | 3.481635 |
| | | | 228 05 17.8 | 48 05 56.7 | H $5_2$ (U. S. E.) | 1569.5 | 3.195759 |
| H $6_2$ (U. S. E.) reference mark,[1] 1913 | 45 52 32.339 | 998.4 | 273 07 | 93 07 | H $6_2$ (U. S. E.) | 16.7 | 1.22272 |
| | 122 47 56.946 | 1228.2 | | | | | |
| H 3 (U. S. E.), 1912 | 45 52 04.948 | 152.8 | 116 49 07.2 | 296 48 11.6 | H $6_2$ (U. S. E.) | 1873.0 | 3.272530 |
| | 122 46 38.668 | 834.1 | 165 06 47.4 | 345 06 30.7 | H $5_2$ (U. S. E.) | 1958.9 | 3.292002 |
| H 3 (U. S. E.) reference mark,[1] 1913 | 45 52 04.555 | 140.6 | 107 30 07 | 287 30 06 | H 3 (U. S. E.) | 40.31 | 1.60541 |
| | 122 46 36.886 | 795.6 | | | | | |
| H 4 (U. S. E.), 1912 | 45 51 23.527 | 726.4 | 164 52 41.9 | 344 52 22.8 | H $6_2$ (U. S. E.) | 2199.8 | 3.342389 |
| | 122 47 29.564 | 637.8 | 190 36 37.1 | 10 36 56.8 | H $5_2$ (U. S. E.) | 3227.1 | 3.508816 |
| | | | 220 38 29.9 | 40 39 06.4 | H 3 (U. S. E.) | 1685.5 | 3.226720 |
| H 4 (U. S. E.) reference mark,[1] 1913 | 45 51 21.996 | 679.1 | 167 52 30 | 347 52 30 | H $4_2$ (U. S. E.) | 48.35 | 1.68440 |
| | 122 47 29.093 | 627.7 | | | | | |
| H $1_2$ (U. S. E.), 1912 | 45 51 15.169 | 468.3 | 106 00 47.6 | 286 00 17.7 | H 4 (U. S. E.) | 935.6 | 2.971104 |
| | 122 46 47.879 | 1033.0 | 187 21 53.5 | 7 22 00.1 | H 3 (U. S. E.) | 1549.7 | 3.190235 |
| H $1_2$ (U. S. E.) reference mark,[1] 1913 | 45 51 14.086 | 434.9 | 133 27 49 | 313 27 48 | H $1_2$ (U. S. E.) | 48.60 | 1.68664 |
| | 122 46 46.244 | 997.7 | | | | | |
| Warrior (U. S. E.), 1912 | 45 50 56.760 | 1752.4 | 163 27 43.3 | 343 27 35.1 | H 4 (U. S. E.) | 862.0 | 2.935521 |
| | 122 47 18.192 | 392.5 | 202 02 39.0 | 22 03 07.0 | H 3 (U. S. E.) | 2271.3 | 3.356273 |
| | | | 229 00 23.7 | 49 00 45.4 | H $1_2$ (U. S. E.) | 866.4 | 2.937738 |
| Warrior (U. S. E.) reference mark,[1] 1913 | 45 50 58.394 | 1802.9 | 321 46 08 | 141 46 09 | Warrior (U. S. E.) | 64.24 | 1.80781 |
| | 122 47 20.034 | 432.3 | | | | | |
| Lake (U. S. E.), 1912 | 45 50 35.966 | 1110.4 | 143 35 52.2 | 323 35 36.5 | Warrior (U. S. E.) | 797.7 | 2.901833 |
| | 122 46 56.253 | 1213.9 | 153 55 16.0 | 333 54 52.0 | H 4 (U. S. E.) | 1634.9 | 3.213483 |
| | | | 188 29 17.1 | 8 29 23.1 | H $1_2$ (U. S. E.) | 1223.8 | 3.087603 |
| Lake (U. S. E.) reference mark,[1] 1913 | 45 50 35.051 | 1082.2 | 156 06 51 | 336 06 51 | Lake (U. S. E.) | 30.90 | 1.48996 |
| | 122 46 55.673 | 1201.4 | | | | | |
| Eleven (U. S. E.), 1912 | 45 50 14.063 | 434.2 | 199 36 43.0 | 19 36 58.6 | Warrior (U. S. E.) | 1399.4 | 3.145953 |
| | 122 47 39.963 | 862.5 | 234 21 32.8 | 54 22 04.1 | Lake (U. S. E.) | 1160.6 | 3.064682 |
| Eleven (U. S. E.) reference mark,[1] 1913 | 45 50 13.184 | 407.1 | 206 17 08 | 26 17 08 | Eleven (U. S. E.) | 30.27 | 1.48101 |
| | 122 47 40.584 | 875.9 | | | | | |
| Ten (U. S. E.), 1912 | 45 50 10.868 | 335.5 | 96 47 05.0 | 276 46 37.5 | Eleven (U. S. E.) | 835.3 | 2.921822 |
| | 122 47 01.531 | 33.0 | 165 45 43.5 | 345 45 31.6 | Warrior (U. S. E.) | 1461.8 | 3.164878 |
| | | | 188 21 39.8 | 8 21 43.6 | Lake (U. S. E.) | 783.2 | 2.893850 |
| Ten (U. S. E.) reference mark,[1] 1913 | 45 50 10.683 | 329.8 | 98 03 56 | 278 03 55 | Ten (U. S. E.) | 40.72 | 1.60981 |
| | 122 46 59.663 | 1287.6 | | | | | |
| Nine (U. S. E.), 1912 | 45 49 27.206 | 840.0 | 189 40 38.6 | 9 40 46.8 | Eleven (U. S. E.) | 1467.5 | 3.166592 |
| | 122 47 51.394 | 1109.4 | 218 35 53.2 | 38 36 28.9 | Ten (U. S. E.) | 1725.0 | 3.236779 |
| Nine (U. S. E.) reference mark,[1] 1913 | 45 49 27.247 | 841.2 | 275 45 28 | 95 45 28 | Nine (U. S. E.) | 12.68 | 1.10312 |
| | 122 47 51.978 | 1122.0 | | | | | |
| Eight (U. S. E.), 1912 | 45 49 25.205 | 778.2 | 93 59 08.6 | 273 58 39.1 | Nine (U. S. E.) | 889.8 | 2.949280 |
| | 122 47 10.275 | 221.8 | 156 59 12.4 | 336 58 51.1 | Eleven (U. S. E.) | 1638.9 | 3.214554 |
| Seven 2 (U. S. E.), 1912 | 45 48 46.813 | 1445.3 | 181 13 37.8 | 1 13 38.7 | Nine (U. S. E.) | 1247.4 | 3.096002 |
| | 122 47 52.633 | 1136.4 | 217 38 41.2 | 37 39 11.6 | Eight (U. S. E.) | 1497.1 | 3.175238 |
| Seven 2 (U. S. E.) reference mark,[1] 1913 | 45 48 46.836 | 1446.0 | 270 57 53 | 90 57 54 | Seven 2 (U. S. E.) | 42.85 | 1.63195 |
| | 122 47 54.617 | 1179.2 | | | | | |
| Six (U. S. E.), 1912 | 45 48 46.325 | 1430.2 | 90 48 34.5 | 270 47 58.9 | Seven 2 (U. S. E.) | 1072.4 | 3.030343 |
| | 122 47 02.969 | 64.1 | 140 22 12.8 | 320 21 38.1 | Nine (U. S. E.) | 1638.9 | 3.214552 |
| Six (U. S. E.) reference mark,[1] 1913 | 45 48 46.470 | 1434.7 | 75 48 35 | 255 48 34 | Six (U. S. E.) | 18.22 | 1.26055 |
| | 122 47 02.151 | 46.4 | | | | | |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Five 2 (U. S. E. ,1912 | 45 48 21.992 | 679.0 | 174 01 39.6 | 354 01 36.9 | Seven 2 (U. S. E.) | 770.5 | 2.886764 |
| | 122 47 48.920 | 1056.4 | 232 51 46.9 | 52 52 19.8 | Six (U. S. E.) | 1244.5 | 3.094989 |
| Five 2 (U. S. E.) reference mark No. 1,[1] 1913. | 45 48 20.427 | 630.7 | 198 08 43 | 18 08 44 | Five 2 (U. S. E.) | 50.85 | 1.70629 |
| | 122 47 49.653 | 1072.2 | | | | | |
| Five 2 (U. S. E.) reference mark No. 2,[1] 1913. | 45 48 22.788 | 703.6 | 299 38 13 | 119 38 14 | Five 2 (U. S. E.) | 49.70 | 1.69636 |
| | 122 47 50.921 | 1099.6 | | | | | |
| Two (U. S. E.), 1912 | 45 47 53.365 | 1647.6 | 119 57 08.5 | 299 56 17.6 | Five 2 (U. S. E.) | 1770.5 | 3.248108 |
| | 122 46 37.876 | 818.0 | 161 40 01.1 | 341 39 43.1 | Six (U. S. E.) | 1722.5 | 3.236161 |
| One 2 (U. S. E.), 1912 | 45 47 55.744 | 1721.0 | 168 36 33.5 | 348 36 28.1 | Five 2 (U. S. E.) | 826.6 | 2.917317 |
| | 122 47 41.360 | 893.2 | 207 57 26.3 | 27 57 53.8 | Six (U. S. E.) | 1768.0 | 3.247478 |
| | | | 273 03 37.7 | 93 04 23.2 | Two (U. S. E.) | 1373.0 | 3.137661 |
| One 2 (U. S. E.) reference mark,[1] 1913. | 45 47 52.238 | 1612.8 | 197 33 57 | 17 33 58 | One 2 (U. S. E.) | 113.54 | 2.055149 |
| | 122 47 42.947 | 927.5 | | | | | |
| D (U. S. E.), 1912 | 45 47 20.454 | 631.5 | 152 50 08.4 | 332 49 49.9 | One 2 (U. S. E.) | 1224.6 | 3.088011 |
| | 122 47 15.471 | 334.2 | 218 37 29.7 | 38 37 56.7 | Two (U. S. E.) | 1300.7 | 3.114165 |
| D (U. S. E.) reference mark,[1] 1913 | 45 47 19.585 | 604.7 | 155 55 18 | 335 55 18 | D. (U. S. E.) | 29.40 | 1.46835 |
| | 122 47 14.916 | 322.2 | | | | | |
| A (U. S. E.), 1912 | 45 47 26.733 | 825.4 | 79 23 28.4 | 259 22 54.1 | D (U. S. E.) | 1052.6 | 3.022273 |
| | 122 46 27.571 | 595.5 | 119 20 38.6 | 299 19 45.8 | One 2 (U. S. E.) | 1828.1 | 3.262003 |
| | | | 164 51 13.5 | 344 51 06.2 | Two (U. S. E.) | 851.8 | 2.930341 |
| A (U. S. E.) reference mark,[1] 1913 | 45 47 27.581 | 851.5 | 61 31 47 | 241 31 45 | A (U. S. E.) | 54.90 | 1.73757 |
| | 122 46 25.337 | 547.3 | | | | | |
| E (U. S. E.), 1912 | 45 47 02.484 | 76.7 | 147 01 38.2 | 327 01 26.3 | D (U. S. E.) | 661.3 | 2.820397 |
| | 122 48 58.809 | 1270.4 | 222 01 29.2 | 42 01 51.6 | A (U. S. E.) | 1007.8 | 3.003394 |
| E (U. S. E.) reference mark,[1] 1913 | 45 47 01.203 | 37.1 | 212 06 28 | 32 06 29 | E (U. S. E) | 46.70 | 1.66932 |
| | 122 46 59.958 | 1295.2 | | | | | |
| B (U. S. E.), 1912 | 45 47 10.104 | 312.0 | 75 38 49.7 | 255 38 19.2 | E (U. S. E.) | 948.8 | 2.977176 |
| | 122 46 16.258 | 351.2 | 104 01 52.4 | 284 01 10.0 | D (U. S. E.) | 1318.3 | 3.120029 |
| | | | 154 32 42.8 | 334 32 34.7 | A (U. S. E.) | 568.6 | 2.754789 |
| B (U. S. E.) reference mark,[1] 1913 | 45 47 10.288 | 317.6 | 80 19 21 | 216 19 20 | B (U. S. E.) | 33.72 | 1.52789 |
| | 122 46 14.719 | 317.9 | | | | | |
| Dead Willow (U. S. E.), 1912 | 45 46 39.013 | 1204.5 | 146 16 58.4 | 326 16 42.4 | E (U. S. E.) | 871.2 | 2.940109 |
| | 122 46 36.423 | 786.9 | 204 24 27.1 | 24 24 41.6 | B (U. S. E.) | 1054.1 | 3.022886 |
| Dead Willow (U. S. E.) reference mark,[1] 1913. | 45 46 38.448 | 1187.0 | 231 34 43 | 51 34 44 | Dead Willow (U. S. E.) | 28.05 | 1.44793 |
| | 122 46 37.440 | 808.9 | | | | | |
| C (U. S. E.), 1912 | 45 46 44.007 | 1358.7 | 80 43 50.2 | 260 43 18.9 | Dead Willow (U. S. E.) | 956.8 | 2.980837 |
| | 122 45 52.713 | 1138.8 | 111 46 58.2 | 291 46 10.8 | E (U. S. E.) | 1537.6 | 3.186845 |
| | | | 147 44 15.6 | 327 43 58.7 | B (U. S. E.) | 952.8 | 2.979009 |
| C (U. S. E.) reference mark,[1] 1913 | 45 46 44.161 | 1363.4 | 76 35 54 | 256 35 53 | C (U. S. E.) | 20.50 | 1.31175 |
| | 122 45 51.790 | 1118.9 | | | | | |
| Grassy (U. S. E.), 1912 | 45 46 22.546 | 696.1 | 147 10 40.7 | 327 10 29.8 | Dead Willow (U. S. E.) | 605.0 | 2.781734 |
| | 122 46 21.246 | 459.0 | 222 55 53.4 | 42 56 13.8 | C (U. S. E.) | 905.0 | 2.956646 |
| Grassy (U. S. E.) reference mark,[1] 1913. | 45 46 22.396 | 691.5 | 262 41 02 | 82 41 03 | Grassy (U. S. E.) | 36.48 | 1.56205 |
| | 122 46 22.921 | 495.2 | | | | | |
| Fales (U. S. E.), 1912 | 45 45 56.237 | 1736.3 | 126 31 54.3 | 306 31 18.0 | Grassy (U. S. E.) | 1364.7 | 3.135033 |
| | 122 45 30.494 | 658.9 | 161 58 15.9 | 341 58 00.0 | C (U. S. E.) | 1551.0 | 3.190614 |
| Fales (U. S. E.) reference mark,[1] 1913. | 45 45 56.167 | 1734.1 | 92 33 41 | 272 33 39 | Fales (U. S. E.) | 48.42 | 1.68502 |
| | 122 45 28.256 | 610.6 | | | | | |
| Ridge (U. S. E.), 1912 | 45 45 47.395 | 1463.3 | 157 51 29.2 | 337 51 14.6 | Grassy (U. S. E.) | 1171.6 | 3.068794 |
| | 122 46 00.809 | 17.5 | 185 42 48.4 | 5 42 54.2 | C (U. S. E.) | 1756.5 | 3.244655 |
| | | | 247 22 34.3 | 67 22 56.0 | Fales (U. S. E.) | 709.7 | 2.851054 |
| Ridge (U. S. E.) reference mark,[1] 1913. | 45 45 46.138 | 1424.5 | 162 14 07 | 342 14 07 | Ridge (U. S. E.) | 40.74 | 1.61002 |
| | 122 46 00.234 | 5.1 | | | | | |
| W 11 (U. S. E.), 1912 | 45 45 16.320 | 503.9 | 142 35 05.9 | 322 34 41.6 | Ridge (U. S. E.) | 1208.0 | 3.082063 |
| | 122 45 26.846 | 580.2 | 176 20 18.0 | 356 20 15.4 | Fales (U. S. E.) | 1234.9 | 3.091628 |
| W 16 (U. S. E.), 1912 | 45 45 15.702 | 484.8 | 181 40 43.6 | 1 40 44.6 | Ridge (U. S. E.) | 978.9 | 2.990723 |
| | 122 46 02.137 | 46.2 | 208 39 00.9 | 28 39 23.6 | Fales (U. S. E.) | 1426.0 | 3.154133 |
| | | | 268 34 00.4 | 88 34 25.7 | W 11 (U. S. E.) | 763.0 | 2.882518 |
| W 16 (U.S.E.) reference mark No. 1,[1] 1913. | 45 45 16.043 | 495.3 | 290 28 52 | 110 28 51 | W 16 (U. S. E.) | 30.13 | 1.47900 |
| | 122 46 03.443 | 74.4 | | | | | |
| W 16 (U.S.E.) reference mark No. 2,[1] 1913. | 45 45 16.228 | 501.0 | 290 28 52 | 110 28 51 | W 16 (U. S. E.) | 46.37 | 1.66624 |
| | 122 46 04.147 | 89.6 | | | | | |
| W 14 (U. S. E.), 1912 | 45 44 52.159 | 1610.4 | 206 31 38.6 | 26 31 50.6 | W 16 (U. S. E.) | 812.4 | 2.909760 |
| | 122 46 18.925 | 409.1 | 236 27 55.5 | 56 28 32.8 | W 11 (U. S. E.) | 1350.3 | 3.130443 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| W 14 (U.S. E.) reference mark,[1] 1913.. | 45 44 52.716<br>122 46 21.028 | 1627.6<br>454.5 | 290 42 57 | 110 42 58 | W 14 (U. S. E.) | 48.60 | 1.68664 |
| W 9 (U. S. E.), 1912 | 45 44 39.746<br>122 45 25.694 | 1227.1<br>555.4 | 108 25 31.2<br>144 38 34.7 | 288 24 53.1<br>324 38 08.6 | W 14 (U. S. E.)<br>W 16 (U. S. E.) | 1212.8<br>1361.2 | 3.083791<br>3.133912 |
| W 9 (U. S. E.) reference mark,[1] 1913.. | 45 44 39.894<br>122 45 24.820 | 1231.7<br>536.6 | 76 22 56 | 256 22 55 | W 9 (U. S. E.) | 19.45 | 1.28892 |
| W $12_2$ (U. S. E.), 1912 | 45 44 21.122<br>122 46 32.832 | 652.1<br>709.8 | 197 25 02.6<br>248 22 55.7 | 17 25 12.6<br>68 23 43.8 | W 14 (U. S. E.)<br>W 9 (U. S. E.) | 1004.3<br>1561.1 | 3.001842<br>3.193440 |
| W $7_2$ (U. S. E.), 1912 | 45 44 10.952<br>122 45 13.315 | 338.1<br>287.9 | 100 21 32.0<br>131 53 49.6<br>163 14 50.9 | 280 20 35.1<br>311 53 02.7<br>343 14 42.1 | W $12_2$ (U. S. E.)<br>W 14 (U. S. E.)<br>W 9 (U. S. E.) | 1747.6<br>1905.3<br>928.4 | 3.242434<br>3.279966<br>2.967727 |
| W $7_2$ (U. S. E.) reference mark No. 1,[1] 1913. | 45 44 11.285<br>122 45 12.011 | 348.4<br>259.7 | 69 58 39 | 249 58 38 | W $7_2$ (U. S. E.) | 30.00 | 1.47712 |
| W $7_2$ (U. S. E.) reference mark No. 2,[1] 1913. | 45 44 11.617<br>122 45 10.708 | 358.7<br>231.5 | 69 58 40 | 249 58 38 | W $7_2$ (U. S. E.) | 60.00 | 1.77815 |
| W $10_2$ (U. S. E.), 1912 | 45 43 27.732<br>122 46 20.316 | 856.2<br>439.3 | 170 40 37.9<br>207 58 15.6<br>227 20 50.7 | 350 40 29.0<br>27 58 54.8<br>47 21 38.7 | W $12_2$ (U. S. E.)<br>W 9 (U. S. E.)<br>W $7_2$ (U. S. E.) | 1670.4<br>2517.5<br>1969.6 | 3.222814<br>3.400964<br>3.294368 |
| W $10_2$ (U. S. E.) reference mark,[1] 1913. | 45 43 25.263<br>122 46 22.377 | 780.0<br>483.9 | 210 19 07 | 30 19 08 | W $10_2$ (U. S. E.) | 88.30 | 1.94596 |
| W $5_3$ (U. S. E.), 1912 | 45 43 02.055<br>122 45 26.747 | 63.4<br>578.5 | 124 23 15.2<br>187 46 26.5 | 304 22 36.8<br>7 46 36.1 | W $10_2$ (U. S. E.)<br>W $7_2$ (U. S. E.) | 1403.7<br>2146.6 | 3.147289<br>3.331782 |
| W $5_3$ (U. S. E.) reference mark,[1] 1913.. | 45 43 01.859<br>122 45 25.092 | 57.4<br>542.7 | 99 35 30 | 279 35 29 | W $5_3$ (U. S. E.) | 36.30 | 1.55991 |
| Range 2 (U. S. E.), 1913 | 45 43 36.398<br>122 45 14.495 | 1123.7<br>313.3 | 79 21 44.2<br>149 13 50.1<br>181 22 08.6 | 259 20 57.1<br>329 13 04.1<br>1 22 09.5 | W $10_2$ (U. S. E.)<br>W 14 (U. S. E.)<br>W $7_2$ (U. S. E.) | 1448.3<br>2722.4<br>1067.1 | 3.160846<br>3.434946<br>3.028206 |
| Range 2 (U. S. E.) reference mark,[1] 1913. | 45 43 36.552<br>122 45 11.498 | 1128.5<br>248.6 | 85 48 39 | 265 48 37 | Range 2 (U. S. E.) | 64.97 | 1.81271 |
| W $8_2$ (U. S. E.), 1912 | 45 43 00.634<br>122 46 21.648 | 19.6<br>468.2 | 181 58 11.7<br>214 14 02.7<br>267 52 46.2 | 1 58 12.6<br>34 14 51.6<br>87 53 25.5 | W $10_2$ (U. S. E.)<br>W $7_2$ (U. S. E.)<br>W $5_3$ (U. S. E.) | 837.1<br>2626.0<br>1188.2 | 2.922755<br>3.419296<br>3.074876 |
| W 6 (U. S. E.), 1912 | 45 42 34.127<br>122 46 15.612 | 1053.6<br>337.7 | 170 56 11.8<br>230 47 13.7 | 350 56 07.5<br>50 47 48.7 | W $8_2$ (U. S. E.)<br>W $5_3$ (U. S. E.) | 828.7<br>1364.0 | 2.918404<br>3.134804 |
| W 6 (U. S. E.) reference mark,[1] 1913... | 45 42 35.177<br>122 46 16.739 | 1086.1<br>362.1 | 323 04 33 | 143 04 34 | W 6 (U. S. E.) | 40.57 | 1.60820 |
| W 3 (U. S. E.), 1912 | 45 41 51.669<br>122 45 35.926 | 1595.2<br>777.3 | 146 46 52.2<br>155 05 20.7<br>185 13 08.2 | 326 46 23.8<br>335 04 48.0<br>5 13 14.8 | W 6 (U. S. E.)<br>W $8_2$ (U. S. E.)<br>W $5_3$ (U. S. E.) | 1567.0<br>2347.7<br>2182.1 | 3.195056<br>3.370641<br>3.338873 |
| W 3 (U. S. E.) reference mark,[1] 1913... | 45 41 51.543<br>122 45 33.752 | 1591.3<br>730.2 | 94 43 22 | 274 43 20 | W 3 (U. S. E.) | 47.20 | 1.67394 |
| W $4_2$ (U. S. E.), 1912 | 45 42 06.095<br>122 46 25.030 | 188.2<br>541.5 | 193 14 42.3<br>216 06 44.2<br>292 44 30.3 | 13 14 49.0<br>36 07 25.9<br>112 45 05.4 | W 6 (U. S. E.)<br>W $5_3$ (U. S. E.)<br>W 3 (U. S. E.) | 889.1<br>2138.7<br>1151.9 | 2.948944<br>3.330149<br>3.061422 |
| W $4_2$ (U. S. E.) reference mark,[1] 1913.. | 45 42 05.291<br>122 46 26.421 | 163.4<br>571.6 | 230 27 | 50 27 | W $4_2$ (U. S. E.) | 39.00 | 1.59106 |
| Brush$_2$ (U. S. E.), 1913 | 45 42 37.551<br>122 45 28.237 | 1159.5<br>610.8 | 6 41 52.9<br>84 06 55.4 | 186 41 47.4<br>264 06 21.5 | W 3 (U. S. E.)<br>W 6 (U. S. E.) | 1426.3<br>1030.2 | 3.154201<br>3.012916 |
| W 1 (U. S. E.), 1912 | 45 41 29.938<br>122 45 44.494 | 924.3<br>962.7 | 141 50 53.6<br>195 26 38.5 | 321 50 24.6<br>15 26 44.6 | W $4_2$ (U. S. E.)<br>W 3 (U. S. E.) | 1419.6<br>696.0 | 3.152167<br>2.842621 |
| W $2_2$ (U. S. E.), 1912 | 45 41 26.444<br>122 46 38.026 | 816.4<br>822.8 | 192 56 02.0<br>239 53 49.9<br>264 40 27.4 | 12 56 11.3<br>59 54 34.3<br>84 41 05.7 | W $4_2$ (U. S. E.)<br>W 3 (U. S. E.)<br>W 1 (U. S. E.) | 1256.0<br>1553.0<br>1163.3 | 3.098998<br>3.191163<br>3.065698 |
| W $2_2$ (U. S. E.) reference mark,[1] 1913.. | 45 41 28.546<br>122 46 41.098 | 881.3<br>889.3 | 314 18 29 | 134 18 31 | W $2_2$ (U. S. E.) | 92.90 | 1.96802 |
| Jewetts (U. S. E.), 1913 | 45 40 54.049<br>122 46 43.009 | 1668.6<br>930.8 | 186 09 08.5<br>228 48 22.3 | 6 09 12.1<br>48 49 04.2 | W $2_2$ (U. S. E.)<br>W 1 (U. S. E.) | 1005.9<br>1682.6 | 3.002575<br>3.225971 |
| Hewletts 2 (U. S. E.), 1913 | 45 40 53.313<br>122 45 59.351 | 1645.9<br>1284.4 | 340 35 32.1<br>24 23 52.0<br>91 22 48.2<br>140 42 44.1 | 160 35 42.1<br>204 23 33.7<br>271 22 16.9<br>320 42 16.4 | One 3 (U. S. E.)<br>Two 2 (U. S. E.)<br>Jewetts (U. S. E.)<br>W $2_2$ (U. S. E.) | 913.6<br>1336.8<br>945.1<br>1321.6 | 2.960769<br>3.126056<br>2.975480<br>3.121105 |
| Morgans 2 (U. S. E.), 1913 | 45 40 38.515<br>122 46 36.547 | 1189.1<br>790.9 | 163 44 22.1<br>215 21 03.4<br>240 25 10.9<br>290 03 23.1<br>341 36 14.7 | 343 44 17.5<br>35 21 40.7<br>60 25 37.6<br>110 03 59.8<br>161 36 23.1 | Jewetts (U. S. E.)<br>W 1 (U. S. E.)<br>Hewletts (U. S. E.)<br>One 3 (U. S. E.)<br>Two 2 (U. S. E.) | 499.5<br>1946.6<br>925.6<br>1180.2<br>801.5 | 2.698568<br>3.289271<br>2.966424<br>3.071968<br>2.903908 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Morgans 2 (U. S. E.) reference mark,[1] 1913. | 45 40 38.661<br>122 46 38.160 | 1193.6<br>825.9 | 277 22 13 | 97 22 14 | Morgans 2 (U. S. E) | 35.21 | 1.54667 |
| One 3 (U. S. E.), 1912 | 45 40 25.402<br>122 45 45.325 | 784.2<br>981.0 | 148 49 22.5<br>180 30 58.7 | 328 48 44.8<br>0 30 59.3 | W $2_2$ (U. S. E.)<br>W 1 (U. S. E.) | 2202.8<br>1992.5 | 3.342977<br>3.299399 |
| One 3 (U. S. E.) reference mark,[1] 1913 | 45 40 25.627<br>122 45 43.917 | 791.2<br>950.5 | 77 08 13 | 257 08 12 | One 3 (U. S. E.) | 31.26 | 1.49499 |
| Two 2 (U. S. E.), 1912 | 45 40 13.880<br>122 46 24.862 | 428.5<br>538.2 | 172 45 09.9<br>200 24 09.9<br>247 25 31.8 | 352 45 00.5<br>20 24 38.8<br>67 26 00.1 | W $2_2$ (U. S. E.)<br>W 1 (U. S. E.)<br>One 3 (U. S. E.) | 2258.3<br>2505.4<br>926.7 | 3.353783<br>3.398870<br>2.966957 |
| Two 2 (U. S. E.) reference mark,[1] 1913 | 45 40 14.232<br>122 46 27.379 | 439.4<br>592.6 | 281 16 30 | 101 16 32 | Two 2 (U. S. E.) | 55.55 | 1.74468 |
| Middle, 1913 | 45 40 03.780<br>122 45 29.891 | 116.7<br>647.0 | 104 41 23.7<br>153 24 49.1 | 284 40 44.4<br>333 24 38.1 | Two 2 (U. S. E.)<br>One 3 (U. S. E.) | 1230.1<br>746.5 | 3.089936<br>2.873008 |
| Middle reference mark,[1] 1913 | 45 40 01.120<br>122 45 27.689 | 34.6<br>599.4 | 149 52 30 | 329 52 28 | Middle | 94.95 | 1.97750 |
| Four 2 (U. S. E.), 1912 | 45 39 28.845<br>122 45 59.314 | 890.5<br>1284.1 | 158 18 34.9<br>189 50 11.6<br>210 33 43.0 | 338 18 16.6<br>9 50 21.6<br>30 34 04.0 | Two 2 (U. S. E.)<br>One 3 (U. S. E.)<br>Middle | 1496.3<br>1772.1<br>1252.6 | 3.175023<br>3.248489<br>3.097799 |
| Four 2 (U. S. E.) reference mark,[1] 1913. | 45 39 28.890<br>122 46 00.696 | 891.9<br>15.1 | 272 39 56 | 92 39 57 | Four 2 (U. S. E.) | 29.96 | 1.47654 |
| Mud, 1913 | 45 38 50.358<br>122 45 57.410 | 1554.7<br>1243.2 | 178 00 44.3<br>194 43 23.7<br>67 30 05.3 | 358 00 43.0<br>14 43 43.4<br>247 29 31.4 | Four 2 (U. S. E.)<br>Middle<br>Howell | 1188.9<br>2343.7<br>1112.4 | 3.075154<br>3.369907<br>3.046277 |
| Mud reference mark, No. 1,[1] 1913 | 45 38 50.402<br>122 45 56.033 | 1556.1<br>1213.3 | 87 24 06 | 267 24 05 | Mud | 29.85 | 1.47494 |
| Mud reference mark, No. 2,[1] 1913 | 45 38 50.414<br>122 45 55.660 | 1556.4<br>1205.2 | 87 24 06 | 267 24 05 | Mud | 37.94 | 1.57910 |
| School, 1913 | 45 39 01.251<br>122 46 18.651 | 38.6<br>403.7 | 206 10 09.3<br>306 10 24.3<br>36 41 20.3 | 26 10 23.1<br>126 10 39.4<br>216 41 01.5 | Four 2 (U. S. E.)<br>Mud<br>Howell | 949.2<br>569.8<br>950.3 | 2.977358<br>2.755707<br>2.977876 |
| School reference mark,[1] 1913 | 45 39 02.910<br>122 46 19.164 | 89.8<br>415.0 | 347 45 08 | 167 45 08 | School | 52.4 | 1.71933 |
| Three 3 (U. S. E.), 1912 | 45 39 49.186<br>122 45 19.498 | 1518.5<br>422.1 | 40 52 42.1<br>53 55 44.4<br>118 19 17.9<br>153 26 05.3 | 220 51 59.8<br>233 55 15.9<br>298 18 31.1<br>333 25 46.8 | School<br>Four 2 (U. S. E.)<br>Two 2 (U. S. E.)<br>One 3 (U. S. E.) | 1957.1<br>1066.5<br>1607.2<br>1250.1 | 3.291609<br>3.027955<br>3.206083<br>3.096028 |
| Three 3 (U. S. E.) reference mark,[1] 1913. | 45 39 49.858<br>122 45 17.065 | 1539.3<br>369.4 | 68 30 42 | 248 30 40 | Three 3 (U. S. E.) | 56.60 | 1.75282 |
| End, 1913 | 45 39 32.732<br>122 46 02.391 | 1010.4<br>51.8 | 192 47 50.5<br>241 18 53.5<br>330 57 37.1<br>19 54 42.2 | 12 48 02.7<br>61 19 24.2<br>150 57 39.3<br>199 54 30.6 | One 3 (U. S. E.)<br>Three 3 (U. S. E.)<br>Four 2 (U. S. E.)<br>School | 1667.5<br>1058.5<br>137.3<br>1033.7 | 3.222059<br>3.024677<br>2.137536<br>3.014385 |
| End reference mark,[1] 1913 | 45 39 30.314<br>122 46 02.596 | 935.9<br>56.2 | 183 24 07 | 3 24 07 | End | 74.78 | 1.87379 |
| Pen, 1913 | 45 38 20.005<br>122 46 25.174 | 617.6<br>545.2 | 140 09 48.6<br>186 19 43.1<br>212 40 54.7 | 320 09 34.5<br>6 19 47.8<br>32 41 14.5 | Howell<br>School<br>Mud | 665.9<br>1281.2<br>1113.4 | 2.823387<br>3.107612<br>3.046632 |
| Pen reference mark,[1] 1913 | 45 38 18.725<br>122 46 28.711 | 578.1<br>621.8 | 242 43 00 | 62 43 02 | Pen | 86.2 | 1.93551 |
| Linton, 1913 | 45 36 02.300<br>122 47 19.807 | 71.0<br>429.2 | 189 01 34.1<br>195 33 07.9<br>233 57 10.0 | 9 01 59.1<br>15 33 47.0<br>53 58 07.0 | Howell<br>Pen<br>Gatton | 4822.5<br>4413.1<br>2136.9 | 3.683269<br>3.644744<br>3.329794 |
| Linton reference mark,[1] 1913 | 45 36 01.888<br>122 47 19.801 | 58.3<br>429.1 | 179 25 54 | 359 25 54 | Linton | 12.72 | 1.10449 |
| Sand, 1913 | 45 37 28.351<br>122 47 14.124 | 875.3<br>306.0 | 196 44 27.7<br>311 05 17.8<br>2 39 17.4 | 16 44 48.6<br>131 06 10.7<br>182 39 12.8 | Howell<br>Gatton<br>Linton | 2199.3<br>2129.0<br>2659.5 | 3.342278<br>3.328178<br>3.424805 |
| Sand reference mark,[1] 1913 | 45 37 27.643<br>122 47 12.967 | 853.4<br>280.9 | 131 05 19 | 311 05 18 | Sand | 33.25 | 1.52179 |
| Howell, 1881 | 45 38 36.566<br>122 46 44.871 | 1128.9<br>971.7 | 15 31 31.9<br>133 46 01.1 | 195 30 53.1<br>313 41 50.6 | Willamet<br>Bouser | 4391.1<br>10486.3 | 3.642575<br>4.020622 |
| Howell reference mark No. 1,[1] 1913 | 45 38 37.445<br>122 46 42.851 | 1150.0<br>928.0 | 58 11 13 | 238 11 12 | Howell | 51.49 | 1.71172 |
| Howell reference mark No. 2,[1] 1913 | 45 38 40.620<br>122 46 43.856 | 1254.1<br>949.7 | 9 57 33 | 189 57 32 | Howell | 127.10 | 2.10415 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Gatton, 1883 | 45 36 43.022 | 1328.2 | 71 19 51.6 | 251 18 40.8 | Willamet | 2265.5 | 3.355156 |
| | 122 46 00.069 | 1.5 | 164 31 45.5 | 344 31 13.5 | Howell | 3637.3 | 3.560782 |
| Gatton reference mark No. 1,[1] 1913 | 45 36 44.796 | 1383.0 | 2 00 19 | 182 00 19 | Gatton | 54.80 | 1.73878 |
| | 122 45 59.981 | 1299.6 | | | | | |
| Gatton reference mark No. 2,[1] 1913 | 45 36 42.856 | 1323.1 | 232 37 34 | 52 37 34 | Gatton | 8.42 | 0.92531 |
| | 122 46 00.378 | 8.2 | | | | | |
| Springville, 1883 | 45 35 04.047 | 125.0 | 140 21 15.0 | 320 20 11.3 | Willamet | 3026.5 | 3.480941 |
| | 122 46 10.000 | 216.8 | 184 01 43.0 | 4 01 50.1 | Gatton | 3063.2 | 3.486180 |
| Watts, 1883 | 45 35 39.329 | 1214.2 | 208 00 22.2 | 28 00 56.7 | Gatton | 2227.3 | 3.347784 |
| | 122 46 48.337 | 1047.7 | 322 39 19.9 | 142 39 47.3 | Springville | 1370.0 | 3.136736 |
| Kaiser, 1883 | 45 36 16.003 | 494.0 | 244 50 30.5 | 64 51 29.4 | Gatton | 1962.8 | 3.292867 |
| | 122 47 22.059 | 478.0 | 324 54 00.4 | 144 53 51.9 | Springville | 2715.6 | 3.433865 |
| St. John, 1883 | 45 35 22.221 | 686.0 | 34 02 34.2 | 214 02 21.7 | Springville | 677.1 | 2.830654 |
| | 122 45 52.516 | 1138.4 | 113 35 16.1 | 293 34 36.2 | Watts | 1320.2 | 3.120648 |
| | | | 130 33 29.2 | 310 32 25.1 | Kaiser | 2554.1 | 3.407241 |
| Caples, 1883 | 45 34 56.731 | 1751.5 | 97 31 15.6 | 277 30 19.2 | Springville | 1727.5 | 3.237423 |
| | 122 44 50.999 | 1105.7 | 120 33 04.6 | 300 32 20.7 | St. John | 1548.5 | 3.189898 |
| Caples reference mark,[1] 1913 | 45 34 57.634 | 1779.3 | 42 20 52 | 222 20 51 | Caples | 37.72 | 1.57657 |
| | 122 44 49.827 | 1080.2 | | | | | |
| Hazel, 1883 | 45 34 36.082 | 1113.9 | 165 01 26.9 | 345 01 14.4 | St. John | 1474.5 | 3.168657 |
| | 122 45 34.938 | 757.6 | 236 12 18.2 | 56 12 49.6 | Caples | 1146.2 | 3.059278 |
| Waud, 1882 | 45 34 19.484 | 601.5 | 102 40 18.4 | 282 39 03.3 | Hazel | 2337.9 | 3.368820 |
| | 122 43 49.738 | 1078.5 | 130 53 25.5 | 310 52 41.8 | Caples | 1756.9 | 3.244738 |
| | | | 339 02 22.4 | 159 03 18.8 | Balch | 4790.6 | 3.680388 |
| Scott, 1882 | 45 33 23.862 | 736.7 | 161 40 15.8 | 341 39 44.5 | Caples | 3020.5 | 3.480073 |
| | 122 44 07.186 | 155.8 | 192 25 29.6 | 12 25 42.0 | Waud | 1758.4 | 3.245123 |
| Scott reference mark,[1] 1913 | 45 33 23.337 | 720.5 | 212 49 44 | 32 49 44 | Scott | 19.28 | 1.28511 |
| | 122 44 07.668 | 166.3 | | | | | |
| Gravel Bluff, 1882 | 45 33 12.226 | 377.4 | 95 53 01.3 | 275 51 06.3 | Scott | 3513.8 | 3.545773 |
| | 122 41 26.035 | 564.6 | 123 41 20.4 | 303 39 37.8 | Waud | 3744.9 | 3.573437 |
| | | | 30 21 55.5 | 210 21 09.3 | Balch | 2778.3 | 3.443786 |
| Potter, 1883 | 45 33 01.778 | 54.9 | 174 47 38.7 | 354 47 31.6 | Waud | 2409.0 | 3.381832 |
| | 122 43 39.658 | 860.3 | 263 38 10.0 | 83 39 45.4 | Gravel Bluff | 2916.3 | 3.464835 |
| | | | 324 13 23.8 | 144 14 13.0 | Balch | 2557.1 | 3.407753 |
| Montgomery, 1882 | 45 32 13.180 | 406.9 | 78 17 17.9 | 258 15 46.9 | Balch | 2826.9 | 3.451313 |
| | 122 40 23.196 | 503.3 | 109 24 44.8 | 289 22 24.6 | Potter | 4518.5 | 3.654993 |
| | | | 143 12 56.6 | 323 12 11.8 | Gravel Bluff | 2276.3 | 3.357228 |
| King, 1883 | 45 31 34.049 | 1052.2 | 156 22 17.4 | 336 21 04.0 | Waud | 5575.3 | 3.746266 |
| | 122 42 06.683 | 145.0 | 196 13 06.1 | 16 13 35.1 | Gravel Bluff | 3156.7 | 3.499233 |
| | | | 241 42 36.5 | 61 43 50.3 | Montgomery | 2549.9 | 3.406528 |
| Tibbets, 1882 | 45 29 56.151 | 1733.5 | 132 03 12.7 | 312 01 22.5 | King | 4513.5 | 3.654513 |
| | 122 39 32.251 | 700.2 | 165 21 26.2 | 345 20 49.8 | Montgomery | 4372.6 | 3.640735 |
| Hoffmans Hill, 1883 | 45 30 23.710 | 732.0 | 196 31 41.2 | 16 32 14.2 | Montgomery | 3525.4 | 3.547207 |
| | 122 41 09.420 | 204.5 | 291 57 18.2 | 111 58 27.5 | Tibbets | 2274.6 | 3.356914 |
| Forty (U. S. E.), 1913 | 45 33 46.496 | 1435.4 | 12 37 41.2 | 192 37 36.1 | Scott | 716.1 | 2.854990 |
| | 122 43 59.967 | 1300.6 | 152 58 09.5 | 332 57 33.1 | Caples | 2434.4 | 3.386385 |
| Forty (U. S. E.) reference mark,[1] 1913 | 45 33 45.367 | 1400.6 | 194 25 13 | 14 25 13 | Forty (U. S. E.) | 36.0 | 1.55630 |
| | 122 44 00.380 | 8.2 | | | | | |
| R (U. S. E.), 1913 | 45 34 05.763 | 177.9 | 27 58 22.2 | 207 57 59.6 | Scott | 1464.7 | 3.165749 |
| | 122 43 35.510 | 770.1 | 41 43 29.5 | 221 43 12.0 | Forty (U. S. E.) | 796.9 | 2.901422 |
| | | | 133 52 44.6 | 313 51 50.7 | Caples | 2270.5 | 3.356114 |
| R (U. S. E.) reference mark,[1] 1913 | 45 34 04.490 | 138.6 | 207 58 21 | 27 58 22 | R (U. S. E.) | 44.51 | 1.64846 |
| | 122 43 36.473 | 791.0 | | | | | |
| Thirty-nine 2 (U. S. E.), 1913 | 45 34 20.740 | 640.3 | 325 28 14.1 | 145 28 24.6 | R (U. S. E.) | 561.3 | 2.749169 |
| | 122 43 50.181 | 1088.1 | 11 21 03.6 | 191 20 56.6 | Forty (U. S. E.) | 1078.3 | 3.032740 |
| Thirty-eight 2 (U. S. E.), 1913 | 45 34 30.209 | 932.6 | 281 56 03.0 | 101 56 48.5 | Thirty-nine 2 (U. S. E.) | 1412.9 | 3.150121 |
| | 122 44 53.935 | 1169.5 | 319 03 50.7 | 139 04 29.2 | Forty (U. S. E.) | 1786.3 | 3.251950 |
| Dike (U. S. E.), 1913 | 45 34 42.140 | 1301.0 | 330 58 29.2 | 150 58 41.3 | Thirty nine 2 (U. S. E.) | 755.5 | 2.878262 |
| | 122 44 07.088 | 153.7 | 70 04 19.9 | 250 03 46.5 | Thirty-eight 2 (U. S. E.) | 1080.4 | 3.033604 |
| Thirty-seven (U. S. E.), 1913 | 45 34 56.780 | 1752.9 | 292 45 51.4 | 112 46 26.8 | Dike (U. S. E.) | 1167.8 | 3.067373 |
| | 122 44 56.755 | 1230.4 | 355 44 11.1 | 175 44 13.1 | Thirty-eight 2 (U. S. E.) | 822.6 | 2.915179 |
| Thirty-nine (U. S. E.), 1913 | 45 34 19.092 | 589.4 | 10 17 38.2 | 190 17 32.1 | Forty (U. S. E.) | 1022.8 | 3.009779 |
| | 122 43 51.540 | 1117.6 | 129 27 24.8 | 309 26 38.2 | Thirty-seven (U. S. E.) | 1831.2 | 3.262727 |
| | | | 132 02 12.8 | 312 01 30.3 | Caples | 1735.6 | 3.239446 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Thirty-eight (U. S. E.), 1913 | 45 34 22.085 | 681.8 | 165 41 18.2 | 345 41 09.2 | Thirty seven (U. S. E.) | 1105.5 | 3.043541 |
| | 122 44 44.151 | 957.3 | 172 05 52.7 | 352 05 47.8 | Caples | 1079.9 | 3.033380 |
| | | | 274 37 30.9 | 94 38 08.5 | Thirty-nine (U. S. E.) | 1144.5 | 3.058623 |
| | | | 318 54 20.6 | 138 54 52.1 | Forty (U. S. E.) | 1457.8 | 3.163696 |
| Forty-one (U. S. E.), 1899 | 45 33 41.432 | 1279.1 | 98 08 24.8 | 278 07 48.8 | Forty (U. S. E.) | 1104.9 | 3.043339 |
| | 122 43 09.531 | 206.7 | 141 55 29.0 | 321 54 59.0 | Thirty-nine (U. S. E.) | 1477.1 | 3.169397 |
| Forty-two (U. S. E.), 1892 | 45 33 20.099 | 620.5 | 130 56 52.8 | 310 56 21.9 | Forty (U. S. E.) | 1243.6 | 3.094693 |
| | 122 43 16.654 | 361.2 | 193 12 03.1 | 13 12 08.2 | Forty-one (U. S. E.) | 676.5 | 2.830263 |
| Forty-three (U. S. E.), 1906 | 45 33 31.125 | 960.9 | 66 36 34.0 | 246 36 08.1 | Forty-two (U. S. E.) | 857.3 | 2.933148 |
| | 122 42 40.376 | 875.7 | 116 42 58.2 | 296 42 37.4 | Forty-one (U. S. E.) | 707.9 | 2.849956 |
| Forty-four (U. S. E.), 1909 | 45 33 07.053 | 217.7 | 115 27 16.7 | 295 26 48.8 | Forty-two (U. S. E.) | 937.2 | 2.971845 |
| | 122 42 37.639 | 816.5 | 124 18 02.5 | 304 17 03.7 | Forty (U. S. E.) | 2161.3 | 3.334722 |
| | | | 175 25 57.2 | 355 25 55.2 | Forty-three (U. S. E.) | 745.5 | 2.872467 |
| Forty-four (U. S. E.) reference mark,[1] 1913. | 45 33 06.511 | 201.0 | 153 50 51 | 333 50 51 | Forty-four (U. S. E.) | 18.64 | 1.27045 |
| | 122 42 37.260 | 808.3 | | | | | |
| F (U. S. E.), 1909 | 45 33 55.057 | 1699.7 | 346 33 20.5 | 166 33 32.1 | Forty-four (U. S. E.) | 1523.7 | 3.182913 |
| | 122 42 53.972 | 1170.4 | 79 32 42.5 | 259 31 55.3 | Forty (U. S. E.) | 1455.4 | 3.162989 |
| | | | 110 09 17.0 | 290 08 47.2 | R (U. S. E.) | 959.5 | 2.982058 |
| T (U. S. E.), 1909 | 45 34 29.906 | 923.3 | 34 23 02.5 | 214 22 38.3 | F (U. S. E.) | 1303.6 | 3.115153 |
| | 122 42 20.024 | 434.2 | 65 31 30.5 | 245 30 36.6 | R (U. S. E.) | 1798.6 | 3.254923 |
| T (U. S. E.) reference mark,[1] 1913 | 45 34 31.673 | 977.8 | 316 58 18 | 136 58 20 | T (U. S. E.) | 74.64 | 1.87297 |
| | 122 42 22.373 | 485.1 | | | | | |
| P (U. S. E.), 1909 | 45 33 45.011 | 1389.6 | 41 52 42.7 | 221 52 08.1 | Forty-four (U. S. E.) | 1573.7 | 3.196935 |
| | 122 41 49.207 | 1067.2 | 102 27 33.2 | 282 26 47.0 | F (U. S. E.) | 1438.4 | 3.157873 |
| | | | 154 15 46.7 | 334 15 24.7 | T (U. S. E.) | 1538.7 | 3.187164 |
| P (U. S. E.) reference mark,[1] 1913 | 45 33 45.935 | 1418.2 | 317 47 07 | 137 47 08 | P (U. S. E.) | 38.5 | 1.58546 |
| | 122 41 50.400 | 1093.0 | | | | | |
| W (U. S. E.), 1909 | 45 33 28.001 | 864.5 | 10 28 52.7 | 190 28 49.5 | Forty-five (U. S. E.) | 531.2 | 2.725354 |
| | 122 41 36.350 | 788.4 | 64 03 50.5 | 244 03 06.7 | Forty-four (U. S. E.) | 1478.3 | 3.169770 |
| | | | 116 23 51.7 | 296 22 56.3 | F (U. S. E.) | 1879.3 | 3.273987 |
| Thirty-six (U. S. E.), 1899 | 45 34 45.855 | 1415.7 | 237 32 34.9 | 57 32 52.4 | Thirty-seven (U. S. E.) | 628.5 | 2.798314 |
| | 122 45 21.218 | 460.1 | 242 51 41.5 | 62 52 03.2 | Caples | 736.2 | 2.866988 |
| | | | 309 13 52.2 | 129 14 11.7 | Thirty-eight 2 (U. S. E.) | 763.7 | 2.882920 |
| | | | 312 23 45.7 | 132 24 12.2 | Thirty-eight (U. S. E.) | 1088.3 | 3.036762 |
| Forty-five (U. S. E.), 1906 | 45 33 11.078 | 342.0 | 84 14 59.6 | 264 14 19.0 | Forty-four (U. S. E.) | 1239.0 | 3.093075 |
| | 122 41 40.806 | 885.1 | 115 36 02.4 | 295 35 19.9 | Forty-three (U. S. E.) | 1432.6 | 3.156139 |
| Forty-five 2 (U. S. E.), 1906 | 45 33 12.419 | 383.4 | 82 09 33 | 262 08 53 | Forty-four (U. S. E.) | 1213.3 | 3.083974 |
| | 122 41 42.227 | 915.9 | 171 26 39 | 351 26 34 | P (U. S. E.) | 1017.5 | 3.007546 |
| Forty-six 2 (U. S. E.), 1906 | 45 32 51.294 | 1583.6 | 118 03 45 | 298 03 15 | Forty-four (U. S. E.) | 1034.4 | 3.014684 |
| | 122 41 55.559 | 1205.3 | 203 54 45 | 23 54 55 | Forty-five 2 (U. S. E.) | 713.4 | 2.853352 |
| Forty-seven (U. S. E.), 1906 | 45 32 52.413 | 1618.1 | 86 40 50 | 266 40 30 | Forty-six 2 (U. S. E.) | 595.9 | 2.775182 |
| | 122 41 28.135 | 610.3 | 153 40 13 | 333 40 03 | Forty-five 2 (U. S. E.) | 689.2 | 2.838318 |
| Forty-eight 2 (U. S. E.), 1906 | 45 32 32.752 | 1011.1 | 134 36 08 | 314 35 49 | Forty-six 2 (U. S. E.) | 815.3 | 2.911319 |
| | 122 41 28.800 | 624.8 | 181 21 38 | 1 21 39 | Forty-seven (U. S. E.) | 607.2 | 2.783310 |
| Forty-nine 2 (U. S. E.), 1906 | 45 32 34.823 | 1075.1 | 82 05 26 | 262 05 11 | Forty-eight 2 (U. S. E.) | 464.6 | 2.667084 |
| | 122 41 07.588 | 164.6 | 140 37 20 | 320 37 06 | Forty-seven 2 (U. S. E.) | 702.6 | 2.846683 |
| Fifty 2 (U. S. E.), 1906 | 45 32 24.967 | 770.8 | 129 52 35 | 309 52 26 | Forty-eight 2 (U. S. E.) | 374.9 | 2.573863 |
| | 122 41 15.540 | 337.1 | 209 33 03 | 29 33 09 | Forty-nine 2 (U. S. E.) | 349.8 | 2.543793 |
| Fifty-one 2 (U. S. E.), 1906 | 45 32 24.138 | 745.2 | 93 16 39 | 273 16 24 | Fifty 2 (U. S. E.) | 447.8 | 2.651049 |
| | 122 40 54.935 | 1191.8 | 140 14 03 | 320 13 54 | Forty-nine 2 (U. S. E.) | 429.1 | 2.632600 |
| Fifty-two 2 (U. S. E.), 1906 | 45 32 15.406 | 475.6 | 134 00 58 | 314 00 48 | Fifty 2 (U. S. E.) | 424.8 | 2.628201 |
| | 122 41 01.459 | 31.7 | 207 41 51 | 27 41 56 | Fifty-one 2 (U. S. E.) | 304.5 | 2.483572 |
| Fifty-three 2 (U. S. E.), 1906 | 45 32 15.914 | 491.3 | 88 10 57 | 268 10 41 | Fifty-two 2 (U. S. E.) | 494.1 | 2.693830 |
| | 122 40 38.696 | 839.6 | 125 46 49 | 305 46 38 | Fifty-one 2 (U. S. E.) | 434.3 | 2.637774 |
| Fifty-four 2 (U. S. E.), 1906 | 45 32 04.249 | 131.2 | 132 23 13 | 312 23 01 | Fifty-two 2 (U. S. E.) | 510.9 | 2.708371 |
| | 122 41 44.065 | 956.1 | 197 55 26 | 17 55 30 | Fifty-three 2 (U. S. E.) | 378.5 | 2.578059 |
| Fifty-five 2 (U. S. E.), 1906 | 45 32 08.191 | 252.9 | 70 52 52 | 250 52 40 | Fifty-four 2 (U. S. E.) | 371.6 | 2.570039 |
| | 122 41 27.885 | 605.0 | 135 27 58 | 315 27 50 | Fifty-three 2 (U. S. E.) | 334.5 | 2.524349 |
| Fifty-six 2 (U. S. E.), 1906 | 45 31 55.578 | 1715.8 | 132 54 25 | 312 54 15 | Fifty-four 2 (U. S. E.) | 393.2 | 2.594621 |
| | 122 41 30.791 | 608.1 | 189 11 57 | 9 11 50 | Fifty-five 2 (U. S. E.) | 394.5 | 2.596020 |
| Fifty-seven 2 (U. S. E.), 1906 | 45 31 55.634 | 1717.6 | 89 42 35 | 269 42 24 | Fifty-six 2 (U. S. E.) | 339.0 | 2.530161 |
| | 122 41 15.170 | 329.2 | 144 33 49 | 324 33 40 | Fifty-five 2 (U. S. E.) | 475.8 | 2.677445 |
| Fifty-eight 2 (U. S. E.), 1906 | 45 31 47.324 | 1401.0 | 135 08 54 | 315 08 46 | Fifty-six 2 (U. S. E.) | 359.4 | 2.555633 |
| | 122 41 19.108 | 414.6 | 198 25 25 | 18 25 28 | Fifty-seven 2 (U. S. E.) | 270.4 | 2.432012 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Fifty-nine 2 (U. S. E.), 1906 | 45 31 49.038 | 1513.9 | 77 18 16 | 257 18 08 | Fifty-eight 2 (U. S. E.) | 240.7 | 2.381520 |
| | 122 41 08.286 | 179.8 | 143 44 22 | 323 44 17 | Fifty-seven 2 (U. S. E.) | 252.5 | 2.402341 |
| Union Depot, Portland (U. S. E.), 1906. | 45 31 45.731 | 1411.8 | 188 38 27 | 8 38 31 | Fifty-five 2 (U. S. E.) | 701.4 | 2.845935 |
| | 122 41 32.741 | 710.5 | 231 16 32 | 51 16 45 | Fifty-seven 2 (U. S. E.) | 488.7 | 2.689053 |
| | | | 259 06 33 | 79 06 51 | Fifty-nine 2 (U. S. E.) | 540.4 | 2.732713 |
| Thirty-five (U. S. E.), 1899 | 45 35 05.086 | 157.0 | 291 10 17.1 | 111 10 38.9 | Thirty-seven (U. S. E.) | 709.9 | 2.851203 |
| | 122 45 27.290 | 591.6 | 347 29 45.1 | 167 29 49.4 | Thirty-six (U. S. E.) | 608.1 | 2.783995 |
| Thirty-four (U. S. E.), 1899 | 45 34 53.801 | 1661.0 | 224 39 23.7 | 44 39 35.1 | Thirty-five (U. S. E.) | 489.8 | 2.690024 |
| | 122 45 43.171 | 935.9 | 297 15 49.7 | 117 16 05.4 | Thirty-six (U. S. E.) | 535.4 | 2.728716 |
| Thirty-three (U. S. E.), 1899 | 45 35 16.168 | 499.2 | 312 10 03.0 | 132 10 16.1 | Thirty-five (U. S. E.) | 509.6 | 2.707260 |
| | 122 45 44.715 | 969.4 | 357 13 29.0 | 177 13 30.7 | Thirty-four (U. S. E.) | 691.3 | 2.839696 |
| Thirty-two (U. S. E.), 1899 | 45 35 09.052 | 279.5 | 242 59 37.4 | 62 59 51.6 | Thirty-three (U. S. E.) | 483.8 | 2.684704 |
| | 122 46 04.601 | 99.7 | 315 22 52.4 | 135 23 07.7 | Thirty-four (U. S. E.) | 661.5 | 2.820505 |
| Thirty (U. S. E.), 1899 | 45 35 21.548 | 665.3 | 282 39 39.2 | 102 40 03.6 | Thirty-three (U. S. E.) | 757.6 | 2.879453 |
| | 122 46 18.815 | 407.9 | 321 23 07.2 | 141 23 17.4 | Thirty-two (U. S. E.) | 493.7 | 2.693493 |
| Thirty-one (U. S. E.), 1899 | 45 35 31.622 | 976.3 | 53 11 57.9 | 233 11 44.2 | Thirty (U. S. E.) | 519.2 | 2.715322 |
| | 122 45 59.637 | 1292.7 | 325 51 50.9 | 145 52 01.6 | Thirty-three (U. S. E.) | 576.4 | 2.760744 |
| Twenty-nine (U. S. E.), 1899 | 45 35 51.697 | 1596.0 | 3 31 19.1 | 183 31 17.2 | Thirty (U. S. E.) | 932.6 | 2.969682 |
| | 122 46 16.172 | 350.4 | 329 57 33.1 | 149 57 44.9 | Thirty-one (U. S. E.) | 716.0 | 2.854884 |
| Twenty-eight (U. S. E.), 1899 | 45 35 36.260 | 1119.5 | 222 15 39.8 | 42 15 54.1 | Twenty-nine (U. S. E.) | 644.0 | 2.808876 |
| | 122 46 36.154 | 783.6 | 320 23 30.8 | 140 23 43.2 | Thirty (U. S. E.) | 589.6 | 2.770526 |
| Twenty-six (U. S. E.), 1899 | 45 36 07.936 | 245.0 | 296 09 58.5 | 116 10 32.1 | Twenty-nine (U. S. E.) | 1136.7 | 3.055647 |
| | 122 47 03.244 | 70.3 | 329 01 04.5 | 149 01 23.8 | Twenty-eight (U. S. E.) | 1140.6 | 3.057151 |
| Twenty-seven (U. S. E.), 1899 | 45 36 20.299 | 626.7 | 64 34 49.0 | 244 34 22.5 | Twenty-six (U. S. E.) | 889.1 | 2.948959 |
| | 122 46 26.189 | 567.5 | 346 11 13.0 | 166 11 20.1 | Twenty-nine (U. S. E.) | 909.3 | 2.958726 |
| Twenty-five (U. S. E.), 1899 | 45 36 32.268 | 996.2 | 34 12 22.3 | 214 12 05.5 | Twenty-six (U. S. E.) | 908.3 | 2.958235 |
| | 122 46 39.682 | 859.9 | 321 38 43.3 | 141 38 53.0 | Twenty-seven (U. S. E.) | 471.2 | 2.673204 |
| Twenty-four (U. S. E.), 1899 | 45 36 36.409 | 1124.1 | 278 25 54.9 | 98 26 23.3 | Twenty-five (U. S. E.) | 871.6 | 2.940298 |
| | 122 47 19.468 | 421.8 | 338 11 56.9 | 158 12 08.5 | Twenty-six (U. S. E.) | 946.8 | 2.976247 |
| Twenty-three (U. S. E.), 1899 | 45 37 00.572 | 17.7 | 25 36 48.7 | 205 36 36.9 | Twenty-four (U. S. E.) | 827.3 | 2.917644 |
| | 122 47 02.964 | 64.2 | 329 59 58.7 | 150 00 15.3 | Twenty-five (U. S. E.) | 1009.0 | 3.003893 |
| Twenty-two (U. S. E.), 1899 | 45 37 05.548 | 202.2 | 284 07 12.5 | 104 07 36.7 | Twenty-three (U. S. E.) | 756.1 | 2.878591 |
| | 122 47 36.808 | 797.8 | 338 00 37.5 | 158 00 49.9 | Twenty-four (U. S. E.) | 1003.5 | 3.001505 |
| Twenty-one (U. S. E.), 1899 | 45 37 22.678 | 700.1 | 44 19 24.5 | 224 19 08.5 | Twenty-two (U. S. E.) | 696.1 | 2.842651 |
| | 122 47 14.360 | 311.1 | 340 06 38.5 | 160 06 46.7 | Twenty-three (U. S. E.) | 725.8 | 2.860805 |
| Twenty (U. S. E.), 1899 | 45 37 33.741 | 1041.7 | 303 59 04.8 | 123 59 21.5 | Twenty-one (U. S. E.) | 611.0 | 2.786053 |
| | 122 47 37.747 | 817.6 | 358 36 43.8 | 178 36 44.5 | Twenty-two (U. S. E.) | 839.8 | 2.924174 |
| Nineteen (U. S. E.), 1899 | 45 37 54.229 | 1674.2 | 13 23 06.2 | 193 22 58.5 | Twenty-one (U. S. E.) | 1001.3 | 3.000558 |
| | 122 47 03.661 | 79.3 | 49 25 04.2 | 229 24 39.8 | Twenty (U. S. E.) | 972.2 | 2.987778 |
| Eighteen (U. S. E.), 1899 | 45 38 07.826 | 241.6 | 11 18 56.8 | 191 18 49.8 | Twenty (U. S. E.) | 1073.2 | 3.030669 |
| | 122 47 28.027 | 607.1 | 308 29 48.8 | 128 30 06.2 | Nineteen (U. S. E.) | 674.3 | 2.828883 |
| Seventeen (U. S. E.), 1899 | 45 38 05.135 | 158.5 | 27 58 53.1 | 207 58 47.2 | Nineteen (U. S. E.) | 381.3 | 2.581253 |
| | 122 46 55.402 | 1200.0 | 96 42 28.1 | 276 42 04.8 | Eighteen (U. S. E.) | 711.5 | 2.852168 |
| Sixteen (U. S. E.), 1899 | 45 38 21.072 | 650.6 | 41 39 25.8 | 221 39 13.8 | Eighteen (U. S. E.) | 547.4 | 2.738270 |
| | 122 47 11.230 | 243.2 | 325 07 59.8 | 145 08 11.1 | Seventeen (U. S. E.) | 599.7 | 2.777909 |
| Fifteen (U. S. E.), 1899 | 45 38 13.179 | 406.9 | 34 04 23.6 | 214 04 18.1 | Seventeen (U. S. E.) | 299.8 | 2.476835 |
| | 122 46 47.648 | 1032.0 | 115 30 33.6 | 295 30 16.8 | Sixteen (U. S. E.) | 565.9 | 2.752741 |
| Fourteen (U. S. E.), 1899 | 45 38 27.611 | 852.4 | 57 42 22.3 | 237 42 11.8 | Sixteen (U. S. E.) | 377.8 | 2.577290 |
| | 122 46 56.483 | 1223.3 | 336 45 25.3 | 156 45 31.6 | Fifteen (U. S. E.) | 484.9 | 2.685658 |
| Thirteen (U. S. E.), 1899 | 45 38 19.118 | 590.2 | 42 59 33.3 | 222 59 27.6 | Fifteen (U. S. E.) | 250.7 | 2.399085 |
| | 122 46 39.756 | 861.0 | 125 53 55.3 | 305 53 43.3 | Fourteen (U. S. E.) | 447.2 | 2.650505 |
| Twelve (U. S. E.), 1899 | 45 38 35.460 | 1094.8 | 55 58 41.2 | 235 58 29.3 | Fourteen (U. S. E.) | 433.1 | 2.636590 |
| | 122 46 39.908 | 864.3 | 359 37 33.2 | 179 37 33.3 | Thirteen (U. S. E.) | 504.6 | 2.702908 |
| Eleven (U. S. E.), 1899 | 45 38 25.829 | 797.4 | 48 46 36.1 | 228 46 28.3 | Thirteen (U. S. E.) | 314.4 | 2.497511 |
| | 122 46 28.837 | 624.6 | 141 07 07.1 | 321 06 59.2 | Twelve (U. S. E.) | 382.0 | 2.582027 |
| Ten (U. S. E.), 1899 | 45 38 43.907 | 1355.5 | 3 37 46.3 | 183 37 45.1 | Eleven (U. S. E.) | 559.3 | 2.747607 |
| | 122 46 27.202 | 589.1 | 46 32 13.3 | 226 32 04.2 | Twelve (U. S. E.) | 379.1 | 2.578768 |
| Nine (U. S. E.), 1899 | 45 38 40.253 | 1242.7 | 51 52 00.8 | 231 51 42.1 | Eleven (U. S. E.) | 721.2 | 2.858030 |
| | 122 46 02.645 | 57.3 | 101 58 38.8 | 281 58 21.3 | Ten (U. S. E.) | 543.6 | 2.735305 |
| Eight (U. S. E.), 1899 | 45 38 53.192 | 1642.2 | 36 45 20.3 | 216 45 13.3 | Ten (U. S. E.) | 357.8 | 2.553648 |
| | 122 46 17.315 | 374.9 | 321 30 18.3 | 141 30 28.8 | Nine (U. S. E.) | 510.4 | 2.707903 |
| Six (U. S. E.), 1899 | 45 39 06.726 | 207.7 | 27 55 57.6 | 207 55 50.3 | Eight (U. S. E.) | 472.9 | 2.674794 |
| | 122 46 07.085 | 153.4 | 353 17 27.6 | 173 17 30.8 | Nine (U. S. E.) | 822.9 | 2.915369 |

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Seven (U. S. E.), 1899 | 45 39 03.471 | 107.2 | 31 18 11.2 | 211 17 56.8 | Nine (U. S. E.) | 838.9 | 2.923716 |
| | 122 45 42.518 | 920.6 | 100 42 04.2 | 280 41 46.6 | Six (U. S. E.) | 541.4 | 2.733483 |
| | | | 155 06 04.2 | 335 05 52.2 | Four 2 (U. S. E.) | 863.8 | 2.936394 |
| Four (U. S. E.), 1899 | 45 39 24.957 | 770.5 | 27 23 12.2 | 207 23 02.6 | Six (U. S. E.) | 633.9 | 2.802023 |
| | 122 45 53.618 | 1160.8 | 340 04 59.3 | 160 05 07.2 | Seven (U. S. E.) | 705.6 | 2.848534 |
| Five (U. S. E.), 1899 | 45 39 27.181 | 839.2 | 44 31 58.0 | 224 31 34.2 | Seven (U. S. E.) | 1026.8 | 3.011505 |
| | 122 45 09.260 | 200.5 | 85 54 54.0 | 265 54 22.3 | Four (U. S. E.) | 962.8 | 2.983555 |
| | | | 92 43 21.0 | 272 42 45.2 | Four 2 (U. S. E.) | 1084.9 | 3.035405 |
| Thirty-five 2 (U. S. E.), 1913 | 45 35 06.359 | 196.3 | 23 54 54 | 203 54 49 | Thirty-four (U. S. E.) | 424.1 | 2.627453 |
| | 122 45 35.241 | 764.0 | 97 26 47 | 277 26 26 | Thirty-two (U. S. E.) | 641.9 | 2.807459 |
| Star (U. S. E.), 1913 | 45 34 59.051 | 1823.1 | 74 00 41 | 254 00 23 | Thirty-four (U. S. E.) | 588.3 | 2.769634 |
| | 122 45 17.083 | 370.3 | 109 49 09 | 299 48 56 | Thirty-five 2 (U. S. E.) | 453.7 | 2.656784 |
| | | | 279 02 12 | 99 02 16 | Thirty-seven (U. S. E.) | 446.2 | 2.649560 |
| Thirty-six 2 (U. S. E.), 1913 | 45 34 42.879 | 1323.8 | 119 15 01 | 299 14 42 | Thirty-four (U. S. E.) | 690.2 | 2.838953 |
| | 122 45 15.396 | 333.8 | 175 48 37 | 355 48 36 | Star (U. S. E.) | 500.6 | 2.699513 |
| | | | 223 16 34 | 43 16 47 | Thirty-seven (U. S. E.) | 589.5 | 2.770491 |
| Twenty-six 2 (U. S. E.), 1913 | 45 36 07.968 | 246.0 | 244 56 18 | 64 56 45 | Twenty-seven (U. S. E.) | 898.8 | 2.953687 |
| | 122 47 03.762 | 81.5 | 295 57 50 | 115 58 24 | Twenty-nine (U. S. E.) | 1147.2 | 3.059654 |
| Twenty-four 2 (U. S. E.), 1913 | 45 36 36.714 | 1133.5 | 207 26 26 | 27 26 39 | Twenty-three (U. S. E.) | 830.0 | 2.919066 |
| | 122 47 20.617 | 446.8 | 278 47 31 | 98 48 00 | Twenty-five (U. S. E.) | 897.6 | 2.953076 |
| Nineteen 2 (U. S. E.), 1913 | 45 37 50.864 | 1570.3 | 55 16 46 | 235 16 21 | Twenty (U. S. E.) | 928.0 | 2.967571 |
| | 122 47 02.535 | 54.9 | 133 29 09 | 313 28 51 | Eighteen (U. S. E.) | 761.0 | 2.881381 |
| Seventeen 2 (U. S. E.), 1913 | 45 38 04.426 | 136.6 | 98 17 20 | 278 16 57 | Eighteen (U. S. E.) | 728.4 | 2.862393 |
| | 122 47 54.747 | 1185.5 | 176 59 33 | 356 59 32 | Fourteen (U. S. E.) | 716.8 | 2.855392 |
| Thirteen 2 (U. S. E.), 1913 | 45 38 18.577 | 573.5 | 126 02 17 | 306 02 04 | Fourteen (U. S. E.) | 474.1 | 2.675874 |
| | 122 46 38.781 | 839.9 | 177 19 09 | 357 19 08 | Twelve (U. S. E.) | 521.8 | 2.717521 |
| *Supplementary points.* | | | | | | | |
| Jetty A, target, 1909 | 46 12 35.051 | 1082.3 | 139 19 50.2 | 319 16 13.2 | Battery | 9873.5 | 3.994472 |
| | 123 57 51.323 | 1100.2 | 214 41 41.9 | 34 43 47.7 | Scarboro Hill 2 | 6555.4 | 3.816601 |
| | | | 274 30 32.6 | 94 31 05.6 | Fort Stevens wharf Lighthouse. | 984.0 | 2.993009 |
| Jetty B, target, 1909 | 46 13 27.034 | 834.7 | 150 15 03.5 | 330 13 10.1 | Battery | 6774.2 | 3.830857 |
| | 124 00 14.857 | 318.4 | 240 54 11.4 | 60 58 00.9 | Scarboro Hill 2 | 7788.5 | 3.891454 |
| | | | 326 20 47.2 | 146 22 03.1 | Point Adams Lighthouse (unused). | 4066.6 | 3.609233 |
| Jetty C, 1909 | 46 13 40.257 | 1243.1 | 246 20 14.5 | 66 24 34.6 | Scarboro Hill 2 | 8422.2 | 3.925425 |
| | 124 00 57.274 | 1227.4 | 292 48 14.1 | 112 51 01.3 | Fort Stevens wharf Lighthouse. | 5388.6 | 3.731472 |
| | | | 320 10 23.9 | 140 12 10.4 | Point Adams Lighthouse. (unused). | 4938.8 | 3.693623 |
| Jetty E, 1909 | 46 14 01.103 | 34.1 | 174 15 18.7 | 354 15 02.3 | Battery | 4852.9 | 3.686004 |
| | 124 02 29.165 | 624.9 | 254 12 07.7 | 74 17 34.2 | Scarboro Hill 2 | 10062.2 | 4.002695 |
| | | | 310 49 34.6 | 130 52 27.4 | Point Adams Lighthouse (unused). | 6784.2 | 3.831496 |
| Jetty D,[1] 1909 | 46 13 42.65 | 1316.9 | 247 20 14 | 67 24 41 | Scarboro Hill 2 | 8581.5 | 3.933565 |
| | 124 01 06.84 | 146.6 | 318 56 31 | 138 58 25 | Point Adams Lighthouse (unused). | 5128.1 | 3.709957 |
| Jetty F,[1] 1909 | 46 13 59.92 | 1850.1 | 177 23 54 | 357 23 47 | Battery | 4870.1 | 3.687539 |
| | 124 02 41.53 | 889.9 | 309 10 15 | 129 13 17 | Point Adams Lighthouse (unused). | 6963.6 | 3.842836 |
| West end of jetty, 1909 | 46 14 03.483 | 107.5 | 204 56 35.4 | 24 57 50.0 | Battery | 5244.7 | 3.719719 |
| | 124 04 35.155 | 753.3 | 257 49 35.5 | 77 56 33.0 | Scarboro Hill 2 | 12665.5 | 4.102621 |
| | | | 299 54 08.1 | 119 58 31.9 | Point Adams Lighthouse (unused). | 9038.4 | 3.956092 |
| Navy east wireless, 1909–1911 | 46 17 55.874 | 1725.2 | 319 47 29.2 | 139 48 38.3 | Battery | 3168.8 | 3.500900 |
| | 124 04 27.399 | 586.4 | 320 24 41.7 | 140 41 33.4 | Saddle Mountain 2 | 47404.2 | 4.675817 |
| | | | 165 32 06.6 | 285 31 59.2 | North Head Lighthouse | 228.4 | 2.358693 |
| Cape Disappointment Astronomic, 1851–1874. | 46 16 37.440 | 1156.0 | 282 58 50.1 | 103 04 27.0 | Scarboro Hill | 10250.2 | 4.010731 |
| | 124 02 51.764 | 1108.4 | 319 07 34.7 | 139 11 15.1 | Point Adams | 9993.3 | 3.999707 |
| Jetty Sands Range rear light, May, 1913. | 46 13 42.284 | 1305.6 | 146 42 03 | 326 39 57 | East Battery | 6792.1 | 3.832007 |
| | 123 59 45.385 | 972.6 | 212 49 39 | 32 50.56 | Island (U. S. E.) | 4241.0 | 3.627470 |
| | | | 310 35 08 | 130 36 38 | Fort Stevens Longitude | 3543.5 | 3.549437 |
| St. Mary's Church, McGowans, 1913 | 46 14 49.974 | 1543.1 | 42 19 49 | 222 17 33 | Fort Stevens Longitude | 5944.6 | 3.774119 |
| | 123 54 33.121 | 709.5 | 55 27 51 | 235 25 54 | Desdemona Sands light | 4219.3 | 3.625242 |
| | | | 108 34 33 | 288 32 05 | Island (U. S. E.) | 4629.8 | 3.665568 |
| Fort Columbia wharf light, May, 1913. | 46 14 46.835 | 1446.2 | 34 47 06 | 214 45 26 | Fort Stevens Longitude | 5233.6 | 3.718801 |
| | 123 55 20.576 | 440.8 | 46 57 55 | 226 56 32 | Desdemona Sands light | 3363.8 | 3.526832 |
| | | | 111 26 08 | 291 20 51 | East Battery | 10096.8 | 4.004185 |
| Jetty Sands Range front light, May, 1913. | 46 13 50.899 | 1571.6 | 217 55 23 | 37 56 50 | Island (U. S. E.) | 4180.7 | 3.621245 |
| | 123 59 58.009 | 1243.0 | 279 15 09 | 99 17 06 | Desdemona Sands light | 3532.7 | 3.548112 |
| | | | 310 57 48 | 130 59 28 | Fort Stevens Longitude | 3922.1 | 3.593524 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Columbia River Entrance Range front light, May, 1913. | 46 15 37.177 | 1147.9 | 357 32 48.6 | 177 32 57.0 | Fort Stevens Longitude | 5858.8 | 3.767810 |
| | 123 57 51.551 | 1104.1 | 96 30 29.5 | 276 30 24.8 | Island | 139.8 | 2.145426 |
| | | | 109 04 07.4 | 289 00 39.3 | East Battery | 6524.1 | 3.814522 |
| Sand Island light, May, 1913 | 46 15 36.310 | 1121.2 | 114 15 20 | 294 15 17 | Island | 103.7 | 2.015988 |
| | 123 57 53.619 | 1148.4 | 238 50 12 | 58 50 13 | Columbia River Entrance Range front light. | 51.7 | 1.713910 |
| Fort Stevens wireless, north pole, 1913. | 46 11 27.457 | 847.8 | 155 10 17 | 335 09 08 | Jetty Sands Range front light | 4880.5 | 3.688465 |
| | 123 58 22.371 | 479.7 | 183 51 33 | 3 51 51 | Island | 7743.9 | 3.888957 |
| | | | 200 25 17 | 20 26 06 | Desdemona Sands light | 4119.0 | 3.614795 |
| Fort Stevens, highest water tank, 1913. | 46 11 52.089 | 1608.4 | 176 25 31 | 356 25 16 | Island | 6979.4 | 3.843816 |
| | 123 57 37.716 | 808.6 | 188 48 27 | 8 48 43 | Desdemona Sands light | 3136.4 | 3.496438 |
| | | | 258 15 30 | 78 19 01 | Sands | 6598.2 | 3.819425 |
| Columbia River Entrance Range, rear light, May, 1913. | 46 15 51.693 | 1596.2 | 18 39 42.3 | 198 38 30.5 | Fort Stevens Longitude | 6651.0 | 3.822884 |
| | 123 56 00.580 | 12.4 | 80 15 32.0 | 260 14 07.1 | Island (U. S. E.) | 2552.3 | 3.406938 |
| | | | 101 09 57.8 | 281 05 09.5 | East Battery | 8706.8 | 3.939858 |
| Republic Spit Range, front light. May, 1913. | 46 15 53.631 | 1656.0 | 277 31 23 | 97 33 28 | Island (U. S. E.) | 3750.8 | 3.574128 |
| | 124 00 51.661 | 1106.3 | 327 07 01 | 147 09 19 | Fort Stevens Longitude | 7573.6 | 3.879300 |
| | | | 125 03 13 | 305 01 55 | East Battery | 2821.9 | 3.450538 |
| Republic Spit Range, rear light, May, 1913. | 46 15 58.553 | 1808.0 | 121 32 12 | 301 30 52 | East Battery | 2808.1 | 3.448415 |
| | 124 00 47.768 | 1022.9 | 280 01 56 | 100 03 59 | Island (U. S. E.) | 3691.6 | 3.567219 |
| | | | 328 15 31 | 148 17 47 | Fort Stevens Longitude | 7657.5 | 3.884085 |
| Chinook Church spire, 1913 | 46 16 25.131 | 776.0 | 47 45 10 | 227 44 15 | Island (U. S. E.) | 2178.4 | 3.338138 |
| | 123 56 42.741 | 915.2 | 94 52 54 | 274 48 36 | East Battery | 7667.1 | 3.884632 |
| | | | 7 27 30 | 187 27 06 | Desdemona Sands light | 5376.6 | 3.730507 |
| Peacock Spit Range, front light, May, 1913. | 46 15 49.201 | 1519.5 | 118 11 10 | 298 09 20 | East Battery | 3721.8 | 3.570751 |
| | 124 00 06.335 | 135.7 | 277 21 27 | 97 23 00 | Island (U. S. E.) | 2770.6 | 3.442579 |
| | | | 319 01 43 | 139 03 47 | Desdemona Sands light | 5590.0 | 3.747410 |
| Peacock Spit Range, rear light, May, 1913. | 46 15 50.368 | 1555.3 | 116 58 02 | 296 56 08 | East Battery | 3797.2 | 3.579464 |
| | 124 00 01.483 | 31.7 | 278 24 37 | 98 26 06 | Island (U. S. E.) | 2672.6 | 3.426941 |
| | | | 334 07 33 | 154 09 15 | Fort Stevens Longitude | 6957.5 | 3.842451 |
| Taylor School, cupola, 1909 | 46 11 15.930 | 491.9 | 106 26 09.4 | 286 21 38.8 | Fort Stevens wharf light | 8379.2 | 3.923200 |
| | 123 50 50.663 | 1086.5 | 122 47 30.6 | 302 38 49.9 | Battery | 18368.2 | 4.264066 |
| | | | 146 01 44.8 | 325 58 46.9 | Scarboro Hill 2 | 9446.2 | 3.975258 |
| Astoria, Smith Point, iron chimney, 1909. | 46 10 51.011 | 1575.1 | 113 37 36.5 | 293 33 34.9 | Fort Stevens wharf light | 7832.6 | 3.893905 |
| | 123 51 30.814 | 660.9 | 126 18 37.9 | 306 10 26.2 | Battery | 18095.2 | 4.257563 |
| | | | 152 48 53.7 | 332 46 24.8 | Scarboro Hill 2 | 9670.9 | 3.985469 |
| Youngs Bay Bridge, center draw, 1909. | 46 10 35.055 | 1082.4 | 119 02 33.2 | 298 58 53.0 | Fort Stevens wharf light | 7479.7 | 3.873882 |
| | 123 52 00.522 | 11.2 | 128 47 06.7 | 308 39 16.4 | Battery | 17890.1 | 4.252613 |
| | | | 157 25 13.4 | 337 23 05.9 | Scarboro Hill 2 | 9849.9 | 3.993432 |
| Adair School, cupola, 1909 | 46 11 33.262 | 1027.1 | 99 06 57.7 | 279 00 31.4 | Fort Stevens wharf light | 11620.8 | 4.065236 |
| | 123 48 10.320 | 221.3 | 116 31 46.6 | 296 21 10.0 | Battery | 21095.4 | 4.324188 |
| | | | 129 58 09.9 | 309 53 16.2 | Scarboro Hill 2 | 11368.3 | 4.055694 |
| Astoria Court House, dome.[1] 1909 | 46 11 20.61 | 636.2 | 120 46 19 | 300 37 03 | Battery | 19167.1 | 4.282556 |
| | 123 50 02.67 | 57.3 | 140 38 56 | 320 35 23 | Scarboro Hill 2 | 9945.4 | 3.997624 |
| Point Adams Life Saving Station, flagpole,[1] 1913. | 46 12 02.10 | 64.8 | 166 54 48 | 346 54 26 | Desdemona Sands Lighthouse | 2864.8 | 3.457100 |
| | 123 56 45.04 | 965.7 | 259 02 09 | 79 05 08 | Sands | 5430.1 | 3.734805 |
| Flavels Wharf, post light, May, 1913 | 46 11 37.265 | 1150.6 | 147 05 30 | 327 01 12 | Desdemona Sands Lighthouse | 4237.5 | 3.627111 |
| | 123 55 27.879 | 597.8 | 217 11 41 | 37 13 58 | Point Ellice (U. S. E.) | 6739.8 | 3.828649 |
| | | | 243 56 17 | 63 58 20 | Sands | 4093.1 | 3.612053 |
| Lower Sands light, May, 1913 | 46 11 34.563 | 1067.2 | 124 22 47 | 304 19 48 | Desdemona Sands Lighthouse | 6451.3 | 3.809647 |
| | 123 53 06.861 | 147.1 | 190 56 06 | 10 56 42 | Point Ellice (U. S. E.) | 5551.9 | 3.744438 |
| | | | 199 10 24 | 19 10 46 | Sands | 1991.1 | 3.299098 |
| Meglers water tank, spindle, 1913 | 46 15 04.275 | 132.0 | 249 05 05 | 69 08 48 | Grays (U. S. E.) | 7083.5 | 3.850245 |
| | 123 51 19.925 | 426.8 | 299 15 01 | 119 19 14 | Tongue (U. S. E.) | 8614.8 | 3.935246 |
| | | | 50 23 58 | 230 23 16 | Point Ellice (U. S. E.) | 1606.5 | 3.205890 |
| Knapton Channel light, May, 1913 | 46 14 16.716 | 516.1 | 96 29 40 | 276 27 28 | Point Ellice (U. S. E.) | 3938.9 | 3.595378 |
| | 123 49 15.029 | 322.0 | 224 37 19 | 44 39 32 | Grays (U. S. E.) | 5612.6 | 3.749167 |
| | | | 296 50 38 | 116 52 10 | Taylor | 3061.9 | 3.485989 |
| United States Quarantine Station, flagpole, 1913. | 46 16 07.289 | 225.1 | 262 41 35 | 82 43 08 | Grays (U. S. E.) | 4559.0 | 3.658865 |
| | 123 49 42.084 | 901.2 | 318 39 54 | 138 41 57 | Tongue (U. S. E.) | 8202.4 | 3.913941 |
| | | | 325 23 35 | 145 24 27 | Taylor | 5828.7 | 3.765570 |
| Knapton Saw Mill, cupola with flagpole, 1913. | 46 16 22.148 | 683.9 | 326 25 22 | 146 27 50 | Tongue (U. S. E.) | 7942.1 | 3.899938 |
| | 123 48 54.190 | 1160.4 | 336 29 57 | 156 31 14 | Taylor | 5731.1 | 3.758238 |
| | | | 34 14 26 | 214 11 46 | Sands | 8464.1 | 3.927582 |
| Grays Point light, May, 1913 | 46 16 26.100 | 805.9 | 354 32 54 | 174 33 16 | Tongue (U. S. E.) | 6771.1 | 3.830660 |
| | 123 45 59.283 | 1269.3 | 15 13 06 | 195 12 17 | Taylor | 5573.4 | 3.746123 |
| | | | 89 41 13 | 269 41 05 | Grays (U. S. E.) | 248.8 | 2.395885 |
| Smith Point light, May, 1913 | 46 11 34.055 | 1051.5 | 128 15 33 | 308 14 11 | Sands | 3063.2 | 3.486175 |
| | 123 50 44.151 | 946.7 | 159 51 59 | 339 50 51 | Point Ellice (U. S. E.) | 5822.8 | 3.765130 |
| | | | 231 53 28 | 51 56 04 | Taylor | 5899.4 | 3.770810 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Finnish Lutheran Church spire, 1913 | 46 11 17.294 | 534.0 | 136 06 59 | 316 05 40 | Sands | 3349.7 | 3.525002 |
| | 123 50 48.037 | 1030.2 | 162 12 12 | 342 11 07 | Point Ellice (U. S. E.) | 6285.2 | 3.798320 |
| | | | 228 39 00 | 48 41 39 | Taylor | 6294.5 | 3.798958 |
| Weather Bureau Tower, flagpole,[1] 1913. | 46 11 26.87 | 829.7 | 121 23 49 | 301 21 52 | Sands | 4067.7 | 3.609350 |
| | 123 49 54.38 | 1166.1 | 151 38 39 | 331 36 55 | Point Ellice (U. S. E.) | 6464.9 | 3.810563 |
| Astoria Rear Range light, May, 1913 | 46 11 04.059 | 125.3 | 155 39 35 | 335 37 58 | Point Ellice (U. S. E.) | 7017.2 | 3.846165 |
| | 123 50 02.708 | 58.1 | 206 31 29 | 26 34 17 | Grays (U. S. E.) | 11114.0 | 4.045870 |
| | | | 219 25 15 | 39 27 22 | Taylor | 5911.3 | 3.771680 |
| Astoria Front Range light, May, 1913 | 46 11 22.276 | 687.8 | 148 52 38 | 328 50 39 | Point Ellice (U. S. E.) | 6811.8 | 3.833263 |
| | 123 49 33.363 | 715.4 | 204 48 06 | 24 50 32 | Grays (U. S. E.) | 10334.3 | 4.014282 |
| | | | 217 58 20 | 38 00 05 | Taylor | 5078.7 | 3.705756 |
| McClure's School cupola, flagpole, 1913. | 46 11 14.427 | 445.5 | 154 42 03 | 334 40 26 | Point Ellice (U. S. E.) | 6717.6 | 3.827217 |
| | 123 50 03.706 | 79.5 | 207 22 55 | 27 25 43 | Grays (U. S. E.) | 10838.3 | 4.034962 |
| | | | 221 38 18 | 41 40 25 | Taylor | 5681.8 | 3.754487 |
| Alderbrook School, cupola, 1913 | 46 11 40.413 | 1247.8 | 102 58 23 | 282 54 14 | Sands | 7592.7 | 3.880306 |
| | 123 46 51.206 | 1097.9 | 127 01 01 | 306 57 05 | Point Ellice (U. S. E.) | 8760.6 | 3.942533 |
| | | | 185 35 18 | 5 35 47 | Grays (U. S. E.) | 8861.8 | 3.947522 |
| Buoy Depot flag, 1913 | 46 12 29.877 | 922.5 | 91 13 19 | 271 08 38 | Sands | 8368.3 | 3.922635 |
| | 123 46 06.072 | 130.2 | 115 12 35 | 295 08 07 | Point Ellice (U. S. E.) | 8800.1 | 3.944486 |
| | | | 179 11 14 | 359 11 11 | Grays (U. S. E.) | 7293.1 | 3.862913 |
| Marconi northeast wireless, tallest pole, Astoria, 1913. | 46 11 05.932 | 183.2 | 106 02 30.0 | 285 57 34.0 | Fort Stevens Longitude | 9148.0 | 3.961328 |
| | 123 50 49.740 | 1066.7 | 124 41 55.0 | 304 33 22.4 | East Battery | 18484.2 | 4.266800 |
| | | | 146 56 59.5 | 326 54 00.9 | Scarboro Hill 2 | 9714.5 | 3.987422 |
| Marconi southwest wireless, Astoria, 1913. | 46 11 05.277 | 162.9 | 106 15 40.9 | 286 10 46.8 | Fort Stevens Longitude | 9099.5 | 3.959018 |
| | 123 50 52.368 | 1123.1 | 124 50 57.3 | 304 42 26.6 | East Battery | 18449.4 | 4.265983 |
| | | | 147 17 36.4 | 327 14 39.7 | Scarboro Hill 2 | 9700.9 | 3.986812 |
| Post light, Sand Island,[1] 1913 | 46 15 43.81 | 1352.8 | 275 37 08 | 95 39 38 | Scarboro Hill 2 | 4472.1 | 3.650512 |
| | 123 58 24.90 | 533.2 | 350 56 32 | 170 57 05 | Fort Stevens Longitude | 6134.7 | 3.787790 |
| Navy west wireless, Astoria,[1] 1913 | 46 17 56.066 | 1731.2 | 290 04 02.9 | 110 10 59.5 | Scarboro Hill 2 | 13145.8 | 4.118787 |
| | 124 04 33.618 | 719.5 | 318 48 32.2 | 138 53 31.2 | Fort Stevens Longitude | 13468.7 | 4.129326 |
| Gun (U. S. E.), 1905 | 46 12 26.964 | 832.6 | 211 51 56.3 | 31 53 54.5 | Scarboro Hill 2 (U. S. E.) | 6640.2 | 3.822178 |
| | 123 57 40.778 | 874.1 | 225 18 19.1 | 45 18 19.8 | Fort Stevens Longitude | 27.90 | 1.445604 |
| Smith (U. S. E.), 1905 | 46 11 24.491 | 756.2 | 101 50 43.5 | 281 45 32.8 | Gun (U. S. E.) | 9430.7 | 3.974546 |
| | 123 50 30.231 | 648.3 | 142 56 40.3 | 322 53 27.6 | Scarboro Hill 2 (U. S. E.) | 9485.6 | 3.977064 |
| | | | 248 14 13.8 | 68 17 51.0 | Tongue (U. S. E.) | 6946.3 | 3.841753 |
| Old Point Ellice (U. S. E.), 1905 | 46 14 30.406 | 938.8 | 245 37 14.0 | 65 41 40.1 | Grays (U. S. E.) | 8663.1 | 3.937671 |
| | 123 52 19.417 | 416.0 | 289 46 53.7 | 109 51 49.8 | Tongue (U. S. E.) | 9343.0 | 3.970485 |
| | | | 337 48 30.3 | 157 49 49.1 | Smith (U. S. E.) | 6199.1 | 3.792328 |
| | | | 61 04 16.7 | 241 00 24.7 | Gun (U. S. E.) | 7871.4 | 3.896052 |
| Seal (U. S. E.), 1905 | 46 12 01.511 | 46.7 | 98 30 25.3 | 278 25 01.9 | Tongue (U. S. E.) | 9711.1 | 3.987270 |
| | 123 38 01.215 | 26.0 | 160 29 48.7 | 340 28 19.5 | Harrington (U. S. E.) | 7922.8 | 3.898878 |
| Elliott (U. S. E.), 1905 | 46 15 38.376 | 1184.9 | 14 17 44.8 | 194 16 47.3 | Seal (U. S. E.) | 6909.7 | 3.839462 |
| | 123 36 41.636 | 891.7 | 65 04 21.7 | 244 58 00.6 | Tongue (U. S. E.) | 12471.9 | 4.095934 |
| | | | 96 56 34.5 | 276 49 48.3 | Grays (U. S. E.) | 12279.3 | 4.089172 |
| Marsh (U. S. E.), 1905 | 46 13 52.180 | 1611.1 | 57 48 13.1 | 237 45 10.5 | Seal (U. S. E.) | 6408.6 | 3.806763 |
| | 123 33 48.276 | 1034.5 | 131 27 31.4 | 311 25 26.2 | Elliott (U. S. E.) | 4954.2 | 3.694976 |
| | | | 262 28 19.3 | 82 30 30.3 | Raspberry (U. S. E.) | 3920.1 | 3.593299 |
| Old Jim Crow (U. S. E.), 1905 | 46 15 40.385 | 1247.0 | 258 12 06.6 | 78 14 01.5 | Three Tree Point (U. S. E.) | 3481.0 | 3.541710 |
| | 123 33 48.827 | 1045.7 | 305 57 15.7 | 125 59 27.1 | Raspberry (U. S. E.) | 4815.6 | 3.682648 |
| | | | 359 47 51.2 | 179 47 51.6 | Marsh (U. S. E.) | 3341.0 | 3.523879 |
| | | | 89 03 25.6 | 269 01 20.8 | Elliott (U. S. E.) | 3701.6 | 3.568385 |
| Astoria (U. S. E.),[1] 1905 | 46 11 17.17 | 530.2 | 158 18 48 | 338 17 28 | Old Point Ellice (U. S. E.) | 6421.5 | 3.807639 |
| | 123 50 28.66 | 614.6 | 210 03 01 | 30 06 07 | Grays (U. S. E.) | 11021.3 | 4.042232 |
| Dot (U. S. E.),[1] 1905 | 46 11 01.16 | 35.8 | 206 46 52 | 26 49 43 | Grays (U. S. E.) | 11239.3 | 4.050740 |
| | 123 50 07.42 | 159.1 | 234 05 36 | 54 12 52 | Harrington (U. S. E.) | 15933.9 | 4.202322 |
| Alderbrook (U. S. E.),[1] 1905 | 46 11 41.71 | 1287.9 | 128 23 05 | 308 19 23 | Old Point Ellice (U. S. E.) | 8394.3 | 3.923986 |
| | 123 47 12.29 | 263.5 | 188 30 53 | 8 31 37 | Grays (U. S. E.) | 8877.6 | 3.948298 |
| Old Tongue (U. S. E.),[1] 1905 | 46 12 48.09 | 1484.9 | 171 34 15 | 351 33 41 | Grays (U. S. E.) | 6803.7 | 3.832746 |
| | 123 45 24.32 | 521.3 | 228 36 03 | 48 39 54 | Harrington (U. S. E.) | 9123.6 | 3.960164 |
| Bear (U. S. E.),[1] 1905 | 46 10 31.76 | 980.6 | 147 08 11 | 327 04 12 | Grays (U. S. E.) | 13028.4 | 4.114891 |
| | 123 40 40.72 | 873.4 | 184 18 16 | 4 18 42 | Harrington (U. S. E.) | 10267.8 | 4.011476 |
| Lower Gauge Pile light, May, 1913 | 46 13 05.413 | 167.1 | 110 17 57 | 290 13 55 | Point Ellice (U. S. E.) | 7638.8 | 3.883024 |
| | 123 46 43.298 | 928.0 | 186 23 19 | 6 23 42 | Grays (U. S. E.) | 6233.9 | 3.794760 |
| | | | 288 55 02 | 108 55 55 | Tongue (U. S. E.) | 1677.4 | 3.224631 |
| Gauge Pile, 1913 | 46 13 22.727 | 701.7 | 181 27 59 | 1 28 04 | Grays (U. S. E.) | 5662.4 | 3.753002 |
| | 123 46 17.671 | 378.7 | 238 07 46 | 58 12 16 | Harrington (U. S. E.) | 9403.8 | 3.973305 |
| | | | 316 06 45 | 136 07 20 | Tongue (U. S. E.) | 1496.5 | 3.175071 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Taylor Sands light, May, 1913 | 46 13 51.065 | 1576.7 | 356 16 31 | 176 16 35 | Tongue (U. S. E.) | 1957.7 | 3.291755 |
| | 123 45 35.205 | 754.4 | 170 55 32 | 350 55 06 | Grays (U. S. E.) | 4846.3 | 3.685409 |
| | | | 239 58 47 | 60 02 46 | Harrington (U. S. E.) | 8173.2 | 3.912394 |
| Pulliam's Fish House, southeast corner, 1913. | 46 13 23.940 | 739.2 | 53 14 02 | 233 13 11 | Tongue (U. S. E.) | 1864.2 | 3.270497 |
| | 123 44 19.603 | 420.1 | 157 02 03 | 337 00 42 | Grays (U. S. E.) | 6107.7 | 3.785879 |
| | | | 227 56 16 | 47 59 20 | Harrington (U. S. E.) | 7351.4 | 3.866371 |
| Megler's Fish House, flag, south gable, 1913. | 46 12 17.176 | 530.3 | 190 31 36 | 10 32 20 | Harrington (U. S. E.) | 7103.7 | 3.851483 |
| | 123 41 05.339 | 114.5 | 249 56 32 | 70 00 29 | Wharf | 7495.9 | 3.874823 |
| | | | 254 10 43 | 74 12 46 | Water | 3797.9 | 3.579545 |
| Beacon No. 1, May, 1913 | 46 13 56.026 | 1729.9 | 43 43 50 | 223 42 42 | Tongue (U. S. E.) | 2915.0 | 3.464641 |
| | 123 43 55.267 | 1184.3 | 147 55 08 | 327 53 30 | Grays (U. S. E.) | 5468.1 | 3.737837 |
| | | | 231 26 59 | 51 29 46 | Harrington (U. S. E.) | 6312.4 | 3.800192 |
| Tongue Point Neck, 1851 | 46 12 18.831 | 581.4 | 75 03 28.1 | 255 00 17.3 | Astor Point | 5866.0 | 3.768344 |
| | 123 45 58.357 | 1251.1 | 116 33 21.4 | 296 28 46.5 | Point Ellice | 9116.9 | 3.959848 |
| | | | 180 48 40.8 | 0 48 44.5 | Grays Point | 7673.2 | 3.884979 |
| Shortis chimney,[1] 1852–85 | 46 11 49.08 | 1515.4 | 126 03 02 | 305 59 11 | Point Ellice | 8484.0 | 3.928600 |
| | 123 46 58.84 | 1261.6 | 189 16 46 | 9 17 33 | Grays Point | 8705.0 | 3.939771 |
| Yellow Bluff, 1851 | 46 16 33.154 | 1023.7 | 41 07 13.6 | 221 03 49.4 | Tongue Point | 9211.6 | 3.964337 |
| | 123 40 41.884 | 896.8 | 88 29 02.3 | 268 25 17.3 | Grays Point | 6669.9 | 3.824118 |
| John Day Point,[1] 1852 | 46 10 54.14 | 1671.7 | 168 53 15 | 348 52 07 | Grays Point | 10484.2 | 4.020537 |
| | 123 44 18.91 | 405.6 | 228 05 02 | 48 10 32 | Rocky Point | 13145.5 | 4.118776 |
| Settlers Point, 1852 | 46 10 32.521 | 1004.1 | 123 54 14.0 | 303 50 43.8 | Tongue Point | 7522.1 | 3.876341 |
| | 123 40 33.244 | 713.0 | 147 58 56.0 | 327 55 04.9 | Grays Point | 12924.9 | 4.111427 |
| | | | 207 39 23.5 | 27 42 10.3 | Rocky Point | 10661.6 | 4.027823 |
| Grays Bay, 1852 | 46 17 20.120 | 621.2 | 290 59 08.5 | 111 01 16.0 | Yellow Bluff | 4046.0 | 3.607022 |
| | 123 43 38.316 | 820.2 | 15 10 28.6 | 195 09 11.9 | Tongue Point | 8695.3 | 3.939286 |
| Grays River,[1] 1852 | 46 17 55.457 | 1712.3 | 344 06 42.0 | 164 07 06.4 | Yellow Bluff | 2642.1 | 3.421957 |
| | 123 41 15.667 | 335.3 | 70 21 00.1 | 250 19 17.0 | Grays Bay | 3242.4 | 3.510863 |
| Beacon No. 2, May, 1913 | 46 14 03.549 | 109.6 | 54 57 35 | 234 55 42 | Tongue (U. S. E.) | 4072.3 | 3.609842 |
| | 123 42 53.726 | 1151.3 | 136 11 37 | 316 09 14 | Grays (U. S. E.) | 6099.0 | 3.785262 |
| | | | 224 21 35 | 44 23 37 | Harrington (U. S. E.) | 5176.0 | 3.713991 |
| Beacon No. 4, May, 1913 | 46 14 44.729 | 1381.1 | 55 00 41 | 234 57 47 | Tongue (U. S. E.) | 6292.8 | 3.798811 |
| | 123 41 28.762 | 616.2 | 117 24 05 | 297 20 41 | Grays (U. S. E.) | 6804.6 | 3.832802 |
| | | | 216 32 18 | 36 33 19 | Harrington (U. S. E.) | 3022.3 | 3.480312 |
| Scappoose Johnson Fish House, flag, northwest gable, 1913. | 46 14 42.152 | 1301.5 | 117 35 12 | 297 31 44 | Grays (U. S. E.) | 6934.5 | 3.841015 |
| | 123 41 23.859 | 511.1 | 214 02 38 | 34 03 35 | Harrington (U. S. E.) | 3026.6 | 3.480957 |
| | | | 310 20 32 | 130 22 48 | Water | 5314.9 | 3.725498 |
| Grays Bay light, May, 1913 | 46 16 03.699 | 114.2 | 20 58 50 | 200 57 32 | Tongue (U. S. E.) | 6477.9 | 3.811433 |
| | 123 43 41.067 | 879.4 | 102 09 26 | 282 07 38 | Grays (U. S. E.) | 3281.9 | 3.516120 |
| | | | 270 06 18 | 90 08 55 | Harrington (U. S. E.) | 4632.6 | 3.665826 |
| Rocky Point light, May, 1913 | 46 17 20.315 | 627.3 | 303 19 11 | 123 24 59 | Wharf | 12350.7 | 4.091692 |
| | 123 43 38.352 | 821.0 | 320 11 51 | 140 15 45 | Water | 10831.8 | 4.034701 |
| | | | 15 46 45 | 195 45 25 | Tongue (U. S. E.) | 8743.5 | 3.941687 |
| Pile, Grays Bay, 1913 | 46 16 34.484 | 1064.8 | 28 58 11 | 208 56 00 | Tongue (U. S. E.) | 7999.0 | 3.903038 |
| | 123 42 28.528 | 610.8 | 46 42 14 | 226 38 52 | Taylor | 8215.8 | 3.914648 |
| | | | 73 15 37 | 253 08 31 | Point Ellice (U. S. E.) | 13181.2 | 4.119955 |
| Alamicut Point,[1] 1852 | 46 18 05.26 | 162.4 | 316 00 56 | 136 02 29 | Yellow Bluff | 3951.9 | 3.596801 |
| | 123 42 50.06 | 1071.4 | 36 32 28 | 216 31 53 | Grays Bay | 1734.9 | 3.239264 |
| Altoona Cannery, main building, south gable, 1913. | 46 15 57.785 | 1784.2 | 311 56 50 | 131 59 29 | Wharf | 6347.5 | 3.802603 |
| | 123 39 17.060 | 365.3 | 347 00 23 | 167 01 08 | Water | 5928.9 | 3.772976 |
| | | | 99 35 15 | 279 34 41 | Harrington (U. S. E.) | 1035.4 | 3.015102 |
| Harrington Point Rear Range light,[1] April, 1913. | 46 16 02.64 | 81.5 | 53 18 14 | 233 13 42 | Tongue (U. S. E.) | 10058.8 | 4.002547 |
| | 123 39 13.01 | 278.6 | 80 32 00 | 260 22 33 | Point Ellice (U. S. E.) | 17043.5 | 4.231560 |
| Klevenhausen store, flag pole, 1913 | 46 15 56.019 | 1729.7 | 312 59 40 | 133 02 11 | Wharf | 6142.3 | 3.788332 |
| | 123 39 06.402 | 137.1 | 349 04 30 | 169 05 07 | Water | 5828.3 | 3.765539 |
| | | | 100 18 01 | 280 17 19 | Harrington (U. S. E.) | 1269.6 | 3.103678 |
| Miller Sands Fish House, flag pole, 1913. | 46 15 24.974 | 771.1 | 265 51 04 | 85 54 40 | Jim Crow (U. S. E.) | 6410.0 | 3.806859 |
| | 123 38 47.000 | 1006.7 | 308 23 31 | 128 25 49 | Wharf | 5201.5 | 3.716128 |
| | | | 351 46 26 | 171 46 49 | Water | 4813.6 | 3.682473 |
| | | | 60 39 32 | 240 34 42 | Tongue (U. S. E.) | 9891.8 | 3.995276 |
| Fish House, leaning stack, 1913 | 46 13 45.824 | 1414.9 | 46 40 31 | 226 39 30 | Water | 2481.3 | 3.394673 |
| | 123 36 50.659 | 1085.6 | 183 02 12 | 3 02 18 | Rocky Point 2 | 3481.1 | 3.541717 |
| | | | 276 07 46 | 96 08 39 | Wharf | 1592.8 | 3.202158 |
| Fish House, west barrel, 1913 | 46 14 23.355 | 721.1 | 172 25 53 | 352 25 42 | Rocky Point 2 | 2337.8 | 3.368799 |
| | 123 36 27.671 | 592.9 | 235 15 47 | 55 17 42 | Jim Crow (U. S. E.) | 4148.6 | 3.617903 |
| | | | 320 36 55 | 140 37 32 | Wharf | 1719.5 | 3.235405 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Fish House, Stack, 1913 | 46 14 40.954 | 1264.5 | 51 56 35 | 231 55 15 | Wharf | 3036.8 | 3.482422 |
| | 123 33 45.174 | 967.8 | 59 31 19 | 239 28 05 | Water | 6707.8 | 3.826581 |
| | | | 177 46 02 | 357 46 00 | Jim Crow (U. S. E.) | 1821.0 | 3.260299 |
| Brookfield Cannery, 1913 | 46 15 52.754 | 1628.9 | 267 11 18 | 87 15 33 | Lower Skumaque | 7586.1 | 3.880018 |
| | 123 33 34.011 | 728.3 | 263 54 38 | 83 56 22 | Three Tree Point (U. S. E.) | 3107.7 | 3.492446 |
| | | | 32 45 14 | 212 43 45 | Wharf | 4861.9 | 3.686807 |
| Three Tree Point light,[1] June, 1913 | 46 16 03.26 | 100.7 | 223 39 50 | 43 39 50 | Three Tree Point (U. S. E.) | 6.32 | 0.800717 |
| | 123 31 09.91 | 212.2 | | | | | |
| Bay View light, May, 1913 | 46 16 26.986 | 833.2 | 293 14 54 | 113 15 48 | Lower Skumaque | 1746.4 | 3.242140 |
| | 123 28 55.116 | 1180.1 | 29 18 20 | 209 16 59 | Raspberry (U. S. E.) | 4893.3 | 3.689602 |
| | | | 75 50 07 | 255 48 30 | Three Tree Point (U. S. E.) | 2972.5 | 3.473119 |
| Bay View light (new), July, 1913 | 46 16 27.708 | 855.5 | 305 32 16 | 125 33 48 | Stump | 3342.1 | 3.524016 |
| | 123 28 55.324 | 1184.5 | 317 39 53 | 137 42 29 | Dike | 6851.7 | 3.835801 |
| | | | 75 23 53 | 255 22 16 | Three Tree Point (U. S. E.) | 2973.7 | 3.473297 |
| Stack Fish House, 1913 | 46 15 52.186 | 1611.3 | 30 35 40 | 210 34 36 | Raspberry (U. S. E.) | 3709.1 | 3.569265 |
| | 123 29 18.795 | 402.5 | 98 18 36 | 278 17 16 | Three Tree Point (U. S. E.) | 2400.2 | 3.380255 |
| | | | 259 39 30 | 79 40 41 | Lower Skumaque | 2146.5 | 3.331734 |
| Skumaque School, square cupola, 1913 | 46 16 14.956 | 461.8 | 338 41 34 | 158 43 02 | Pole | 7183.9 | 3.856361 |
| | 123 27 16.960 | 363.2 | 82 40 49 | 262 36 06 | Jim Crow (U. S. E.) | 8454.2 | 3.927070 |
| | | | 85 55 50 | 265 53 02 | Three Tree Point (U. S. E.) | 4996.7 | 3.698680 |
| Hunting Island Rear Range light,[1] June, 1913. | 46 13 45.15 | 1394.1 | 58 25 57 | 238 25 54 | Dike | 90.5 | 1.956649 |
| | 123 25 16.39 | 351.2 | | | | | |
| Pillar Rock Cannery, flagpole, 1913 | 46 15 38.839 | 1199.2 | 9 47 11 | 189 46 50 | Wharf | 3713.8 | 3.569820 |
| | 123 35 07.301 | 156.4 | 89 38 01 | 269 36 53 | Rocky Point 2 | 2029.3 | 3.307338 |
| | | | 268 53 47 | 88 54 44 | Jim Crow (U. S. E.) | 1688.3 | 3.227440 |
| Pillar Rock, 1913 | 46 15 30.815 | 951.5 | 96 50 32 | 276 49 26 | Rocky Point 2 | 1970.6 | 3.294600 |
| | 123 35 10.693 | 229.0 | 260 57 16 | 80 58 15 | Jim Crow (U. S. E.) | 1782.8 | 3.251100 |
| | | | 9 17 50 | 189 17 31 | Wharf | 3457.4 | 3.538754 |
| Pillar Rock Channel Front Range light, May, 1913. | 46 15 38.798 | 1198.0 | 10 08 42 | 190 08 20 | Wharf | 3716.6 | 3.570147 |
| | 123 35 06.210 | 133.0 | 37 55 36 | 217 53 20 | Water | 6579.2 | 3.818174 |
| | | | 89 40 24 | 269 39 15 | Rocky Point 2 | 2052.6 | 3.312309 |
| Pillar Rock Channel Rear Range light,[1] May, 1913. | 46 15 38.93 | 1202.0 | 80 24 24 | 260 24 16 | Pillar Rock Channel Front Range light. | 251.7 | 2.400840 |
| | 123 34 54.62 | 1169.8 | | | | | |
| Jim Crow Point light,[1] June, 1913 | 46 15 39.97 | 1234.1 | 3 55 41 | 183 55 41 | Jim Crow (U. S. E.) | 2.6 | 0.414973 |
| | 123 33 48.48 | 1038.3 | | | | | |
| Elliott Point light,[1] May, 1913 | 46 15 38.53 | 1189.7 | 274 43 18 | 94 43 20 | Rocky Point 2 | 45.24 | 1.655523 |
| | 123 36 44.15 | 945.5 | | | | | |
| Tongue Point light,[1] May, 1913 | 46 12 29.88 | 922.6 | 89 00 35 | 269 00 35 | Buoy Depot flag | 5.2 | 0.716003 |
| | 123 46 05.83 | 125.0 | | | | | |
| Oil Works Stack, western one, 1913 | 46 10 51.824 | 1600.2 | 137 28 39 | 317 26 06 | Desdemona Sands Lighthouse | 6732.4 | 3.828170 |
| | 123 53 42.981 | 921.9 | 195 06 02 | 15 07 03 | Point Ellice (U. S. E.) | 7013.0 | 3.845901 |
| | | | 204 02 58 | 24 03 46 | Sands | 3504.6 | 3.544640 |
| | | | 239 42 56 | 59 47 42 | Taylor | 9813.5 | 3.991824 |
| Welch,[1] 1871 | 46 15 18.25 | 563.5 | 108 59 10 | 288 56 53 | Three Tree Point | 4314.8 | 3.634963 |
| | 123 27 59.31 | 1270.3 | 211 30 19 | 31 30 58 | Skumaquea | 2196.7 | 3.341774 |
| Welch's Fish House, northeast gable,[1] 1871. | 46 15 05.43 | 167.7 | 112 03 28 | 292 00 58 | Three Tree Point | 4792.9 | 3.680599 |
| | 123 27 42.41 | 908.5 | 199 06 29 | 19 06 55 | Skumaquea | 2401.0 | 3.380397 |
| Puget, 1871 | 46 12 23.484 | 725.1 | 35 36 01.3 | 215 35 28.8 | Hunts Mill Point | 1661.7 | 3.220553 |
| | 123 25 17.872 | 383.1 | 212 24 10.6 | 32 25 35.7 | Lokamin | 4709.3 | 3.672954 |
| | | | 284 25 11.0 | 104 26 58.8 | Birnie | 3306.1 | 3.519315 |
| Birnie's House, northwest gable, 1871. | 46 12 02.699 | 83.3 | 312 56 41.4 | 132 56 53.0 | Point Basalt | 470.8 | 2.672806 |
| | 123 22 57.812 | 1239.5 | 312 30 33.8 | 132 30 40.5 | Birnie | 269.9 | 2.431171 |
| | | | 79 53 15.8 | 259 51 02.2 | Hunts Mill Point | 4033.2 | 3.605654 |
| Point Basalt, 1871 | 46 11 52.311 | 1615.2 | 0 39 18.8 | 180 39 16.0 | Westport | 7281.7 | 3.862235 |
| | 123 22 41.741 | 894.9 | 84 52 21.8 | 264 49 56.6 | Hunts Mill Point | 4332.5 | 3.636742 |
| | | | 133 31 58.4 | 313 31 53.5 | Birnie | 200.9 | 2.302934 |
| | | | 312 58 59.0 | 133 01 10.8 | Anderson | 5353.5 | 3.728639 |
| Tenasillikee,[1] 1871 | 46 14 05.816 | 179.6 | 75 27 40.2 | 255 25 41.5 | Quinn | 3640.0 | 3.561106 |
| | 123 26 10.300 | 220.7 | 163 53 55.0 | 343 53 15.0 | Skumaquea | 4277.3 | 3.631168 |
| Snag (U. S. E.),[1] 1905 | 46 13 59.06 | 1823.6 | 201 07 43 | 21 08 23 | Elliott (U. S. E.) | 3287.8 | 3.516904 |
| | 123 37 36.97 | 792.2 | 237 21 06 | 57 23 51 | Old Jim Crow (U. S. E.) | 5803.0 | 3.763655 |
| Skamokowa (U. S. E.),[1] 1905 | 46 16 18.54 | 572.5 | 48 58 53 | 228 56 18 | Raspberry (U. S. E.) | 6102.2 | 3.785486 |
| | 123 27 12.02 | 257.4 | 84 46 46 | 264 43 55 | Three Tree Point (U. S. E.) | 5111.0 | 3.708507 |
| Pole, 1913 | 46 12 38.175 | 1178.7 | 153 20 48.6 | 333 20 13.1 | Mud | 2346.5 | 3.370426 |
| | 123 25 15.186 | 325.5 | 158 47 56.6 | 338 46 49.3 | Stump | 5517.8 | 3.741765 |
| | | | 177 04 55.2 | 357 04 51.7 | Dike | 2023.1 | 3.306018 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Upper Skumaquea light, June, 1913 | 46 14 50.326 | 1553.9 | 338 13 00 | 158 13 28 | Dike | 2218.2 | 3.346002 |
| | 123 25 58.405 | 1251.1 | 3 38 56 | 183 38 52 | Mud | 1987.3 | 3.298261 |
| | | | 77 11 21 | 257 10 32 | Ten | 1489.8 | 3.173128 |
| Bugby Hole Eccentric, 1913 | 46 10 31.795 | 981.7 | 177 50 58 | 357 50 48 | Upper Skumaquea light | 7988.1 | 3.902444 |
| | 123 25 44.413 | 952.7 | 185 02 58 | 5 03 16 | Dike | 5945.7 | 3.774204 |
| Bugby Hole Eccentric reference mark,[1] 1913. | 46 10 30.839 | 952.2 | 216 26 22 | 36 26 23 | Bugby Hole Eccentric | 36.71 | 1.56478 |
| | 123 25 45.429 | 974.5 | | | | | |
| Chimney House,[1] 1913 | 46 14 18.59 | 574.0 | 170 55 58 | 350 55 47 | Stump | 2069.3 | 3.315828 |
| | 123 26 33.12 | 709.7 | 304 34 06 | 124 34 59 | Dike | 1903.2 | 3.279488 |
| Chimney House, south end Tenasillihee Island,[1] 1913. | 46 12 34.75 | 1073.0 | 208 59 03 | 28 59 43 | Dike | 2430.9 | 3.385765 |
| | 123 26 14.96 | 320.7 | 265 16 20 | 85 17 03 | Pole | 1285.7 | 3.109146 |
| Bugby Hole light, June, 1913 | 46 10 31.938 | 986.1 | 177 45 38 | 357 45 27 | Upper Skumaquea light | 7984.2 | 3.902231 |
| | 123 25 43.840 | 940.4 | 184 56 08 | 4 56 25 | Dike | 5940.3 | 3.773806 |
| Cathlamet light, June, 1913 | 46 11 54.076 | 1669.7 | 114 18 09 | 294 16 28 | Pole | 3310.2 | 3.519858 |
| | 123 22 54.449 | 1167.4 | 130 22 46 | 310 20 29 | Mud | 5340.8 | 3.727609 |
| Burroughs,[1] 1872 | 46 10 39.36 | 1215.3 | 28 27 22 | 208 25 51 | Westport | 5719.1 | 3.757331 |
| | 123 20 38.68 | 829.6 | 105 02 01 | 284 58 07 | Hunts Mill Point | 7200.5 | 3.857363 |
| Sandy Point, 1872 | 46 10 06.929 | 213.9 | 138 46 55.2 | 318 45 19.2 | Point Basalt | 4326.6 | 3.636142 |
| | 123 20 28.780 | 617.4 | 290 28 43.1 | 110 29 18.9 | Anderson | 1135.6 | 3.055224 |
| Mouth,[1] 1872 | 46 08 40.52 | 1251.1 | 354 02 09 | 174 02 14 | Westport | 1367.0 | 3.135769 |
| | 123 22 52.24 | 1121.2 | 143 32 01 | 323 29 44 | Hunts Mill Point | 6881.7 | 3.837694 |
| Gruber,[1] 1873 | 46 07 15.85 | 489.4 | 119 11 52 | 299 10 37 | Westport | 2572.9 | 3.410431 |
| | 123 21 00.99 | 21.3 | 199 45 37 | 19 46 36 | Anderson | 5190.7 | 3.715229 |
| Skunk Cabbage Ridge,[1] 1873 | 46 06 33.28 | 1027.6 | 181 16 29 | 1 16 33 | Cape Horn | 4839.2 | 3.684778 |
| | 123 17 21.35 | 458.5 | 253 25 31 | 73 27 50 | Clatskanie | 4320.5 | 3.635535 |
| Holland, 1873 | 46 10 14.300 | 441.5 | 71 48 26.4 | 251 46 09.6 | Cooper | 4281.4 | 3.631581 |
| | 123 12 03.141 | 67.4 | 218 14 21.3 | 38 15 11.8 | Abernathy | 2426.1 | 3.384906 |
| Wallaces Island, 1873 | 46 09 10.177 | 314.2 | 107 48 57.6 | 287 47 50.4 | Cooper | 2098.7 | 3.321958 |
| | 123 13 39.579 | 849.3 | 222 34 10.5 | 42 36 10.6 | Abernathy | 5276.9 | 3.722382 |
| | | | 226 15 12.5 | 46 16 22.1 | Holland | 2863.8 | 3.456936 |
| Eagle Cliff, 1873 | 46 10 38.921 | 1201.7 | 322 43 17.2 | 142 43 36.7 | Holland | 955.4 | 2.980163 |
| | 123 12 30.115 | 645.9 | 28 32 54.5 | 208 32 04.4 | Wallaces Island | 3119.1 | 3.494031 |
| | | | 58 59 11.7 | 238 57 14.4 | Cooper | 4070.4 | 3.609642 |
| Hapgood House chimney,[1] 1873 | 46 10 24.06 | 742.9 | 278 45 46 | 98 46 51 | Holland | 1975.1 | 3.295591 |
| | 123 13 34.14 | 732.3 | 2 55 50 | 182 55 46 | Wallaces Island | 2284.0 | 3.358704 |
| G. Hume's house chimney,[1] 1873 | 46 10 17.93 | 553.6 | 272 43 40 | 92 44 59 | Holland | 2345.5 | 3.370239 |
| | 123 13 52.36 | 1123.1 | 352 32 02 | 172 32 11 | Wallaces Island | 2109.8 | 3.324244 |
| Alder Bluff,[1] 1873 | 46 11 17.60 | 543.4 | 14 13 02 | 194 12 42 | Greens Point | 2463.7 | 3.391594 |
| | 123 05 17.70 | 379.6 | 93 20 21 | 273 18 26 | Nequally | 3418.8 | 3.533878 |
| Monticello,[1] 1873 | 46 07 27.39 | 845.7 | 4 13 00 | 184 12 49 | Rainier | 4192.7 | 3.622495 |
| | 122 55 13.99 | 300.4 | 96 47 11 | 276 44 18 | Mount Coffin | 5182.2 | 3.714513 |
| Cowlitz,[1] 1873 | 46 05 59.22 | 1828.5 | 255 04 15 | 75 06 02 | Coweman | 3295.4 | 3.517911 |
| | 122 55 05.21 | 111.9 | 18 48 27 | 198 48 10 | Rainier | 1541.3 | 3.187884 |
| Mountain top, back of Westport, 1873. | 46 05 14.633 | 451.8 | 240 03 30.2 | 60 10 34.7 | Cape Horn | 14584.6 | 4.163894 |
| | 123 27 05.276 | 113.4 | 241 46 08.5 | 61 57 49.3 | Abernathy | 23663.0 | 4.374070 |
| | | | 252 12 33.4 | 72 25 23.2 | Bradbury | 24072.0 | 4.381513 |
| | | | 257 33 02.4 | 77 42 22.1 | Clatskanie | 17080.3 | 4.232496 |
| Cottonwood Island,[1] 1873 | 46 05 18.95 | 585.1 | 218 54 25 | 38 55 21 | Coweman | 2687.8 | 3.429401 |
| | 122 53 55.55 | 1193.5 | 352 38 40 | 172 38 50 | Galloway | 2427.9 | 3.385235 |
| Episcopal Church cross, Kalama,[1] 1873 | 46 00 38.43 | 1186.6 | 37 43 40 | 217 42 45 | Hunter | 2699.8 | 3.431330 |
| | 122 50 34.24 | 736.7 | 107 53 36 | 287 52 12 | Gobles Point | 2636.5 | 3.421026 |
| Methodist Church spire, Kalama,[1] 1873. | 46 00 27.57 | 851.3 | 44 17 59 | 224 17 00 | Hunter | 2514.9 | 3.400529 |
| | 122 50 29.39 | 632.3 | 113 40 06 | 293 38 39 | Gobles Point | 2853.4 | 3.455357 |
| Walker Island light, 1913 | 46 08 57.846 | 1786.0 | 290 02 13 | 110 02 58 | Barlow | 1402.9 | 3.147025 |
| | 123 02 44.566 | 956.4 | 297 36 16 | 117 38 46 | Quarry | 4995.0 | 3.698538 |
| | | | 300 12 31 | 120 15 49 | Slaughter | 6816.8 | 3.833579 |
| Barlow Point Range, front light, 1913. | 46 08 43.659 | 1348.0 | 298 04 50 | 118 04 53 | Barlow | 90.9 | 1.958373 |
| | 123 01 46.892 | 1006.4 | 33 32 20 | 213 31 48 | Rinearson | 1707.8 | 3.232428 |
| Barlow Point Range, rear light,[1] 1913. | 46 08 42.06 | 1298.6 | 118 40 22 | 298 40 22 | Barlow | 13.74 | 1.13799 |
| | 123 01 42.60 | 914.3 | | | | | |
| Walker Island Dike light, 1913 | 46 08 08.966 | 276.8 | 285 31 00 | 105 32 38 | Quarry | 3013.6 | 3.479090 |
| | 123 01 33.642 | 722.2 | 73 59 47 | 253 59 06 | Rinearson | 1277.5 | 3.106355 |
| | | | 168 45 09 | 348 46 02 | Barlow | 1048.5 | 3.020570 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| La Du light, 1913 | 46 07 55.865 | 1724.9 | 303 35 17 | 123 35 37 | Quarry | 727.3 | 2.861733 |
| | 122 59 46.606 | 1000.4 | 306 16 03 | 126 17 11 | Slaughter | 2567.2 | 3.409454 |
| | | | 90 51 52 | 270 49 54 | Rinearson | 3526.1 | 3.547296 |
| White Tree, three prongs, 1913 | 46 07 10.013 | 309.2 | 116 21 40 | 296 20 00 | Rinearson | 3307.5 | 3.519500 |
| | 123 00 12.792 | 274.6 | 145 45 19 | 325 44 14 | Barlow | 3446.4 | 3.537368 |
| | | | 229 03 16 | 49 03 55 | Quarry | 1546.4 | 3.189330 |
| Mount Coffin light,[1] 1913 | 46 07 42.76 | 1320.2 | 113 20 | 293 20 | Quarry | 5.3 | 0.72427 |
| | 122 59 18.16 | 389.9 | | | | | |
| Slaughter Island Bar Range, rear light, 1913. | 46 07 10.877 | 335.9 | 342 45 08 | 162 45 09 | Slaughter | 136.0 | 2.133562 |
| | 122 58 12.088 | 259.5 | 104 34 11 | 284 31 04 | Rinearson | 5739.2 | 3.758854 |
| | | | 124 44 12 | 304 43 24 | Quarry | 1731.9 | 3.238522 |
| Kelso, school,[1] 1913 | 46 08 52.82 | 1631.0 | 72 09 04 | 252 05 33 | Mount Coffin | 6604.8 | 3.819857 |
| | 122 54 20.84 | 447.3 | 80 49 59 | 260 44 06 | Rinearson | 10654.8 | 4.027547 |
| Kelso, square tower,[1] 1913 | 46 08 49.86 | 1539.6 | 72 57 05 | 252 53 33 | Mount Coffin | 6593.2 | 3.819095 |
| | 122 54 20.07 | 430.7 | 81 19 57 | 261 14 03 | Rinearson | 10657.1 | 4.027638 |
| Kelso, white church, red spire,[1] 1913 | 46 08 33.46 | 1033.2 | 74 49 01 | 254 45 26 | Mount Coffin | 6625.8 | 3.821239 |
| | 122 54 15.84 | 340.0 | 82 27 03 | 262 21 06 | Rinearson | 10719.3 | 4.030168 |
| Bournes House, west gable, 1913 | 46 05 52.00 | 1605.5 | 245 36 11 | 65 36 51 | Hut (U. S. E.) | 1296.5 | 3.112757 |
| | 122 57 33.49 | 719.4 | 261 59 48 | 82 00 46 | Wood 2 (U. S. E.) | 1743.2 | 3.241356 |
| Beaver Dock Building, north gable, 1913. | 46 05 28.50 | 880.0 | 240 41 51 | 60 42 49 | Cowlitz 2 (U. S. E.) | 1992.4 | 3.299369 |
| | 122 56 04.70 | 101.0 | 294 18 21 | 114 18 58 | Bluff (U. S. E.) | 1193.5 | 3.076824 |
| Ranier Mineral Soap factory, 1913 | 46 05 22.82 | 704.6 | 228 51 20 | 48 52 04 | Cowlitz 2 (U. S. E.) | 1748.8 | 3.242729 |
| | 122 55 45.12 | 969.3 | 295 19 35 | 115 19 58 | Bluff (U. S. E.) | 738.0 | 2.868065 |
| Ranier Church, steeple, 1913 | 46 05 16.88 | 521.2 | 163 41 33 | 343 41 20 | Wood 2 (U. S. E.) | 1382.4 | 3.140646 |
| | 122 55 55.05 | 1182.7 | 186 28 03 | 6 28 07 | Net 2 (U. S. E.) | 1210.2 | 3.082860 |
| Crib No. 1, 1913 | 46 05 48.73 | 1504.6 | 335 58 43 | 155 59 00 | Bluff (U. S. E.) | 1221.7 | 3.086975 |
| | 122 55 37.22 | 799.5 | 24 35 28 | 204 35 16 | Ranier 2 (U. S. E.) | 847.2 | 2.928002 |
| Crib No. 4, 1913 | 46 05 52.42 | 1618.5 | 320 00 55 | 140 01 30 | Bluff (U. S. E.) | 1604.7 | 3.205401 |
| | 122 56 02.07 | 44.5 | 348 24 55 | 168 25 01 | Ranier 2 (U. S. E.) | 902.5 | 2.955444 |
| Cowlitz River light, 1913 | 46 05 31.944 | 986.3 | 305 55 28.1 | 125 56 38.0 | Cottonwood Island | 2572.9 | 3.410428 |
| | 122 54 47.682 | 1024.4 | 312 22 26.9 | 132 23 53.6 | Cotton | 3500.0 | 3.544070 |
| | | | 335 26 21.5 | 155 26 44.5 | Old | 1650.5 | 3.217606 |
| Crib No. 8, 1913 | 46 06 03.29 | 101.6 | 350 50 00 | 170 50 04 | Dock (U. S. E.) | 881.8 | 2.945353 |
| | 122 56 36.59 | 786.0 | 24 39 38 | 204 39 26 | Mill (U. S. E.) | 871.8 | 2.940421 |
| Crib No. 11, 1913 | 46 06 15.65 | 483.2 | 38 28 29 | 218 28 08 | Bourne (U. S. E.) | 1006.8 | 3.002925 |
| | 122 57 03.53 | 75.8 | 78 41 59 | 258 41 11 | Tangent (U. S. E.) | 1448.2 | 3.160838 |
| Schoolhouse, flagpole, 1913 | 46 05 20.60 | 636.0 | 163 42 57 | 343 42 43 | Hut (U. S. E.) | 1567.7 | 3.195253 |
| | 122 56 18.06 | 388.0 | 184 59 42 | 4 59 46 | Wood 2 (U. S. E.) | 1216.5 | 3.085096 |
| Columbia River Door Co. Dock, water tank, 1913. | 46 05 35.84 | 1106.6 | 197 12 17 | 17 12 28 | Hut (U. S. E.) | 1082.9 | 3.034575 |
| | 122 56 53.44 | 1148.1 | 229 25 17 | 49 25 46 | Wood 2 (U. S. E.) | 1140.0 | 3.056894 |
| Bushes Dock, front gable, 1913 | 46 07 37.86 | 1169.0 | 311 44 35 | 131 45 11 | Slaughter 2 (U. S. E.) | 1446.2 | 3.160237 |
| | 122 59 00.46 | 9.9 | 111 46 02 | 291 45 49 | Quarry (U. S. E.) | 414.2 | 2.617220 |
| Nusoms House, west gable, 1913 | 46 05 08.83 | 272.6 | 194 09 04 | 14 09 17 | Cowlitz 2 (U. S. E.) | 1631.9 | 3.212699 |
| | 122 55 02.39 | 51.4 | 270 34 19 | 90 35 24 | D 10 (U. S. E.) | 1949.7 | 3.289977 |
| Flagpole, 1913 | 46 05 37.69 | 1163.7 | 277 31 57 | 97 31 57 | Mill (U. S. E.) | 14.69 | 1.167022 |
| | 122 56 54.20 | 1164.4 | | | | | |
| Enterprise Landing, rear light,[1] 1913 | 46 00 09.55 | 394.9 | 308 54 | 128 54 | Enterprise Landing, front light | 181.6 | 2.25912 |
| | 122 52 27.95 | 601.4 | | | | | |
| Last pile log boom,[1] 1913 | 46 03 26.24 | 810.0 | 68 26 46 | 248 26 09 | Dock | 1168.0 | 3.067458 |
| | 122 52 18.36 | 394.6 | 192 50 35 | 12 50 45 | Rail | 1367.6 | 3.135959 |
| Cottonwood Island light, lower rear, 1913. | 46 03 55.714 | 1720.2 | 18 28 18 | 198 28 03 | Dock | 1412.1 | 3.149868 |
| | 122 52 48.080 | 1033.3 | 102 21 44 | 282 21 05 | Cut | 1175.8 | 3.070338 |
| | | | 245 49 14 | 65 49 46 | Rail | 1033.4 | 3.014280 |
| Cottonwood Island light, upper and lower front, 1913. | 46 04 06.366 | 196.6 | 84 26 13 | 264 25 47 | Cut | 796.6 | 2.901241 |
| | 122 53 04.631 | 99.5 | 173 24 42 | 353 24 38 | Cottonwood Island light, upper rear. | 1139.9 | 3.056850 |
| | | | 232 40 59 | 52 41 12 | Cotton | 466.6 | 2.668895 |
| Cottonwood Island light, upper rear,[1] 1913. | 46 04 43.254 | 1335.5 | 359 12 | 179 12 | Cottonwood Island | 6.6 | 0.81954 |
| | 122 53 10.722 | 230.4 | | | | | |
| Stack, Western Lumber Co., 1913 | 46 04 29.560 | 912.7 | 145 12 59 | 325 12 49 | Old | 517.4 | 2.713854 |
| | 122 54 02.018 | 43.4 | 249 18 38 | 69 19 15 | Cottonwood Island light, upper rear. | 1178.3 | 3.071260 |
| | | | 285 06 26 | 105 07 20 | Cotton | 1661.7 | 3.220566 |
| Small house on shore, pipe,[1] 1913 | 46 06 01.29 | 39.8 | 340 18 14 | 160 18 58 | Cut | 3850.8 | 3.585548 |
| | 122 54 41.91 | 900.2 | 346 51 34 | 166 51 53 | Old | 2472.0 | 3.393041 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Chimney, near white house,[1] 1913 | 46 00 12.85 | 396.7 | 0 45 54 | 180 45 54 | H $23_3$ (U. S. E.) | 632.8 | 2.801265 |
| | 122 50 31.33 | 674.2 | 144 36 26 | 324 36 21 | Kalama | 295.3 | 2.470240 |
| Red barn, cupola, 1913 | 46 01 24.163 | 746.0 | 294 40 55 | 114 43 18 | Kalama | 4692.8 | 3.671432 |
| | 122 53 57.461 | 1236.1 | 302 36 53 | 122 39 22 | H $23_2$ (U. S. E.) | 5256.1 | 3.720662 |
| | | | 320 34 26 | 140 36 15 | Slue | 5121.9 | 3.709434 |
| Church, Goble, 1913 | 46 00 58.538 | 1807.4 | 295 55 17 | 115 56 37 | Kalama | 2675.2 | 3.427359 |
| | 122 52 31.108 | 669.2 | 308 29 28 | 128 30 54 | H $23_2$ (U. S. E.) | 3282.2 | 3.516168 |
| | | | 336 13 54 | 156 14 40 | Slue | 3459.3 | 3.538993 |
| Stack, Mountain Lumber Co., 1913 | 46 01 23.696 | 731.7 | 67 19 47 | 247 19 11 | Knight | 1162.6 | 3.065412 |
| | 122 51 41.004 | 882.1 | 145 14 23 | 325 13 24 | Carr | 3049.5 | 3.484229 |
| | | | 355 25 12 | 175 25 22 | Slue | 3955.5 | 3.597201 |
| Coffin Rock light, 1913 | 46 02 09.121 | 281.6 | 194 58 39 | 14 59 12 | Rail | 3845.0 | 3.584901 |
| | 122 52 50.452 | 1085.0 | 309 46 08 | 129 46 41 | Bank | 1287.0 | 3.109594 |
| | | | 344 55 26 | 164 55 27 | Coffin Rock (U. S. E.) | 167.8 | 2.224839 |
| Cable landing, north side sign post, 1913. | 46 02 21.251 | 656.1 | 44 18 30 | 224 18 13 | Coffin Rock (U. S. E.) | 749.8 | 2.874930 |
| | 122 52 24.068 | 517.6 | 131 51 10 | 311 50 43 | Carr | 1091.2 | 3.037902 |
| | | | 148 34 37 | 328 34 06 | Dock | 1848.3 | 3.266782 |
| Tank, Beaver Lumber Co., 1913 | 46 03 12.639 | 390.2 | 181 28 43 | 1 28 45 | Cottonwood Island light | 2792.1 | 3.445934 |
| | 122 53 14.070 | 302.5 | 196 27 57 | 16 28 16 | Cotton | 2024.7 | 3.306371 |
| | | | 220 34 18 | 40 35 08 | Rail | 2308.3 | 3.363290 |
| | | | 274 50 13 | 94 50 16 | Dock | 111.7 | 2.048061 |
| West stack, Beaver Lumber Co.,[1] 1913. | 46 03 11.35 | 350.3 | 181 52 52 | 1 52 55 | Cottonwood Island light | 2832.6 | 3.452183 |
| | 122 53 15.04 | 323.4 | 196 42 32 | 16 42 52 | Cotton | 2068.9 | 3.315748 |
| New Enterprise Landing front light,[1] 1913. | 46 00 06.91 | 213.3 | 259 12 43 | 79 13 58 | Kalama | 2268.1 | 3.355671 |
| | 122 52 22.83 | 491.3 | 280 37 56 | 100 39 16 | H $23_3$ (U. S. E.) | 2432.7 | 3.386096 |
| Sandy Island Channel, front light, 1913. | 45 59 55.232 | 1705.3 | 248 23 57 | 68 25 03 | Kalama | 2132.3 | 3.328856 |
| | 122 52 11.426 | 245.9 | 272 21 34 | 92 22 46 | H $23_2$ (U. S. E.) | 2147.3 | 3.331890 |
| | | | 321 17 50 | 141 18 22 | Slue | 1552.3 | 3.190978 |
| Ahle Point light, 1913 | 45 59 53.939 | 1665.4 | 41 46 42 | 221 46 07 | Slue | 1571.0 | 3.196165 |
| | 122 50 37.699 | 811.2 | 152 27 47 | 332 27 00 | Mill | 3100.3 | 3.491398 |
| | | | 177 38 10 | 357 38 09 | Kalama | 825.3 | 2.916603 |
| Shingle mill stack, Ahle Point, 1913 | 45 59 55.581 | 1716.1 | 41 19 28 | 221 18 52 | Slue | 1627.5 | 3.211511 |
| | 122 50 36.398 | 783.2 | 151 33 45 | 331 32 56 | Mill | 3068.6 | 3.486945 |
| | | | 175 25 03 | 355 25 01 | Kalama | 776.4 | 2.890069 |
| Sandy Island house, pipe,[1] 1913 | 46 00 29.04 | 896.7 | 280 03 11 | 100 04 00 | Kalama | 1484.0 | 3.171438 |
| | 122 51 47.19 | 1015.2 | 348 44 18 | 168 44 33 | Slue | 2299.7 | 3.361664 |
| School, Kalama, 1913 | 46 00 31.591 | 975.4 | 32 02 20 | 212 01 31 | Slue | 2753.3 | 3.439854 |
| | 122 50 18.465 | 397.2 | 112 10 52 | 292 09 17 | Knight | 3075.8 | 3.487962 |
| | | | 112 59 20 | 292 57 47 | H $30_2$ (U. S. E.) | 3031.6 | 3.481679 |
| Catholic Church, cross, Kalama, 1913. | 46 00 33.743 | 1041.8 | 30 35 21 | 210 34 33 | Slue | 2788.4 | 3.445359 |
| | 122 50 20.400 | 438.8 | 111 18 35 | 291 17 01 | Knight | 3012.5 | 3.478933 |
| | | | 112 07 18 | 292 05 47 | H $30_2$ (U. S. E.) | 2967.8 | 3.472433 |
| Church, Kalama, star,[1] 1913 | 46 00 38.98 | 1203.6 | 23 29 13 | 203 28 36 | Slue | 2793.7 | 3.446184 |
| | 122 50 34.60 | 744.3 | 110 27 11 | 290 25 48 | Knight | 2669.5 | 3.426428 |
| New Range, rear light, 1913 | 45 59 04.435 | 136.9 | 144 38 54 | 324 38 46 | Slue | 437.5 | 2.641023 |
| | 122 51 14.566 | 313.5 | 197 52 54 | 17 53 20 | Kalama | 2472.5 | 3.393141 |
| | | | 211 55 30 | 31 56 01 | H $23_2$ (U. S. E.) | 1743.4 | 3.241385 |
| New Range, front light, 1913 | 45 59 17.519 | 540.9 | 49 18 02 | 229 17 59 | Slue | 72.2 | 1.858622 |
| | 122 51 23.785 | 512.0 | 206 09 48 | 26 10 20 | Kalama | 2171.7 | 3.336792 |
| | | | 226 09 45 | 46 10 22 | H $23_2$ (U. S. E.) | 1553.1 | 3.191208 |
| Barn, gable, 1913 | 45 59 05.236 | 161.7 | 203 09 34 | 23 10 08 | Kalama | 2194.6 | 3.341350 |
| | 122 51 25.574 | 550.5 | 218 32 03 | 38 32 42 | H $23_2$ (U. S. E.) | 1860.0 | 3.269511 |
| | | | 255 34 24 | 75 35 22 | H 21 (U. S. E.) | 1776.9 | 3.249658 |
| White house, terra cotta pipe, 1913 | 45 59 25.636 | 791.5 | 221 24 21 | 41 25 11 | Kalama | 2264.7 | 3.355006 |
| | 122 51 48.895 | 1052.5 | 253 41 47 | 73 42 49 | Rock | 1942.6 | 3.288377 |
| | | | 301 30 28 | 121 30 44 | Slue | 569.7 | 2.755644 |
| Tank, large black, oil, 1913 | 45 59 44.417 | 1371.4 | 238 09 17 | 58 10 17 | Kalama | 2120.5 | 3.326436 |
| | 122 52 03.000 | 64.5 | 270 54 35 | 90 55 48 | Rock | 2168.3 | 3.336112 |
| | | | 318 01 54 | 138 02 20 | Slue | 1180.3 | 3.071989 |
| Light on dolphin, 1913 | 45 59 49.280 | 1521.5 | 235 17 24 | 55 18 10 | Kalama | 1701.0 | 3.230704 |
| | 122 51 44.269 | 952.5 | 266 30 41 | 86 31 33 | H $23_3$ (U. S. E.) | 1564.0 | 3.194234 |
| | | | 339 24 28 | 159 24 41 | Slue | 1097.9 | 3.040555 |
| Enterprise landing, front light, 1913 | 46 00 05.854 | 180.7 | 258 14 37 | 78 15 51 | Kalama | 2243.5 | 3.350921 |
| | 122 52 21.364 | 459.7 | 296 03 18 | 116 04 56 | H 21 (U. S. E.) | 3252.1 | 3.512168 |
| | | | 316 03 50 | 136 05 10 | Flat | 3450.5 | 3.537884 |
| Large tree, top out, 1913 | 45 57 57.001 | 1759.8 | 343 21 04 | 163 21 26 | Martin 3 (U. S. E.) | 2223.3 | 3.346989 |
| | 122 48 40.564 | 873.4 | 109 04 42 | 289 03 50 | H 22 (U. S. E.) | 1661.9 | 3.220597 |
| | | | 133 40 01 | 313 39 50 | Hill | 490.2 | 2.690367 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Bluff (U. S. E.), 1913 | 45 57 38.021 | 1173.9 | 42 59 14.3 | 222 58 36.9 | Connel 2 (U. S. E.) | 1641.8 | 3.215319 |
| | 122 48 25.367 | 546.3 | 94 12 41.6 | 274 11 42.3 | H 20 (U. S. E.) | 1780.2 | 3.250471 |
| | | | 348 38 34.7 | 168 38 45.0 | Martin 3 (U. S. E.) | 1579.9 | 3.198634 |
| Bend (U. S. E.), 1913 | 45 57 43.218 | 1334.4 | 174 59 48.5 | 354 59 44.6 | H 19 (U. S. E.) | 1344.2 | 3.128473 |
| | 122 49 21.169 | 455.8 | 214 13 23.0 | 34 13 40.4 | Hill (U. S. E.) | 924.0 | 2.965666 |
| | | | 277 36 01.4 | 97 36 44.6 | Bluff (U. S. E.) | 1212.3 | 3.083596 |
| | | | 318 29 06.5 | 138 29 57.1 | Martin 3 (U. S. E.) | 2282.7 | 3.358456 |
| Day mark on tree, Bybee Landing, 1913. | 45 58 13.561 | 418.7 | 91 40 58 | 271 40 22 | H 22 (U. S. E.) | 1082.7 | 3.034519 |
| | 122 49 03.246 | 69.9 | 117 42 02 | 297 41 00 | Flat (U. S. E.) | 2112.7 | 3.324844 |
| | | | 322 15 51 | 142 15 57 | Hill (U. S. E.) | 218.6 | 2.339558 |
| Hoffman Landing light, June, 1913 | 45 58 38.514 | 1189.1 | 19 22 25 | 199 22 16 | H 22 (U. S. E.) | 783.0 | 2.893789 |
| | 122 49 41.450 | 892.4 | 101 24 27 | 281 23 52 | Flat (U .S. E.) | 1069.3 | 3.029114 |
| | | | 117 08 59 | 297 07 43 | Slue (U. S. E.) | 2536.8 | 3.404293 |
| H 24 (U. S. E.), 1913 | 45 58 38.511 | 1189.0 | 131 21 47.9 | 311 21 03.9 | Slue (U. S. E.) | 1751.4 | 3.243393 |
| | 122 50 25.253 | 543.6 | 198 26 22.2 | 18 26 36.3 | H 21 (U. S. E.) | 1336.2 | 3.125870 |
| | | | 286 14 56.8 | 106 15 38.9 | H 19 (U. S. E.) | 1314.9 | 3.118898 |
| | | | 317 13 31.4 | 137 13 54.2 | H 22 (U. S. E.) | 1006.2 | 3.002694 |
| Chimney, white house,[1] 1913 | 45 58 53.341 | 1801.3 | 63 42 26 | 243 41 59 | Flat (U. S. E.) | 904.6 | 2.956469 |
| | 122 49 52.466 | 1129.3 | 105 06 24 | 285 05 16 | Slue (U. S. E.) | 2092.5 | 3.320664 |
| Front chimney, white house, H. and R. Duck Club, 1913. | 45 49 28.632 | 884.0 | 219 58 19 | 39 58 55 | Ten (U. S. E.) | 1701.7 | 3.230881 |
| | 122 47 52.185 | 1126.5 | 320 51 12 | 140 52 45 | Six (U. S. E.) | 1683.7 | 3.226277 |
| | | | 338 48 32 | 158 48 33 | Nine (U. S. E.) | 47.2 | 1.674070 |
| Peninsula Lumber Co., black tank, 1913. | 45 54 05.630 | 174.0 | 207 25 59 | 27 26 27 | H 11 (U. S. E.) | 1812.5 | 3.258289 |
| | 122 48 43.946 | 947.3 | 227 24 51 | 47 25 16 | H $9_2$ (U. S. E.) | 1021.6 | 3.009266 |
| | | | 260 33 59 | 80 34 28 | H $7_2$ (U. S. E.) | 892.9 | 2.950824 |
| Day mark on dolphin, 1913 | 45 55 58.974 | 1820.8 | 9 31 22 | 189 31 11 | H 11 (U. S. E.) | 1916.9 | 3.282609 |
| | 122 47 50.479 | 1087.5 | 75 59 13 | 255 58 19 | H $16_2$ (U. S. E.) | 1673.4 | 3.223607 |
| | | | 134 47 23 | 314 46 20 | Connel 2 (U. S. E.) | 2636.1 | 3.420968 |
| White house, near wharf, north chimney, 1913. | 45 53 32.655 | 1008.2 | 187 45 46 | 7 45 58 | H 11 (U. S. E.) | 2651.2 | 3.423449 |
| | 122 48 21.814 | 470.4 | 199 07 24 | 19 07 38 | H $7_2$ (U. S. E.) | 1232.6 | 3.090819 |
| | | | 295 19 49 | 115 20 46 | H $5_2$ (U. S. E.) | 1904.0 | 3.279664 |
| Dark Pile, day mark, 1913 | 45 57 20.523 | 633.6 | 64 28 35 | 244 27 49 | Connel 2 (U. S. E.) | 1533.3 | 3.185632 |
| | 122 48 13.098 | 282.1 | 127 40 44 | 307 39 32 | H 22 (U. S. E.) | 2731.3 | 3.436376 |
| | | | 146 34 25 | 326 34 08 | Martins Bluff | 921.9 | 2.964671 |
| Deer Island Jetty light, July, 1913 | 45 55 51.209 | 1581.1 | 67 56 37 | 247 56 23 | H $16_2$ (U. S. E.) | 441.0 | 2.644484 |
| | 122 48 46.864 | 1009.6 | 203 52 37 | 23 53 03 | Martin 3 (U. S. E.) | 1912.5 | 3.281602 |
| | | | 289 00 32 | 109 01 14 | H $13_2$ (U. S. E.) | 1353.6 | 3.131476 |
| Old Barn, gable, 1913 | 45 56 55.223 | 1705.0 | 179 13 01 | 359 13 01 | Connel 2 (U. S. E.) | 120.3 | 2.080289 |
| | 122 49 17.266 | 371.9 | 209 24 19 | 29 24 48 | Martins Bluff | 1779.9 | 3.250387 |
| | | | 279 02 37 | 99 03 24 | Martin 3 (U. S. E.) | 1447.0 | 3.160457 |
| Bybee Landing light, July, 1913 | 45 58 06.098 | 188.3 | 102 27 16 | 282 26 36 | H 22 (U. S. E.) | 1216.0 | 3.084927 |
| | 122 48 58.364 | 1256.6 | 121 32 22 | 301 31 16 | Flat (U. S. E.) | 2318.1 | 3.365134 |
| | | | 206 27 05 | 26 27 06 | Hill (U. S. E.) | 643.1 | 2.808250 |
| Old Orchard, 1878 | 45 55 45.618 | 1408.4 | 193 47 16.4 | 13 47 46.7 | Martins Bluff | 3809.4 | 3.580855 |
| | 122 49 18.846 | 406.0 | 266 33 24.9 | 86 36 15.3 | Burnt Hill | 5117.9 | 3.709089 |
| | | | 344 23 08.4 | 164 23 39.6 | Adams | 3483.0 | 3.541950 |
| Maxwell, 1878 | 45 54 07.545 | 232.9 | 64 45 53.4 | 244 45 30.3 | Adams | 765.8 | 2.884132 |
| | 122 48 03.223 | 69.5 | 151 43 01.7 | 331 42 07.3 | Old Orchard | 3438.7 | 3.536394 |
| Old house, yellow terra-cotta chimney, 1913. | 45 52 21.149 | 653.0 | 18 44 16 | 198 43 47 | Warrior (U. S. E.) | 2751.2 | 3.439519 |
| | 122 46 37.231 | 802.9 | 32 24 07 | 212 23 30 | H 4 (U. S. E.) | 2107.0 | 3.323665 |
| | | | 3 33 01 | 183 33 01 | H 3 (U. S. E.) | 501.2 | 2.699998 |
| St. Helens Bar front range light, July, 1913. | 45 53 17.104 | 528.1 | 191 50 10 | 11 50 21 | H $7_2$ (U. S. E.) | 1680.4 | 3.225415 |
| | 122 48 19.072 | 411.2 | 281 22 52 | 101 23 47 | H $5_2$ (U. S. E.) | 1695.1 | 3.229198 |
| | | | 315 48 19 | 135 49 30 | H 3 (U. S. E.) | 3106.7 | 3.492300 |
| St. Helens Bar rear range light, July, 1913. | 45 53 21.756 | 671.7 | 197 45 44 | 17 46 00 | H $7_2$ (U. S. E.) | 1576.2 | 3.197618 |
| | 122 48 25.388 | 547.4 | 284 53 13 | 104 54 22 | H $5_2$ (U. S. E.) | 1860.5 | 3.269622 |
| | | | 315 50 37 | 135 52 03 | H 3 (U. S. E.) | 3304.6 | 3.519121 |
| Columbia City front range light, July, 1913. | 45 53 46.743 | 1443.2 | 216 56 44 | 36 57 02 | H $7_2$ (U. S. E.) | 912.9 | 2.960440 |
| | 122 48 28.537 | 615.2 | 303 48 31 | 123 49 33 | H $5_2$ (U. S. E.) | 2245.6 | 3.351338 |
| | | | 337 18 09 | 157 18 15 | H $8_2$ (U. S. E.) | 458.3 | 2.661123 |
| Columbia City rear range light, July, 1913. | 45 53 39.159 | 1209.0 | 196 02 45 | 16 02 59 | H $9_2$ (U. S. E.) | 1569.9 | 3.195867 |
| | 122 48 29.182 | 629.2 | 210 16 29 | 30 16 48 | H $7_2$ (U. S. E.) | 1116.0 | 3.047658 |
| | | | 298 22 31 | 118 23 33 | H $5_2$ (U. S. E.) | 2136.5 | 3.329699 |
| Unpainted house, stovepipe, 1913 | 45 54 29.175 | 900.8 | 7 34 40 | 187 34 32 | H $8_2$ (U. S. E.) | 1748.1 | 3.242567 |
| | 122 48 09.644 | 207.9 | 38 12 36 | 218 12 16 | Dock (U. S. E.) | 960.5 | 2.982513 |
| | | | 340 11 25 | 160 11 27 | H $9_2$ (U. S. E.) | 37.7 | 1.576802 |
| White house, chimney, back, 1913 | 45 54 21.474 | 663.0 | 9 19 21 | 189 19 13 | H $8_2$ (U. S. E.) | 1515.1 | 3.180439 |
| | 122 48 08.952 | 193.0 | 49 40 27 | 229 40 07 | Dock (U. S. E.) | 798.9 | 2.902480 |
| | | | 179 23 57 | 359 23 57 | H $9_2$ (U. S. E.) | 202.3 | 2.305912 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Adams, 1878 | 45 53 56.969 | 1758.9 | 228 43 45.1 | 48 46 04.2 | Burnt Hill | 5550.4 | 3.744326 |
| | 122 48 35.358 | 762.2 | 282 23 29.4 | 102 27 24.1 | Lewis River Hill | 7217.1 | 3.858360 |
| Carruthers, 1878 | 45 53 07.316 | 225.9 | 127 57 51.4 | 307 56 45.9 | Adams | 2492.5 | 3.396636 |
| | 122 47 04.202 | 90.6 | 145 37 21.6 | 325 36 39.2 | Maxwell | 2253.2 | 3.352806 |
| | | | 203 01 55.2 | 23 03 08.8 | Burnt Hill | 5643.0 | 3.751508 |
| Rock crusher, southeast stack, 1913 | 45 52 19.013 | 587.0 | 217 55 59 | 37 56 37 | H 5₂ (U. S. E.) | 1849.7 | 3.267105 |
| | 122 47 54.742 | 1180.7 | 284 49 01 | 104 49 55 | H 3 (U. S. E.) | 1697.3 | 3.229754 |
| | | | 323 47 58 | 143 48 46 | H 1₂ (U. S. E.) | 2442.5 | 3.387829 |
| St. Helens jetty light, July, 1913 | 45 52 24.726 | 763.4 | 101 47 30 | 281 46 52 | H 6₂ (U. S. E.) | 1146.4 | 3.059333 |
| | 122 47 04.138 | 89.2 | 182 03 10 | 2 03 11 | H 5₂ (U. S. E.) | 1283.3 | 3.108320 |
| | | | 318 01 17 | 138 01 35 | H 3 (U. S. E.) | 821.4 | 2.914544 |
| Lemont, 1878 | 45 52 26.352 | 813.6 | 177 04 38.4 | 357 04 33.1 | Maxwell | 3128.4 | 3.495318 |
| | 122 47 55.823 | 1203.9 | 207 12 19.6 | 27 14 10.2 | Burnt Hill | 7261.8 | 3.861042 |
| | | | 221 20 53.6 | 41 21 30.7 | Carruthers | 1684.9 | 3.226570 |
| | | | 258 36 41.2 | 78 40 07.5 | Lewis River Hills | 6320.9 | 3.800778 |
| Balsam, 1878 | 45 52 16.844 | 520.1 | 100 02 03.9 | 280 01 08.6 | Lemont | 1686.0 | 3.226854 |
| | 122 46 38.845 | 837.8 | 160 39 56.7 | 340 39 38.5 | Carruthers | 1651.5 | 3.217869 |
| St. Helens Congregational Church, 1913. | 45 51 59.154 | 1826.3 | 209 00 01 | 29 00 39 | H 5₂ (U. S. E.) | 2369.1 | 3.374585 |
| | 122 47 55.272 | 1192.2 | 263 48 50 | 83 49 45 | H 3 (U. S. E.) | 1662.0 | 3.220633 |
| | | | 313 02 24 | 133 03 13 | H 1₂ (U. S. E.) | 1989.4 | 3.298733 |
| St. Helens new courthouse, dome, 1913. | 45 51 49.608 | 1531.6 | 251 52 34 | 71 53 23 | H 3 (U. S. E.) | 1523.1 | 3.182737 |
| | 122 47 45.781 | 987.6 | 310 23 54 | 130 24 35 | H 1₂ (U. S. E.) | 1640.4 | 3.214938 |
| | | | 336 30 55 | 156 31 07 | H 4 (U. S. E.) | 877.9 | 2.943448 |
| St. Helens School, small cupola, 1913. | 45 51 49.749 | 1536.0 | 206 24 30 | 26 25 10 | H 5₂ (U. S. E.) | 2637.7 | 3.421225 |
| | 122 47 56.413 | 1217.0 | 254 21 35 | 74 22 31 | H 3 (U. S. E.) | 1741.4 | 3.240899 |
| | | | 324 24 54 | 144 25 14 | H 4 (U. S. E.) | 995.5 | 2.998020 |
| United Wireless Co., pole, 1913 | 45 51 46.867 | 1447.0 | 256 09 45 | 76 11 01 | H 3 (U. S. E.) | 2335.7 | 3.368422 |
| | 122 48 23.817 | 513.8 | 295 17 53 | 115 19 02 | H 1₂ (U. S. E.) | 2289.4 | 3.359716 |
| | | | 319 11 43 | 139 12 46 | Lake (U. S. E.) | 2891.5 | 3.461126 |
| St. Helen's Church, 1878 | 45 51 44.766 | 1382.1 | 202 52 08.4 | 22 53 57.0 | Burnt Hill | 8402.8 | 3.924423 |
| | 122 47 53.298 | 1149.7 | 238 19 49.4 | 58 20 42.8 | Balsam | 1886.8 | 3.275717 |
| | | | 247 35 47.0 | 67 39 11.2 | Lewis River Hills | 6643.4 | 3.822392 |
| | | | 299 22 59.6 | 119 23 46.1 | Russell | 1604.1 | 3.205238 |
| | | | 307 06 47.1 | 127 09 20.9 | Reed | 5812.1 | 3.764331 |
| St. Helens Lumber Co., pole near gable of mill, 1913. | 45 51 39.292 | 1213.1 | 239 54 04 | 59 54 50 | H 3 (U. S. E.) | 1579.8 | 3.198599 |
| | 122 47 42.036 | 906.9 | 302 30 36 | 122 31 15 | H 1₂ (U. S. E.) | 1385.5 | 3.141618 |
| | | | 331 04 03 | 151 04 12 | H 4 (U. S. E.) | 556.1 | 2.745177 |
| Russell, 1878 | 45 51 19.269 | 594.9 | 40 35 54.0 | 220 35 34.3 | Warriors Point | 908.7 | 2.958424 |
| | 122 46 48.509 | 1046.4 | 144 58 25.4 | 324 57 36.9 | Lemont | 2529.4 | 3.403020 |
| | | | 186 41 16.5 | 6 41 23.4 | Balsam | 1789.8 | 3.252800 |
| Warriors Point, 1878 | 45 50 56.920 | 1757.4 | 162 41 14.7 | 342 40 46.0 | Lemont | 2892.2 | 3.461233 |
| | 122 47 15.916 | 343.4 | 183 35 24.0 | 3 35 32.4 | Carruthers | 4033.8 | 3.605716 |
| | | | 197 57 10.6 | 17 57 37.2 | Balsam | 2594.0 | 3.413962 |
| Lake River, 1878 | 45 50 43.802 | 1352.4 | 126 45 23.4 | 306 45 05.4 | Warriors Point | 676.8 | 2.830492 |
| | 122 46 50.783 | 1095.8 | 156 06 21.5 | 336 05 34.6 | Lemont | 3463.1 | 3.539468 |
| | | | 176 15 49.6 | 356 15 39.8 | Carruthers | 4440.4 | 3.647418 |
| | | | 182 33 54.3 | 2 33 55.9 | Russell | 1096.1 | 3.039855 |
| Warrior Rock Lighthouse, ventilator, August, 1913. | 45 50 56.806 | 1753.8 | 226 09 15 | 46 09 35 | H 1₂ (U. S. E.) | 818.5 | 2.913003 |
| | 122 47 15.240 | 328.8 | 327 30 33 | 147 30 47 | Lake (U. S. E.) | 762.8 | 2.882400 |
| | | | 348 12 53 | 168 13 04 | Ten (U. S. E.) | 1448.8 | 3.161000 |
| St. Helens Lumber Co., north stack, 1913. | 45 51 37.956 | 1171.9 | 238 40 26 | 58 41 12 | H 3 (U. S. E.) | 1603.1 | 3.204973 |
| | 122 47 42.159 | 909.5 | 300 59 29 | 121 00 08 | H 1₂ (U. S. E.) | 1366.1 | 3.135484 |
| | | | 328 37 13 | 148 37 22 | H 4 (U. S. E.) | 521.8 | 2.717513 |
| Henrici Landing rear range light, August, 1913. | 45 48 53.726 | 1658.8 | 345 15 35 | 165 15 37 | Seven 2 (U. S. E.) | 220.7 | 2.343791 |
| | 122 47 55.234 | 1192.5 | 281 26 31 | 101 27 08 | Six (U. S. E.) | 1151.3 | 3.061186 |
| | | | 343 23 31 | 163 23 59 | D (U. S. E.) | 3004.9 | 3.477835 |
| Henrici Landing front range light, August, 1913. | 45 48 48.159 | 1486.9 | 48 47 24 | 228 47 22 | Seven 2 (U. S. E.) | 63.1 | 1.800033 |
| | 122 47 50.434 | 1088.9 | 273 09 30 | 93 10 04 | Six (U. S. E.) | 1026.3 | 3.011295 |
| | | | 344 24 56 | 164 25 21 | D (U. S. E.) | 2811.1 | 3.448873 |
| Powder House, low stack, 1913 | 45 48 52.674 | 1626.3 | 346 50 02 | 166 50 03 | Seven 2 (U. S. E.) | 185.8 | 2.269077 |
| | 122 47 54.591 | 1178.5 | 279 58 04 | 99 58 41 | Six (U. S. E.) | 1131.7 | 3.053720 |
| | | | 324 40 56 | 144 41 59 | A (U. S. E.) | 3251.4 | 3.512064 |
| Shobert, 1881 | 45 48 53.944 | 1665.5 | 358 05 30.4 | 178 05 35.7 | Fales | 4763.0 | 3.677880 |
| | 122 44 44.358 | 957.7 | 40 46 31.5 | 220 40 54.4 | Bouser | 15586.7 | 4.192753 |
| | | | 62 41 54.8 | 242 35 34.0 | Scappoose | 12920.7 | 4.111286 |
| | | | 141 30 24.5 | 321 27 27.9 | Table Cliff | 8525.6 | 3.930724 |
| Ladd,[1] 1881 | 45 49 19.75 | 609.8 | 249 08 24 | 69 09 49 | Reed | 2721.2 | 3.434766 |
| | 122 46 16.37 | 353.4 | 338 52 38 | 158 53 50 | Fales | 5957.1 | 3.775036 |
| Meadows, 1881 | 45 47 48.060 | 1483.8 | 30 45 01.2 | 210 41 48.6 | Bouser | 11374.0 | 4.055914 |
| | 122 48 06.110 | 132.0 | 61 18 02.9 | 241 14 06.7 | Scappoose | 8118.8 | 3.909492 |

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Four 2 (U. S. E.), 1913 | 45 48 16.712 | 516.0 | 355 16 36.2 | 175 16 38.2 | Two (U. S. E.) | 723.3 | 2.859295 |
| | 122 46 40.634 | 877.5 | 63 43 59.1 | 243 43 15.4 | One 2 (U. S. E.) | 1462.5 | 3.165082 |
| | | | 96 18 53.9 | 276 18 05.0 | Five 2 (U. S. E.) | 1483.5 | 3.171297 |
| Abrams, 1881 | 45 47 48.779 | 1506.0 | 47 28 54.5 | 227 23 01.0 | Bouser | 14486.9 | 4.160977 |
| | 122 44 21.325 | 460.5 | 71 54 29.2 | 251 47 52.0 | Scappoose | 12602.2 | 4.100447 |
| | | | 146 14 59.7 | 326 11 46.7 | Table Cliff | 10445.6 | 4.018933 |
| Batchelors Point Light, August, 1913 | 45 47 18.409 | 568.4 | 13 41 35 | 193 41 25 | Dead Willow (U. S. E.) | 1251.9 | 3.097562 |
| | 122 46 22.706 | 490.4 | 57 46 24 | 237 45 58 | E (U. S. E.) | 921.9 | 2.964696 |
| | | | 93 10 25 | 273 09 47 | D (U. S. E.) | 1141.5 | 3.057470 |
| Fales's House, red chimney, 1881 | 45 46 10.564 | 326.2 | 56 39 30.9 | 236 33 50.8 | Bouser | 12297.5 | 4.089818 |
| | 122 44 40.015 | 864.6 | 85 38 33.8 | 265 32 10.0 | Scappoose | 11608.8 | 4.064786 |
| | | | 183 53 26.6 | 3 53 42.0 | Reed | 6825.3 | 3.834122 |
| Nelson, 1881 | 45 45 52.247 | 1613.1 | 35 00 07.7 | 214 57 44.0 | Bouser | 7569.6 | 3.879073 |
| | 122 49 14.231 | 307.5 | 86 42 38.6 | 266 39 31.3 | Scappoose | 5658.6 | 3.752710 |
| Cloniger,[1] 1881 | 45 44 53.58 | 1654.2 | 35 39 38 | 215 37 54 | Bouser | 5402.9 | 3.732625 |
| | 122 50 09.35 | 202.1 | 108 25 55 | 288 23 27 | Scappoose | 4699.3 | 3.672032 |
| Knapp, 1881 | 45 44 20.027 | 618.3 | 308 01 13.8 | 128 02 16.0 | Brookside | 2384.3 | 3.377369 |
| | 122 45 16.734 | 361.8 | 11 44 57.8 | 191 43 16.0 | Willamet | 15151.5 | 4.180457 |
| | | | 70 32 57.8 | 250 27 44.0 | Bouser | 10053.0 | 4.002294 |
| | | | 103 12 08.9 | 283 06 11.5 | Scappoose | 11074.4 | 4.044321 |
| Knapp's chimney, 1881 | 45 44 16.700 | 515.6 | 17 57 27.0 | 197 54 49.4 | Willamet | 15484.6 | 4.189901 |
| | 122 43 58.807 | 1271.4 | 73 48 27.9 | 253 42 18.3 | Bouser | 11626.1 | 4.065434 |
| | | | 101 56 10.3 | 281 49 17.0 | Scappoose | 12741.2 | 4.105212 |
| Sheringhousen,[1] 1878 | 45 44 08.50 | 262.4 | 32 18 00 | 212 16 57 | Bouser | 3560.4 | 3.551494 |
| | 122 51 07.01 | 151.6 | 131 44 23 | 311 42 36 | Scappoose | 4304.7 | 3.633947 |
| Brookside, 1881 | 45 43 32.449 | 1001.9 | 20 23 28.8 | 200 20 44.9 | Willamet | 14257.4 | 4.154041 |
| | 122 43 49.870 | 1078.5 | 80 37 24.8 | 260 31 08.9 | Bouser | 11512.0 | 4.061150 |
| | | | 107 32 34.6 | 287 25 35.0 | Scappoose | 13276.3 | 4.123078 |
| Oak Ridge,[1] 1881 | 45 43 10.79 | 333.1 | 74 10 41 | 254 08 19 | Bouser | 4458.9 | 3.649225 |
| | 122 49 16.64 | 359.9 | 129 46 46 | 309 43 40 | Scappoose | 7283.3 | 3.862328 |
| Harris, 1881 | 45 42 27.172 | 838.9 | 13 45 16.6 | 193 43 45.0 | Willamet | 11685.1 | 4.067632 |
| | 122 45 30.902 | 668.4 | 90 51 02.1 | 270 45 58.6 | Bouser | 9173.8 | 3.962549 |
| | | | 119 51 21.8 | 299 45 34.7 | Scappoose | 12078.6 | 4.082018 |
| Morgan, 1881 | 45 40 47.068 | 1453.2 | 112 41 10.0 | 292 36 54.8 | Bouser | 8361.2 | 3.922271 |
| | 122 46 38.325 | 829.4 | 195 01 03.2 | 15 02 01.6 | Knapp | 6807.6 | 3.832991 |
| | | | 9 03 37.4 | 189 02 54.3 | Willamet | 8364.2 | 3.922427 |
| Hendrickson,[1] 1881 | 45 39 32.79 | 1012.4 | 28 12 53 | 208 11 08 | Willamet | 6770.4 | 3.830616 |
| | 122 45 11.40 | 246.8 | 140 38 23 | 320 37 21 | Morgan | 2966.4 | 3.472226 |
| Howell house, east chimney, 1881 | 45 38 29.738 | 918.1 | 13 34 30.0 | 193 33 58.0 | Willamet | 4135.7 | 3.616546 |
| | 122 46 54.314 | 1176.3 | 135 22 10.7 | 315 18 07.0 | Bouser | 10448.5 | 4.020714 |
| | | | 244 07 55.0 | 44 08 01.8 | Howell | 293.7 | 2.467898 |
| Hillside,[1] 1883 | 45 37 54.92 | 1695.5 | 249 38 13 | 69 40 08 | Howell | 3698.1 | 3.567974 |
| | 122 49 24.96 | 540.5 | 316 41 33 | 136 42 35 | Quigley | 2748.2 | 3.439051 |
| Quigley, 1883 | 45 36 50.132 | 1547.7 | 205 43 11.0 | 25 44 03.2 | Howell | 3647.5 | 3.561999 |
| | 122 47 57.965 | 1255.9 | 274 53 57.9 | 94 55 22.1 | Gatton | 2564.0 | 3.408910 |
| House, west gable, 1883 | 45 36 07.175 | 221.5 | 2 20 36.5 | 182 20 33.9 | Springville | 1950.6 | 3.290161 |
| | 122 46 06.322 | 137.0 | 46 39 07.2 | 226 38 37.2 | Watts | 1252.3 | 3.097713 |
| | | | 99 26 11.3 | 279 25 17.1 | Kaiser | 1663.8 | 3.221104 |
| Gatton's house, chimney, 1883 | 45 35 57.370 | 1771.2 | 8 00 00.0 | 187 59 52.4 | Springville | 1662.4 | 3.220732 |
| | 122 45 59.329 | 1285.7 | 62 20 04.9 | 242 19 29.9 | Watts | 1199.4 | 3.078954 |
| | | | 107 47 53.0 | 287 46 53.8 | Kaiser | 1883.0 | 3.274842 |
| Thistle,[1] 188? | 45 34 12.57 | 388.2 | 199 23 10 | 19 23 26 | Caples | 1445.2 | 3.159938 |
| | 122 45 13.13 | 284.7 | 263 15 45 | 83 16 45 | Waud | 1820.8 | 3.260251 |
| Mann,[1] 1883 | 45 33 44.65 | 1378.6 | 171 05 23 | 351 05 11 | Caples | 2252.4 | 3.352643 |
| | 122 44 34.90 | 757.1 | 222 19 40 | 42 20 12 | Waud | 1454.5 | 3.162722 |
| Portland Episcopal Church, spire, 1883. | 45 31 20.207 | 623.8 | 101 57 21.3 | 281 56 14.9 | King | 2064.5 | 3.314805 |
| | 122 40 33.616 | 729.5 | 187 56 15.0 | 7 52 22.4 | Montgomery | 1651.0 | 3.217746 |
| | | | 332 49 18.7 | 152 50 02.5 | Tibbets | 2916.9 | 3.464924 |
| | | | 24 01 09.5 | 204 00 41.0 | Hoffmans Hill | 1909.5 | 3.280921 |
| Portland customhouse, dome, 1882–3. | 45 31 08.661 | 267.4 | 112 19 18.1 | 292 18 15.3 | King | 2064.5 | 3.314808 |
| | 122 40 38.680 | 839.5 | 189 34 25.5 | 9 34 36.5 | Montgomery | 2020.0 | 3.305366 |
| | | | 327 12 16.6 | 147 13 04.0 | Tibbets | 2662.8 | 3.425339 |
| | | | 25 40 54.4 | 205 40 32.5 | Hoffmans Hill | 1539.8 | 3.187469 |
| Portland Methodist Church, spire, 1883. | 45 31 02.066 | 63.8 | 115 26 10.0 | 295 25 01.7 | King | 2299.7 | 3.361673 |
| | 122 40 30.984 | 672.5 | 184 24 04.4 | 4 24 09.9 | Montgomery | 2202.0 | 3.342813 |
| | | | 327 55 32.0 | 147 56 13.9 | Tibbets | 2401.4 | 3.380467 |
| | | | 35 10 15.0 | 215 09 47.6 | Hoffmans Hill | 1448.6 | 3.160934 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Portland courthouse dome, 1883 | 45 31 00.464 | 14.3 | 118 32 29.6 | 298 31 26.9 | King | 2170.7 | 3.336603 |
| | 122 40 38.812 | 842.4 | 188 34 57.4 | 8 35 08.5 | Montgomery | 2270.4 | 3.356102 |
| | | | 323 56 54.9 | 143 57 42.4 | Tibbets | 2455.6 | 3.390155 |
| | | | 30 21 12.7 | 210 20 50.9 | Hoffmans Hill | 1314.9 | 3.118888 |
| Portland Congregational Church spire, 1883. | 45 30 52.994 | 1636.1 | 122 03 32.8 | 302 02 26.2 | King | 2388.5 | 3.378124 |
| | 122 40 33.405 | 725.0 | 185 06 47.1 | 5 06 54.3 | Montgomery | 2485.5 | 3.395406 |
| | | | 322 53 11.9 | 142 53 55.5 | Tibbets | 2200.5 | 3.342513 |
| | | | 40 51 15.3 | 220 50 49.6 | Hoffmans Hill | 1195.2 | 3.077447 |
| Portland Waterworks, pumping tower, 1883. | 45 30 24.228 | 748.0 | 314 54 10.9 | 134 54 39.4 | Tibbets | 1227.9 | 3.089150 |
| | 122 40 12.308 | 267.2 | 11 15 56.3 | 191 15 46.5 | Homestead | 1523.0 | 3.182705 |
| | | | 89 15 54.6 | 269 15 13.8 | Hoffmans Hill | 1239.9 | 3.093392 |
| Homestead, 1883 | 45 29 35.846 | 1106.7 | 147 28 27.3 | 327 27 56.3 | Hoffmans Hill | 1752.6 | 3.243690 |
| | 122 40 26.010 | 564.8 | 241 45 26.6 | 61 46 04.9 | Tibbets | 1324.9 | 3.122195 |
| Large white house, chimney,[1] August, 1913. | 45 45 46.17 | 1425.5 | 106 12 50 | 286 12 14 | Fales | 1113.5 | 3.046802 |
| | 122 44 41.00 | 886.2 | 117 25 03 | 297 23 51 | Grassy | 2440.0 | 3.387387 |
| Fales Landing light, 1913 | 45 45 49.079 | 1515.3 | 171 26 32 | 351 26 31 | Fales | 223.5 | 2.349277 |
| | 122 45 28.955 | 625.9 | | | | | |
| Windmill, on unpainted tower, 1913 | 45 44 56.226 | 1735.9 | 294 00 31 | 114 01 09 | W 9 (U. S. E.) | 1250.2 | 3.096990 |
| | 122 46 18.526 | 400.4 | 3 55 58 | 183 55 58 | W 14 (U. S. E.) | 125.9 | 2.099925 |
| Red mill, spindle, 1913 | 45 44 24.239 | 748.4 | 248 53 51 | 68 54 32 | W 9 (U. S. E.) | 1330.1 | 3.123878 |
| | 122 46 23.097 | 499.4 | 285 12 17 | 105 13 07 | W $7_2$ (U. S. E.) | 1563.4 | 3.194074 |
| | | | 314 52 21 | 134 53 08 | Range 2 (U. S. E.) | 2093.2 | 3.320815 |
| Red house, chimney, 1913 | 45 44 18.835 | 581.5 | 242 31 55 | 62 32 36 | W 9 (U. S. E.) | 1399.9 | 3.146086 |
| | 122 46 23.151 | 500.5 | 279 09 03 | 99 09 53 | W $7_2$ (U. S. E.) | 1529.3 | 3.184501 |
| | | | 332 46 01 | 152 46 41 | W $5_2$ (U. S. E.) | 2665.8 | 3.425826 |
| Yellow house, south chimney, 1913 | 45 44 16.215 | 500.6 | 239 51 47 | 59 52 28 | W 9 (U. S. E.) | 1447.2 | 3.160533 |
| | 122 46 23.592 | 510.1 | 276 05 51 | 96 06 41 | W $7_2$ (U. S. E.) | 1528.0 | 3.184136 |
| | | | 309 26 29 | 129 27 16 | Range 2 (U. S. E.) | 1934.7 | 3.286621 |
| Old windmill, high tank, 1913 | 45 43 50.781 | 1567.8 | 246 47 01 | 66 47 49 | W $7_2$ (U. S. E.) | 1580.1 | 3.198678 |
| | 122 46 20.494 | 443.1 | 287 16 55 | 107 17 41 | Range 2 (U. S. E.) | 1494.3 | 3.174447 |
| | | | 322 18 38 | 142 19 16 | W $5_3$ (U. S. E.) | 1900.8 | 3.278946 |
| East silo, 1913 | 45 43 34.329 | 1059.9 | 231 59 20 | 52 00 08 | W $7_2$ (U. S. E.) | 1836.3 | 3.263940 |
| | 122 46 20.234 | 437.5 | 267 25 19 | 87 26 05 | Range 2 (U. S. E.) | 1423.0 | 3.153196 |
| | | | 310 44 09 | 130 44 47 | W $5_3$ (U. S. E.) | 1526.7 | 3.183748 |
| White house, middle chimney, 1913 | 45 43 33.274 | 1027.3 | 265 57 14 | 85 57 59 | Range 2 (U. S. E.) | 1368.5 | 3.136251 |
| | 122 46 17.625 | 381.1 | 311 12 45 | 131 13 21 | W $5_3$ (U. S. E.) | 1462.7 | 3.165159 |
| | | | 18 47 16 | 198 47 14 | W $10_2$ (U. S. E.) | 180.7 | 2.257017 |
| Upper Willow Bar range, front light, August, 1913. | 45 43 36.259 | 1119.5 | 162 05 | 342 05 | Range 2 (U. S. E.) | 4.51 | 0.65417 |
| | 122 45 14.431 | 312.0 | | | | | |
| Upper Willow Bar range, rear light, August, 1913. | 45 43 38.813 | 1198.3 | 31 17 | 211 17 | Range 2 (U. S. E.) | 87.25 | 1.94077 |
| | 122 45 12.400 | 268.1 | | | | | |
| Lower Willow Bar range, front light, August, 1913. | 45 43 08.614 | 265.9 | 4 48 54 | 184 48 53 | W $5_3$ (U. S. E.) | 203.2 | 2.307966 |
| | 122 45 25.958 | 561.4 | 45 15 06 | 225 14 30 | W 6 (U. S. E.) | 1512.3 | 3.179626 |
| Lower Willow Bar range, rear light, August, 1913. | 45 43 03.248 | 100.3 | 24 30 12 | 204 30 11 | W $5_3$ (U. S. E.) | 40.5 | 1.607455 |
| | 122 45 25.970 | 561.7 | 50 03 48 | 230 03 12 | W 6 (U. S. E.) | 1400.4 | 3.146249 |
| Reeder's house, north chimney,[1] 1913. | 45 43 00.35 | 10.8 | 211 57 34 | 31 58 19 | W $7_2$ (U. S. E.) | 2569.3 | 3.409818 |
| | 122 46 16.22 | 350.8 | 230 10 27 | 50 11 11 | Range 2 (U. S. E.) | 1737.9 | 3.240031 |
| Old church belfry, front spindle, 1913. | 45 43 05.985 | 184.8 | 170 49 58 | 350 49 54 | W $10_2$ (U. S. E.) | 680.1 | 2.832580 |
| | 122 46 15.305 | 331.0 | 213 44 57 | 33 45 40 | W $7_3$ (U. S. E.) | 2412.4 | 3.382451 |
| | | | 276 35 00 | 96 35 34 | W $5_3$ (U. S. E.) | 1057.2 | 3.024146 |
| New house, chimney, 1913 | 45 42 41.213 | 1272.4 | 206 04 57 | 26 05 42 | W $7_2$ (U. S. E.) | 3084.8 | 3.489226 |
| | 122 46 16.047 | 347.1 | 217 59 46 | 38 00 29 | Range 2 (U. S. E.) | 2162.1 | 3.334873 |
| | | | 238 53 09 | 58 53 44 | W $5_3$ (U. S. E.) | 1245.4 | 3.095316 |
| Reeder Point light, August, 1913 | 45 42 03.213 | 99.2 | 180 13 32 | 0 13 32 | W $4_2$ (U. S. E.) | 89.0 | 1.949390 |
| | 122 46 25.046 | 541.8 | 288 32 07 | 108 32 42 | W 3 (U. S. E.) | 1120.9 | 3.049550 |
| Morgan Wharf light, September, 1913. | 45 40 39.929 | 1232.8 | 292 49 07 | 112 49 42 | One 3 (U. S. E.) | 1156.3 | 3.063067 |
| | 122 46 34.567 | 748.1 | 308 33 23 | 128 34 09 | Middle | 1790.3 | 3.252932 |
| | | | 345 21 38 | 165 21 45 | Two 2 (U. S. E.) | 831.2 | 2.919706 |
| High tank, remains of windmill, 1913. | 45 40 40.119 | 1238.6 | 292 19 02 | 112 19 39 | One 3 (U. S. E.) | 1196.3 | 3.077840 |
| | 122 46 36.456 | 788.9 | 307 54 00 | 127 54 48 | Middle | 1826.1 | 3.261518 |
| | | | 342 47 11 | 162 47 19 | Two 2 (U. S. E.) | 848.1 | 2.928426 |
| Mountain View Dairy Farm, windmill on barn, 1913. | 45 40 13.721 | 423.6 | 340 48 49 | 160 48 53 | Middle | 325.0 | 2.511829 |
| | 122 45 34.824 | 753.8 | 90 15 53 | 270 15 17 | Two 2 (U. S. E.) | 1083.1 | 3.034668 |
| | | | 147 46 37 | 327 46 29 | One 3 (U. S. E.) | 426.3 | 2.629684 |
| Schoolhouse, belfry, 1913 | 45 40 02.165 | 66.8 | 342 09 48 | 162 09 52 | Three 3 (U. S. E.) | 420.9 | 2.624166 |
| | 122 46 25.453 | 551.0 | 105 42 54 | 285 42 11 | Two 2 (U. S. E.) | 1335.9 | 3.125770 |
| | | | 117 37 06 | 297 38 03 | Middle | 108.3 | 2.034754 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters* | |
| Windmill, white tank, 1913 | 45 39 53.685 | 1657.5 | 45 56 36 | 225 56 10 | Four 2 (U. S. E.) | 1102.7 | 3.042473 |
| | 122 45 22.710 | 491.6 | 114 52 12 | 294 51 28 | Two 2 (U. S. E.) | 1482.8 | 3.171096 |
| | | | 153 29 21 | 333 29 16 | Middle | 348.3 | 2.541932 |
| Coon Island Light, October, 1913 | 45 39 19.179 | 592.1 | 205 30 20 | 25 30 41 | Middle | 1525.7 | 3.183465 |
| | 122 46 00.241 | 5.2 | 356 03 28 | 176 03 30 | Mud | 891.9 | 2.950316 |
| | | | 16 27 57 | 196 27 39 | Pen | 1904.9 | 3.279883 |
| Willamette River range front light, October, 1913. | 45 39 08.224 | 253.9 | 72 41 25 | 252 41 02 | School | 723.4 | 2.859385 |
| | 122 45 46.754 | 1012.4 | 155 53 37 | 335 53 26 | End | 828.9 | 2.918509 |
| | | | 205 00 43 | 25 01 03 | Three 3 (U. S. E.) | 1395.5 | 3.144733 |
| Day mark, October, 1913 | 45 38 45.897 | 1417.0 | 140 46 13 | 320 46 00 | School | 612.0 | 2.786739 |
| | 122 46 00.776 | 16.8 | 178 36 49 | 358 36 48 | End | 1446.4 | 3.160276 |
| | | | 207 53 24 | 27 53 26 | Mud | 155.8 | 2.192623 |
| Gillihan tank, white, 1913 | 45 38 47.527 | 1467.3 | 46 18 58 | 226 18 46 | Howell | 489.9 | 2.690095 |
| | 122 46 28.511 | 617.3 | 206 44 31 | 26 44 38 | School | 474.5 | 2.676217 |
| | | | 262 36 07 | 82 36 27 | Mud | 679.1 | 2.831943 |
| Three Tree Island Shoal Light, October, 1913. | 45 38 34.379 | 1061.4 | 351 55 27 | 171 55 29 | Pen | 448.2 | 2.651471 |
| | 122 46 28.081 | 608.0 | 100 31 26 | 280 31 14 | Howell | 369.8 | 2.567982 |
| | | | 233 23 39 | 53 24 00 | Mud | 827.3 | 2.917674 |
| Post Office Bar lower light, October, 1913. | 45 38 11.574 | 357.3 | 326 34 22 | 146 35 22 | Gatton | 3275.4 | 3.515263 |
| | 122 47 23.340 | 505.5 | 351 29 25 | 171 29 32 | Sand | 1349.3 | 3.130099 |
| | | | 358 54 04 | 178 54 06 | Linton | 3991.8 | 3.601172 |
| Post Office Bar range front light, October, 1913. | 45 37 50.147 | 1548.2 | 217 19 13 | 37 19 49 | Howell | 1802.2 | 3.255797 |
| | 122 47 35.324 | 765.1 | 315 06 41 | 135 07 49 | Gatton | 2924.6 | 3.466070 |
| | | | 325 41 09 | 145 41 24 | Sand | 814.7 | 2.910995 |
| Post Office Bar range rear light, October, 1913. | 45 37 53.329 | 1646.5 | 316 07 16 | 136 08 25 | Gatton | 3010.8 | 3.478687 |
| | 122 47 36.381 | 788.0 | 327 58 58 | 147 59 15 | Sand | 909.5 | 2.958793 |
| | | | 354 01 04 | 174 01 16 | Linton | 3446.6 | 3.537390 |
| Linton Landing Light, October, 1913. | 45 36 17.022 | 525.5 | 175 37 30 | 355 37 24 | Sand | 2208.6 | 3.344115 |
| | 122 47 06.346 | 137.5 | 240 47 31 | 60 48 18 | Gatton | 1645.3 | 3.216245 |
| | | | 32 41 46 | 212 41 35 | Linton | 540.1 | 2.732475 |
| Vancouver Bridge, center of draw,[1] 1913. | 45 37 37.53 | 1158.6 | 69 29 32 | 249 25 14 | Linton | 8377.7 | 3.923123 |
| | 122 41 17.75 | 384.5 | 119 26 04 | 299 22 43 | Four 2 (U. S. E.) | 6999.6 | 3.845071 |
| Swan Island Bar upper light,[1] 1913 | 45 32 58.77 | 1814.4 | 101 02 43 | 281 02 00 | Forty-four (U. S. E.) | 1335.6 | 3.125692 |
| | 122 41 37.20 | 807.0 | 169 40 00 | 349 39 52 | P (U. S. E.) | 1451.1 | 3.161708 |
| Incinerator, stack, 1913 | 45 32 33.052 | 1020.4 | 122 05 44 | 302 04 22 | Scott | 2953.2 | 3.470300 |
| | 122 42 11.836 | 256.8 | 142 07 37 | 322 05 43 | Caples | 5620.6 | 3.749784 |
| | | | 192 27 26 | 12 27 42 | P (U. S. E.) | 2275.1 | 3.357010 |
| Swan Island Bar lower light, 1913 | 45 33 33.822 | 1044.2 | 37 52 54 | 217 52 32 | Forty-four (U. S. E.) | 1047.0 | 3.019953 |
| | 122 42 08.001 | 173.5 | 171 26 18 | 351 26 09 | T (U. S. E.) | 1751.0 | 3.243284 |
| | | | 229 43 08 | 49 43 21 | P (U. S. E.) | 534.3 | 2.727768 |
| Swan Island Channel front light, 1913. | 45 33 40.394 | 1247.0 | 32 31 58 | 212 31 36 | Forty-four (U. S. E.) | 1220.8 | 3.086658 |
| | 122 42 07.372 | 159.9 | 169 49 33 | 349 49 24 | T (U. S. E.) | 1553.0 | 3.191176 |
| | | | 250 06 26 | 70 06 39 | P (U. S. E.) | 418.9 | 2.622154 |
| Swan Island Channel rear light,[1] 1913. | 45 33 47.91 | 1479.1 | 280 00 25 | 100 00 42 | P (U. S. E.) | 514.6 | 2.711452 |
| | 122 42 12.57 | 272.6 | 334 03 59 | 154 04 03 | Swan Island Channel, front light. | 258.0 | 2.411535 |
| Mocks Bottom Light, 1913 | 45 34 09.827 | 303.4 | 234 57 44 | 54 58 13 | T (U. S. E.) | 1079.9 | 3.033374 |
| | 122 43 00.802 | 17.4 | 296 15 26 | 116 16 17 | P (U. S. E.) | 1731.3 | 3.238383 |
| | | | 342 00 14 | 162 00 18 | F (U. S. E.) | 479.4 | 2.680723 |
| Sawmill, west stack, 1913 | 45 34 16.756 | 517.3 | 252 46 59 | 72 47 42 | T (U. S. E.) | 1372.0 | 3.137358 |
| | 122 43 20.466 | 443.8 | 31 49 21 | 211 48 48 | Scott | 1921.8 | 3.283706 |
| | | | 43 52 14 | 223 52 04 | R (U. S. E.) | 470.8 | 2.672796 |
| Swan Island Range front light, 1913 | 45 34 06.710 | 200.9 | 138 45 35 | 318 44 50 | Caples | 2053.9 | 3.312582 |
| | 122 43 48.544 | 1052.7 | 275 54 18 | 95 54 27 | R (U. S. E.) | 284.2 | 2.453552 |
| | | | 21 39 07 | 201 38 58 | Forty (U. S. E.) | 671.4 | 2.826998 |
| Swan Island Range rear light, 1913 | 45 34 04.628 | 142.9 | 20 58 48 | 200 58 32 | Scott | 1347.9 | 3.129662 |
| | 122 43 44.935 | 974.4 | 30 13 02 | 210 12 51 | Forty (U. S. E.) | 647.8 | 2.811425 |
| | | | 138 19 19 | 318 18 32 | Caples | 2153.9 | 3.333229 |
| Union Oil Co., white tank, knob, 1913. | 45 33 46.334 | 1430.4 | 166 20 49 | 346 20 32 | Caples | 2236.6 | 3.349590 |
| | 122 44 26.645 | 577.8 | 243 53 13 | 63 54 43 | T (U. S. E.) | 3057.6 | 3.485384 |
| | | | 328 40 55 | 148 41 09 | Scott | 812.1 | 2.909603 |
| Cement stack, 1913 | 45 34 30.612 | 945.1 | 3 35 29 | 183 35 26 | Forty (U. S. E.) | 1364.6 | 3.135018 |
| | 122 43 56.026 | 1214.8 | 6 41 57 | 186 41 49 | Scott | 2074.9 | 3.317003 |
| | | | 124 05 12 | 304 04 32 | Caples | 1439.0 | 3.158069 |
| Peninsula Lumber Co., stack, 1913 | 45 34 34.178 | 1055.2 | 350 45 41 | 170 45 50 | Forty (U. S. E.) | 1491.3 | 3.173576 |
| | 122 44 11.008 | 238.8 | 357 48 47 | 177 48 50 | Scott | 2172.4 | 3.336938 |
| | | | 128 46 20 | 308 45 51 | Caples | 1112.0 | 3.046123 |
| Fairmont Gas Co., stack, 1913 | 45 34 45.826 | 1414.8 | 252 26 30 | 72 27 05 | Caples | 1116.3 | 3.047796 |
| | 122 45 40.093 | 869.3 | 290 32 04 | 110 34 48 | P (U. S. E.) | 5347.1 | 3.728116 |
| | | | 294 35 22 | 114 36 51 | R (U. S. E.) | 2971.0 | 3.472901 |

[1] No check on this position.

*Mouth of the Columbia River to Portland*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| N. P. R. R. bridge light, center of draw,[1] 1913. | 45 34 38.30 | 1182.4 | 172 11 11 | 352 11 08 | Caples | 574.4 | 2.759236 |
| | 122 44 47.40 | 1027.7 | 302 47 26 | 122 48 17 | R (U. S. E.) | 1854.3 | 3.268186 |
| Portland woolen mills, red tank, 1913. | 45 35 20.589 | 635.6 | 316 26 32 | 136 28 42 | Forty-four (U. S. E.) | 5687.2 | 3.754900 |
| | 122 45 38.309 | 830.4 | 323 42 39 | 143 43 49 | Forty (U. S. E.) | 3603.5 | 3.556720 |
| | | | 331 15 21 | 151 16 26 | Scott | 4109.8 | 3.613823 |
| Red tank on bluff, spindle,[1] 1913 | 45 34 31.08 | 959.5 | 24 41 28 | 204 40 57 | Scott | 2283.9 | 3.358674 |
| | 122 43 23.20 | 503.0 | 30 05 13 | 210 04 47 | Forty (U. S. E.) | 1590.6 | 3.201561 |
| University flagstaff,[1] 1913 | 45 34 20.11 | 620.8 | 257 53 15 | 77 54 01 | T (U. S. E.) | 1441.5 | 3.158800 |
| | 122 43 25.02 | 542.5 | 318 57 34 | 138 57 56 | F (U. S. E.) | 1025.6 | 3.010975 |
| Windmill on bluff,[1] 1913 | 45 34 32.09 | 990.7 | 22 21 33 | 202 21 18 | F (U. S. E.) | 1236.4 | 3.092143 |
| | 122 42 32.28 | 699.9 | 59 20 31 | 239 19 46 | R (U. S. E.) | 1593.9 | 3.202448 |
| Round barn,[1] 1913 | 45 33 21.20 | 654.5 | 127 00 58 | 307 00 54 | Scott | 136.2 | 2.134324 |
| | 122 44 02.17 | 47.1 | 183 30 03 | 3 30 04 | Forty (U. S. E.) | 782.3 | 2.893368 |
| Large red tank with pole,[1] 1913 | 45 32 44.81 | 1383.4 | 113 38 35 | 293 37 04 | Scott | 3007.6 | 3.478221 |
| | 122 42 00.16 | 3.5 | 137 43 27 | 317 41 25 | Caples | 5505.8 | 3.740818 |
| Portland tall building weather vane,[1] 1913. | 45 32 00.31 | 9.6 | 131 33 57 | 311 32 21 | Scott | 3888.8 | 3.589818 |
| | 122 41 53.04 | 1150.9 | 144 41 39 | 324 39 32 | Caples | 6675.6 | 3.824493 |
| White tank, inshore one of two, 1913 | 45 35 12.629 | 389.9 | 321 05 44 | 141 07 28 | Forty-four (U. S. E.) | 4980.9 | 3.697308 |
| | 122 45 01.850 | 40.1 | 333 13 09 | 153 13 53 | Forty (U. S. E.) | 2978.5 | 3.473997 |
| | | | 340 33 08 | 160 33 47 | Scott | 3561.0 | 3.551575 |
| St. Johns Lumber Co., inshore stack, 1913. | 45 35 06.209 | 191.7 | 290 09 54 | 110 10 21 | Caples | 857.7 | 2.933314 |
| | 122 45 28.135 | 609.9 | 322 11 08 | 142 12 11 | Forty (U. S. E.) | 3118.7 | 3.493972 |
| | | | 330 57 47 | 150 58 45 | Scott | 3617.3 | 3.558383 |
| St. Johns Lumber Co., tank, 1913 | 45 35 07.460 | 230.3 | 315 25 45 | 135 27 47 | Forty-four (U. S. E.) | 5216.6 | 3.717388 |
| | 122 45 26.414 | 572.6 | 323 07 32 | 143 08 34 | Forty (U. S. E.) | 3124.3 | 3.494752 |
| | | | 331 45 00 | 151 45 57 | Scott | 3630.6 | 3.559976 |
| Standard Oil Co., white tank,[1] 1913 | 45 33 52.20 | 1611.6 | 248 27 14 | 68 28 50 | T (U. S. E.) | 3171.5 | 3.501271 |
| | 122 44 36.08 | 782.5 | 324 23 23 | 144 23 44 | Scott | 1076.1 | 3.031858 |
| St. Johns High School,[1] 1913 | 45 35 23.15 | 714.7 | 329 08 45 | 149 09 44 | Forty (U. S. E.) | 3475.7 | 3.541037 |
| | 122 45 22.16 | 480.4 | 336 10 30 | 156 11 24 | Scott | 4025.7 | 3.604838 |
| St. Johns Fire Hall, flagstaff,[1] 1913 | 45 35 22.34 | 689.7 | 330 17 08 | 150 18 04 | Forty (U. S. E.) | 3406.5 | 3.532312 |
| | 122 45 17.83 | 386.5 | 336 16 13 | 157 17 04 | Scott | 3965.4 | 3.598288 |
| Crest, 1913 | 45 29 57.927 | 1788.3 | 181 51 02.5 | 1 51 11.3 | River | 8369.9 | 3.922718 |
| | 122 42 26.377 | 572.6 | 225 04 51.6 | 45 06 08.2 | Oregonian | 3292.1 | 3.517473 |
| Mills, 1913 | 45 32 16.488 | 509.0 | 332 21 08.5 | 152 21 42.1 | Oregonian | 2205.3 | 3.343471 |
| | 122 41 26.118 | 566.7 | 17 00 22.4 | 196 59 39.4 | Crest | 4473.2 | 3.650618 |
| | | | 165 46 31.4 | 345 45 57.2 | River | 4217.1 | 3.625018 |
| Federal east wireless, 1913 | 45 28 15.279 | 471.7 | 105 55 48.7 | 285 49 42.9 | Crest | 11582.0 | 4.063784 |
| | 122 33 53.411 | 1160.2 | 121 59 47.1 | 301 54 57.8 | Oregonian | 10378.7 | 4.016141 |
| | | | 127 11 45.8 | 307 06 22.9 | Mills | 12330.6 | 4.090985 |
| Federal west wireless, 1913 | 45 28 15.237 | 470.4 | 106 08 31.9 | 286 02 31.0 | Crest | 11437.5 | 4.058331 |
| | 122 34 00.350 | 7.6 | 122 26 50.8 | 302 22 06.4 | Oregonian | 10251.8 | 4.010801 |
| | | | 127 37 37.2 | 307 32 19.2 | Mills | 12211.7 | 4.086775 |
| Y. M. C. A. east wireless, Portland,[1] 1913. | 45 31 06.346 | 195.9 | 156 31 44.5 | 336 31 13.6 | Mills | 2360.9 | 3.373075 |
| | 122 40 42.779 | 928.5 | 201 19 47.8 | 21 19 50.5 | Oregonian | 227.5 | 2.356931 |
| Y. M. C. A. west wireless, Portland,[1] 1913. | 45 31 07.046 | 217.5 | 157 28 17.2 | 337 27 48.0 | Mills | 2321.0 | 3.365682 |
| | 122 40 45.131 | 979.6 | 215 06 37.1 | 35 06 41.5 | Oregonian | 232.6 | 2.366578 |
| Journal spire, 1913 | 45 31 08.123 | 250.8 | 45 39 44.0 | 225 38 31.1 | Crest | 3100.3 | 3.491402 |
| | 122 40 44.245 | 960.3 | 156 42 40.1 | 336 42 10.2 | Mills | 2297.9 | 3.361328 |
| | | | 162 35 10.7 | 342 34 06.6 | River | 6496.4 | 3.812673 |
| | | | 216 06 57.3 | 36 07 01.0 | Oregonian | 194.3 | 2.288575 |
| Old Garbage Plant, chimney, 1913 | 45 32 32.126 | 991.8 | 327 14 01.5 | 147 14 11.7 | Mills | 574.1 | 2.759021 |
| | 122 41 40.440 | 877.3 | 331 17 36.4 | 151 18 20.2 | Oregonian | 2777.7 | 3.443677 |
| | | | 11 49 58.1 | 191 49 25.3 | Crest | 4863.8 | 3.686977 |
| Columbia Flour Mills, water tank, 1913. | 45 33 17.272 | 533.2 | 8 11 19.2 | 188 10 50.1 | Crest | 6217.6 | 3.793624 |
| | 122 41 45.588 | 988.9 | 164 28 43.7 | 344 28 23.4 | River | 2294.9 | 3.360768 |
| | | | 339 19 03.1 | 159 19 50.6 | Oregonian | 4093.8 | 3.612128 |

[1] No check on this position.

*Columbia River from the mouth of the Willamette River to the Cascade Locks.*

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points.* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Shaw, 1889 | 45 36 36.677 | 1132.3 | 245 05 05.8 | 65 06 44.6 | Harney | 3303.7 | 3.519004 |
| | 122 40 11.844 | 256.7 | 310 30 31.8 | 130 35 01.4 | Rocky Butte | 10772.0 | 4.032296 |
| Stansbury, 1889 | 45 34 31.018 | 957.6 | 193 53 20.4 | 13 54 03.4 | Harney | 5429.4 | 3.734753 |
| | 122 38 53.697 | 1164.3 | 295 39 21.9 | 115 42 55.7 | Rocky Butte | 7205.1 | 3.857642 |
| Wintler, 1889 | 45 36 55.201 | 1704.2 | 337 48 52.6 | 157 50 34.3 | Rocky Butte | 8179.1 | 3.912705 |
| | 122 36 16.673 | 361.3 | 37 24 58.6 | 217 23 06.4 | Stansbury | 5603.4 | 3.748450 |
| | | | 83 37 12.0 | 263 34 23.9 | Shaw | 5127.6 | 3.709914 |
| Lower Point, 1889 | 45 35 41.492 | 1281.0 | 354 08 53.4 | 174 09 11.3 | Rocky Butte | 5326.5 | 3.726439 |
| | 122 34 19.337 | 419.1 | 131 50 16.0 | 311 48 52.2 | Wintler | 3412.3 | 3.533052 |
| Hexter, 1889 | 45 36 19.075 | 588.9 | 3 48 51.0 | 183 48 36.8 | Rocky Butte | 6473.3 | 3.811128 |
| | 122 33 34.453 | 746.6 | 39 58 48.5 | 219 58 16.4 | Lower Point | 1514.1 | 3.180159 |
| | | | 64 17 37.8 | 244 13 49.6 | Stansbury | 7682.2 | 3.885487 |
| Jungle, 1889 | 45 36 24.261 | 749.0 | 103 30 22.3 | 283 29 29.7 | Shaw | 1642.2 | 3.215418 |
| | 122 38 58.155 | 1260.4 | 218 16 06.3 | 38 16 52.5 | Harney | 2260.2 | 3.354150 |
| Quartermasters Wharf, 1889 | 45 37 15.229 | 470.2 | 266 07 11.5 | 86 08 49.5 | Harney | 2078.5 | 3.474000 |
| | 122 40 10.710 | 232.1 | 315 01 09.3 | 135 02 01.1 | Jungle | 2224.3 | 3.347190 |
| | | | 1 10 58.0 | 181 10 57.2 | Shaw | 1190.5 | 3.075715 |
| Rauer, 1889 | 45 37 35.003 | 1080.6 | 285 08 49.0 | 105 10 03.3 | Quartermasters Wharf | 2334.9 | 3.368263 |
| | 122 41 54.739 | 1185.8 | 308 55 09.2 | 128 56 22.7 | Shaw | 2865.7 | 3.457232 |
| Sisters farm, 1889 | 45 37 58.564 | 1808.0 | 322 05 51.7 | 142 06 56.6 | Shaw | 3203.5 | 3.505631 |
| | 122 41 42.665 | 923.9 | 19 46 37.4 | 199 46 28.8 | Rauer | 773.0 | 2.888169 |
| Allman, 1889 | 45 38 37.375 | 1153.9 | 302 33 43.0 | 122 34 44.9 | Sisters farm | 2225.9 | 3.347513 |
| | 122 43 09.278 | 200.9 | 320 01 00.7 | 140 01 54.0 | Rauer | 2512.9 | 3.400181 |
| Hayden, 1889 | 45 38 10.567 | 326.2 | 218 41 19.6 | 38 41 41.5 | Allman | 1060.5 | 3.025502 |
| | 122 43 39.888 | 863.9 | 278 17 32.7 | 98 18 56.5 | Sisters farm | 2565.9 | 3.409238 |
| Hood, 1891 | 45 35 02.674 | 82.6 | 29 23 30.6 | 209 22 14.6 | Rocky Butte | 4705.6 | 3.672611 |
| | 122 32 07.846 | 170.1 | 141 29 37.8 | 321 28 35.9 | Hexter | 3014.5 | 3.479219 |
| Prune Hill, 1891 | 45 34 59.249 | 1829.2 | 64 59 29.3 | 244 54 47.9 | Rocky Butte | 9435.1 | 3.974748 |
| | 122 27 20.144 | 436.7 | 90 59 58.9 | 270 56 33.4 | Hood | 6238.0 | 3.795047 |
| Mays, 1891 | 45 34 19.266 | 594.8 | 34 32 37.9 | 214 31 35.4 | Rocky Butte | 3350.6 | 3.525125 |
| | 122 32 26.721 | 579.4 | 134 01 41.3 | 313 58 57.0 | Wintler | 6929.6 | 3.840707 |
| Taggarts Bluff, 1891 | 45 33 30.929 | 954.9 | 81 08 46.4 | 261 04 19.6 | Rocky Butte | 8203.5 | 3.913998 |
| | 122 27 40.649 | 881.8 | 103 33 13.1 | 283 29 48.7 | Mays | 6380.8 | 3.804873 |
| | | | 189 15 33.4 | 9 15 48.0 | Prune Hill | 2762.7 | 3.441335 |
| Fisher, 1891 | 45 35 22.597 | 697.6 | 279 29 59.1 | 99 32 20.6 | Prune Hill | 4358.5 | 3.639337 |
| | 122 30 38.431 | 833.1 | 42 01 51.6 | 221 59 31.7 | Rocky Butte | 6346.3 | 3.802522 |
| | | | 72 24 11.1 | 252 23 07.2 | Hood | 2033.6 | 3.308259 |
| Harlow, 1891 | 45 32 27.941 | 862.6 | 92 41 37.6 | 272 33 32.2 | Rocky Butte | 14768.6 | 4.169340 |
| | 122 22 34.257 | 743.2 | 127 01 24.4 | 306 58 00.3 | Prune Hill | 7762.9 | 3.890024 |
| Daniels, 1891 | 45 34 58.377 | 1802.2 | 312 20 39.4 | 132 23 27.1 | Harlow | 6891.9 | 3.838341 |
| | 122 26 29.048 | 629.8 | 67 42 23.0 | 247 37 05.1 | Rocky Butte | 10439.3 | 4.018671 |
| Washougal, 1891 | 45 34 41.118 | 1269.4 | 26 55 09.0 | 206 54 00.3 | Harlow | 4610.8 | 3.663774 |
| | 122 20 58.040 | 1258.3 | 94 16 45.2 | 274 12 48.8 | Daniels | 7196.1 | 3.857097 |
| Eagles Bluff, 1891 | 45 32 32.576 | 1005.7 | 124 15 16.3 | 304 11 38.4 | Daniels | 8003.2 | 3.903265 |
| | 122 21 23.918 | 518.9 | 188 02 49.8 | 8 03 08.3 | Washougal | 4007.9 | 3.602922 |
| Mount Pleasant, 1891 | 45 33 46.256 | 1428.0 | 72 47 53.3 | 252 43 52.0 | Eagles Bluff | 7677.1 | 3.885195 |
| | 122 15 45.882 | 995.0 | 99 08 06.2 | 279 00 26.8 | Daniels | 14122.5 | 4.149912 |
| | | | 104 04 46.2 | 284 01 03.3 | Washougal | 6977.6 | 3.843704 |
| | | | 85 53 24.6 | 265 40 27.5 | Rocky Butte | 23672.0 | 4.374235 |
| Remington, 1891 | 45 35 05.605 | 173.0 | 274 59 18.3 | 95 00 32.2 | Prune Hill | 2252.2 | 3.352604 |
| | 122 29 03.037 | 78.8 | 56 24 38.6 | 236 21 11.1 | Rocky Butte | 7569.3 | 3.879058 |
| Government Island, 1891 | 45 34 31.743 | 980.0 | 125 11 01.0 | 305 10 12.1 | Remington | 1814.6 | 3.258788 |
| | 122 27 55.223 | 1197.4 | 221 50 42.5 | 41 51 07.5 | Prune Hill | 1140.0 | 3.056892 |
| Quarry, 1891 | 45 35 03.054 | 94.3 | 275 08 36.5 | 95 09 19.4 | Prune Hill | 1309.1 | 3.116959 |
| | 122 28 20.283 | 439.7 | 330 39 32.0 | 150 39 49.9 | Government Island | 1108.9 | 3.044889 |
| | | | 94 47 37.6 | 274 47 06.6 | Remington | 943.1 | 2.974576 |
| Ladys Island, 1891 | 45 34 22.952 | 708.6 | 109 10 04.6 | 289 08 20.8 | Daniels | 3333.3 | 3.522880 |
| | 122 24 03.810 | 82.7 | 262 03 18.0 | 82 05 30.7 | Washougal | 4066.9 | 3.609260 |
| | | | 331 18 34.0 | 151 19 37.9 | Harlow | 4047.3 | 3.607165 |
| Brush, 1901 | 45 32 07.830 | 241.7 | 162 03 02.9 | 342 02 12.4 | Washougal | 4974.7 | 3.696770 |
| | 122 19 47.330 | 1026.9 | 239 51 18.5 | 59 54 10.8 | Mount Pleasant | 6055.2 | 3.782129 |
| Cliff, 1901 | 45 32 24.726 | 763.4 | 85 36 00.0 | 265 32 18.6 | Brush | 6751.9 | 3.829425 |
| | 122 14 37.065 | 804.1 | 117 02 30.5 | 296 57 58.6 | Washougal | 9273.8 | 3.967260 |
| | | | 149 20 13.3 | 329 19 24.2 | Mount Pleasant | 2926.4 | 3.466334 |
| Grout, 1901 | 45 33 45.749 | 1412.4 | 335 49 22.8 | 155 49 59.7 | Cliff | 2741.8 | 3.438039 |
| | 122 15 28.823 | 625.1 | 61 41 48.3 | 241 38 43.8 | Brush | 6370.6 | 3.804177 |
| | | | 103 29 55.4 | 283 26 00.4 | Washougal | 7340.6 | 3.865730 |

*Columbia River from the mouth of the Willamette River to the Cascade Locks*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Shepard, 1901 | 45 32 51.460 | 1588.7 | 77 34 15.9 | 257 32 12.8 | Cliff | 3829.6 | 3.583157 |
| | 122 11 44.687 | 969.4 | 109 02 39.8 | 288 59 59.8 | Grout | 5142.3 | 3.711160 |
| Mount Zion, 1901 | 45 34 52.151 | 1610.0 | 347 14 11.7 | 167 14 39.5 | Shepard | 3820.4 | 3.582110 |
| | 122 12 23.595 | 511.5 | 32 28 10.1 | 212 26 34.8 | Cliff | 5394.0 | 3.731907 |
| | | | 62 58 42.0 | 242 56 29.7 | Grout | 4509.3 | 3.654113 |
| Angel, 1901 | 45 34 14.020 | 432.8 | 51 10 54.4 | 231 09 10.2 | Shepard | 4064.8 | 3.609043 |
| | 122 09 18.692 | 405.4 | 106 22 57.4 | 286 20 45.4 | Mount Zion | 4178.4 | 3.621005 |
| Twin Mountain, 1901 | 45 35 47.928 | 1479.6 | 6 31 19.5 | 186 31 08.6 | Angel | 2918.1 | 3.465098 |
| | 122 09 03.406 | 73.8 | 32 42 45.4 | 212 40 50.3 | Shepard | 6473.9 | 3.811165 |
| | | | 68 22 33.2 | 248 20 10.2 | Mount Zion | 4668.7 | 3.669194 |
| Railroad, 1901 | 45 34 32.100 | 991.0 | 56 42 10.5 | 236 41 42.5 | Angel | 1016.7 | 3.007176 |
| | 122 08 39.504 | 856.6 | 97 16 59.8 | 277 14 19.8 | Mount Zion | 4897.8 | 3.690004 |
| | | | 167 31 18.2 | 347 31 01.1 | Twin Mountain | 2397.7 | 3.379792 |
| Oneonta, 1901 | 45 35 20.430 | 630.7 | 74 15 18.0 | 254 12 23.9 | Railroad | 5490.4 | 3.739602 |
| | 122 04 35.784 | 775.7 | 98 21 09.4 | 278 17 58.2 | Twin Mountain | 5862.6 | 3.768094 |
| | | | 148 31 25.1 | 328 30 32.0 | Bluff | 3085.6 | 3.489342 |
| Bluff, 1901 | 45 36 45.662 | 1409.7 | 41 41 39.5 | 221 39 38.5 | Railroad | 5520.8 | 3.741999 |
| | 122 05 50.140 | 1086.5 | 66 57 56.7 | 246 55 38.6 | Twin Mountain | 4551.8 | 3.658180 |
| Lookout, 1901 | 45 37 35.640 | 1100.3 | 28 08 01.1 | 208 06 47.5 | Oneonta | 4733.2 | 3.675151 |
| | 122 02 52.826 | 1144.4 | 68 08 05.4 | 248 05 58.7 | Bluff | 4139.8 | 3.616983 |
| Dodson, 1901 | 45 36 38.813 | 1198.3 | 58 28 41.4 | 238 26 31.4 | Oneonta | 4626.2 | 3.665221 |
| | 122 01 33.862 | 733.8 | 92 12 22.6 | 272 09 19.5 | Bluff | 5557.1 | 3.744851 |
| | | | 135 43 44.4 | 315 42 48.0 | Lookout | 2450.5 | 3.389252 |
| Warren, 1901 | 45 36 51.863 | 1601.3 | 73 57 22.9 | 253 56 36.7 | Dodson | 1457.2 | 3.163518 |
| | 122 00 29.232 | 633.3 | 113 29 48.0 | 293 28 05.4 | Lookout | 3391.9 | 3.530437 |
| Climb, 1901 | 45 38 42.631 | 1316.1 | 0 22 40.3 | 180 22 39.5 | Warren | 3419.8 | 3.534007 |
| | 122 00 28.191 | 610.5 | 20 25 07.5 | 200 24 20.5 | Dodson | 4078.8 | 3.610529 |
| | | | 56 34 50.9 | 236 33 07.5 | Lookout | 3753.8 | 3.574472 |
| Bonneville, 1901 | 45 37 39.542 | 1218.0 | 68 06 22.8 | 248 04 22.3 | Warren | 3937.3 | 3.595202 |
| | 121 57 40.619 | 879.9 | 118 16 17.3 | 298 14 17.5 | Climb | 4120.3 | 3.614931 |
| Aldrich, 1901 | 45 39 14.398 | 444.6 | 334 53 31.3 | 154 54 16.6 | Bonneville | 3237.0 | 3.510144 |
| | 121 58 44.027 | 953.2 | 27 23 11.5 | 207 21 56.2 | Warren | 4955.5 | 3.695089 |
| | | | 66 30 35.1 | 246 29 20.6 | Climb | 2459.5 | 3.390852 |
| Moffat, 1901 | 45 40 24.607 | 759.7 | 16 01 38.5 | 196 00 50.1 | Bonneville | 5304.9 | 3.724678 |
| | 121 56 33.005 | 714.3 | 52 37 32.4 | 232 35 58.7 | Aldrich | 3569.8 | 3.552645 |
| Cascade, 1901 | 45 39 34.610 | 1068.5 | 59 36 14.0 | 239 32 54.1 | Bonneville | 7020.8 | 3.846388 |
| | 121 53 01.062 | 23.0 | 85 13 49.6 | 265 09 44.3 | Aldrich | 7451.7 | 3.872253 |
| | | | 108 36 58.7 | 288 34 27.1 | Moffat | 4840.6 | 3.684903 |
| End, 1901 | 45 41 25.779 | 795.9 | 40 10 06.3 | 220 08 30.6 | Cascade | 4490.6 | 3.652302 |
| | 121 50 47.270 | 1022.8 | 75 52 05.4 | 255 47 58.1 | Moffat | 7716.8 | 3.887436 |
| Stackhouse, 1901 | 45 42 31.794 | 981.6 | 336 47 19.6 | 156 47 48.5 | End | 2217.6 | 3.345875 |
| | 121 51 27.662 | 598.4 | 20 17 17.4 | 200 16 10.6 | Cascade | 5831.8 | 3.765799 |
| | | | 59 18 21.5 | 239 14 43.0 | Moffat | 7685.7 | 3.885684 |
| Bradford, 1901 | 45 38 09.396 | 290.1 | 99 34 46.4 | 279 31 25.0 | Climb | 6183.4 | 3.791230 |
| | 121 55 46.634 | 1010.1 | 117 36 00.6 | 297 33 53.7 | Aldrich | 4334.1 | 3.636901 |
| | | | 66 28 50.9 | 346 28 17.7 | Moffat | 4293.4 | 3.632806 |
| Locks, 1901 | 45 40 18.024 | 556.4 | 36 15 53.2 | 216 14 17.0 | Bradford | 4924.4 | 3.692352 |
| | 121 53 32.146 | 695.8 | 92 59 23.2 | 272 57 13.8 | Moffat | 3919.9 | 3.593278 |
| | | | 213 06 02.0 | 33 07 30.9 | Stackhouse | 4930.7 | 3.692908 |
| | | | 333 20 24.1 | 153 20 46.2 | Cascade | 1499.8 | 3.176026 |
| *Supplementary points.* | | | | | | | |
| Vancouver Episcopal Church,[1] 1889 | 45 37 35.59 | 1098.8 | 312 44 47 | 132 45 52 | Shaw | 2679.2 | 3.428006 |
| | 122 41 42.64 | 923.7 | 86 02 35 | 266 02 27 | Rauer | 262.6 | 2.419323 |
| Lucca Mill, pipe,[1] 1889 | 45 37 38.35 | 1184.0 | 327 05 02 | 147 05 43 | Shaw | 2268.1 | 3.355654 |
| | 122 41 08.72 | 188.9 | 84 05 01 | 264 04 28 | Rauer | 1002.2 | 3.000947 |
| Sawmill, pipe, 1889 | 45 37 28.016 | 864.9 | 337 34 54.4 | 157 35 15.9 | Shaw | 1714.5 | 3.234147 |
| | 122 40 42.019 | 910.2 | 97 48 15.5 | 277 47 23.5 | Rauer | 1590.0 | 3.201404 |
| Vancouver St. James Church,[1] 1889 | 45 37 51.57 | 1592.1 | 355 36 20 | 175 36 26 | Shaw | 2319.0 | 3.365309 |
| | 122 40 20.04 | 434.1 | 76 00 25 | 255 59 18 | Rauer | 2114.1 | 3.325120 |
| Vancouver Presbyterian Church,[1] 1889 | 45 37 46.02 | 1420.8 | 351 05 43 | 171 05 54 | Shaw | 2167.0 | 3.335852 |
| | 122 40 27.32 | 591.8 | 79 49 30 | 259 48 28 | Rauer | 1923.9 | 3.284182 |
| Railroad depot, northwest gable, 1889 | 45 36 26.189 | 808.6 | 114 03 41.8 | 294 03 17.9 | Shaw | 794.3 | 2.899979 |
| | 122 39 38.373 | 831.6 | 155 10 10.5 | 335 09 47.4 | Quartermasters Wharf | 1668.3 | 3.222268 |
| | | | 232 56 17.7 | 52 57 32.6 | Harney | 2846.1 | 3.454250 |
| Vancouver lower flagstaff, 1889 | 45 37 37.925 | 1170.8 | 282 40 44.4 | 102 41 57.6 | Harney | 2275.6 | 3.357091 |
| | 122 39 36.016 | 780.2 | 340 09 43.5 | 160 10 10.5 | Jungle | 2417.7 | 3.383395 |
| | | | 19 41 05.0 | 199 39 00.2 | Balch | 11256.9 | 4.051420 |
| | | | 22 19 18.7 | 202 18 53.1 | Shaw | 2044.0 | 3.310490 |

[1] No check on this position.

*Columbia River from the mouth of the Willamette River to the Cascade Locks*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Vancouver upper flagstaff, 1889 | 45 37 34.619 | 1068.8 | 283 02 01.0 | 103 02 57.6 | Harney | 1762.8 | 3.246207 |
| | 122 39 12.813 | 277.6 | 35 34 09.1 | 215 33 26.9 | Shaw | 2199.0 | 3.342229 |
| | | | 64 29 29.3 | 244 28 47.9 | Quartermasters Wharf | 1389.8 | 3.142954 |
| Deaf and Dumb School, 1889 | 45 37 30.095 | 929.1 | 295 26 09.0 | 115 26 26.9 | Harney | 600.9 | 2.778785 |
| | 122 38 18.586 | 402.7 | 27 51 04.6 | 207 48 04.5 | Balch | 11712.9 | 4.068663 |
| | | | 56 06 26.7 | 236 05 05.8 | Shaw | 2956.5 | 3.470783 |
| | | | 79 18 42.1 | 259 17 22.0 | Quartermasters Wharf | 2472.0 | 3.393053 |
| Marked tree, No. 1, 1889 | 45 36 05.689 | 175.6 | 105 40 29.4 | 285 39 22.0 | Jungle | 2123.5 | 3.327049 |
| | 122 37 23.808 | 516.0 | 120 42 42.5 | 300 40 43.3 | Quartermasters Wharf | 4205.8 | 3.623844 |
| | | | 164 39 33.4 | 344 39 12.2 | Harney | 2434.5 | 3.386417 |
| Stenger,[1] 1889 | 45 36 35.23 | 1087.6 | 352 03 09 | 172 03 41 | Rocky Butte | 7025.2 | 3.846656 |
| | 122 34 39.08 | 846.8 | 55 13 57 | 235 10 55 | Stansbury | 6720.5 | 3.827402 |
| House, chimney,[1] 1889 | 45 35 16.79 | 518.4 | 152 23 54 | 332 23 02 | Wintler | 3428.6 | 3.535122 |
| | 122 35 03.36 | 72.8 | 231 31 40 | 51 22 12 | Lower Point | 1221.5 | 3.086890 |
| Fishers's wharf, southeast pile,[1] 1891 | 45 35 14.50 | 447.6 | 277 06 07 | 97 08 11 | Prune Hill | 3799.1 | 3.579682 |
| | 122 30 14.04 | 304.4 | 46 56 59 | 226 54 22 | Rocky Butte | 6538.7 | 3.815491 |
| Bartlett's barn, north gable, 1891 | 45 34 33.230 | 1025.9 | 130 39 42.6 | 310 39 04.3 | Remington | 1534.1 | 3.185859 |
| | 122 28 09.055 | 215.8 | 166 19 58.6 | 346 19 51.2 | Quarry | 947.6 | 2.976625 |
| | | | 223 21 11.6 | 53 21 47.1 | Prune Hill | 1345.9 | 3.129025 |
| Lever's house, east gable,[1] 1891 | 45 34 36.64 | 1131.2 | 150 04 29 | 330 04 12 | Remington | 1031.7 | 3.013554 |
| | 122 28 39.89 | 864.9 | 207 32 18 | 27 32 32 | Quarry | 919.6 | 2.963592 |
| Fairview, cupola,[1] 1891 | 45 32 24.55 | 757.9 | 161 55 57 | 341 55 05 | Prune Hill | 5023.9 | 3.701040 |
| | 122 26 08.27 | 179.4 | 268 41 14 | 88 43 47 | Harlow | 4644.4 | 3.666929 |
| Washougal Hall, flagstaff, 1891 | 45 34 42.128 | 1300.6 | 275 16 52.7 | 95 17 04.0 | Washougal | 338.7 | 2.529868 |
| | 122 21 13.598 | 294.8 | 3 12 14.7 | 183 12 07.4 | Eagles Bluff | 4005.9 | 3.602700 |
| | | | 22 54 04.1 | 202 53 06.6 | Harlow | 4496.9 | 3.652916 |
| | | | 94 13 35.2 | 274 09 49.9 | Daniels | 6857.4 | 3.836160 |
| Washougal Schoolhouse, 1901 | 45 34 45.388 | 1401.2 | 298 24 42.8 | 118 29 06.6 | Cliff | 9116.1 | 3.959807 |
| | 122 20 46.632 | 1011.0 | 345 10 58.1 | 165 11 40.5 | Brush | 5031.4 | 3.701689 |
| | | | 61 57 07.8 | 241 56 59.7 | Washougal | 280.3 | 2.447563 |
| Gibbons Creek, 1891 | 45 34 17.306 | 534.3 | 44 32 31.3 | 224 30 46.6 | Eagles Bluff | 4535.3 | 3.656608 |
| | 122 18 57.284 | 1242.1 | 105 41 44.7 | 285 40 18.5 | Washougal | 2719.5 | 3.434496 |
| | | | 282 59 08.1 | 103 01 24.7 | Mount Pleasant | 4259.9 | 3.629397 |
| Gibbons Creek Church,[1] 1901 | 45 34 31.96 | 986.8 | 305 05 51 | 125 08 55 | Cliff | 6827.6 | 3.834271 |
| | 122 18 54.54 | 1182.7 | 14 26 03 | 194 25 25 | Brush | 4594.7 | 3.662258 |
| Williams, 1891 | 45 32 17.848 | 551.0 | 149 45 21.4 | 329 43 56.5 | Washougal | 5120.7 | 3.709328 |
| | 122 18 59.079 | 1281.8 | 236 56 23.3 | 56 56 37.1 | Mount Pleasant | 5001.2 | 3.699078 |
| Chamberlain's barn, 1901 | 45 32 06.593 | 203.5 | 95 22 49.6 | 275 22 36.3 | Brush | 407.3 | 2.609892 |
| | 122 19 28.642 | 621.5 | 157 53 23.0 | 337 52 19.2 | Washougal | 5149.6 | 3.711774 |
| | | | 237 29 29.1 | 57 32 08.1 | Mount Pleasant | 5728.6 | 3.758050 |
| Big barn, east gable, 1901 | 45 32 19.304 | 596.0 | 136 02 17.7 | 315 59 58.6 | Washougal | 6084.4 | 3.784219 |
| | 122 17 43.232 | 938.0 | 223 28 02.1 | 43 29 25.8 | Mount Pleasant | 3699.4 | 3.568133 |
| | | | 227 31 01.1 | 47 32 37.0 | Grout | 3952.6 | 3.596832 |
| Corbett, 1901 | 45 32 32.474 | 1002.6 | 220 24 01.1 | 40 25 04.9 | Mount Pleasant | 2991.6 | 3.475897 |
| | 122 17 15.285 | 331.6 | 225 34 44.0 | 45 36 00.0 | Grout | 3232.7 | 3.509567 |
| | | | 273 58 13.0 | 94 00 05.9 | Cliff | 3441.0 | 3.536680 |
| Tunnel Point, tree, 1901 | 45 32 35.528 | 1096.9 | 210 56 00.3 | 30 56 43.1 | Grout | 2527.6 | 3.402701 |
| | 122 16 28.733 | 623.4 | 265 24 29.3 | 85 27 52.1 | Shepard | 6181.6 | 3.791103 |
| | | | 277 49 37.5 | 97 50 57.2 | Cliff | 2445.5 | 3.388368 |
| Rooster Rock, 1901 | 45 32 38.867 | 1199.9 | 81 16 51 | 261 13 26 | Brush | 6300.5 | 3.799375 |
| | 122 15 00.308 | 6.7 | 115 58 37 | 295 54 22 | Washougal | 8627.7 | 3.935897 |
| | | | 154 35 23 | 334 34 51 | Mount Pleasant | 2303.4 | 3.362368 |
| | | | 163 19 35 | 343 19 15 | Grout | 2155.5 | 3.333552 |
| Middle fish wheel, 1901 | 45 33 29.133 | 899.4 | 285 27 25.0 | 105 29 43.3 | Shepard | 4358.7 | 3.639357 |
| | 122 14 58.347 | 1205.5 | 346 55 37.7 | 166 55 52.9 | Cliff | 2041.3 | 3.309909 |
| | | | 68 12 28.6 | 248 09 02.4 | Brush | 6752.8 | 3.829483 |
| Lower fish wheel, 1901 | 45 33 25.536 | 788.4 | 281 18 34.3 | 101 21 27.1 | Shepard | 5353.3 | 3.728623 |
| | 122 15 46.672 | 1012.2 | 321 11 02.8 | 141 11 52.5 | Cliff | 2409.3 | 3.381884 |
| | | | 65 20 39.0 | 245 17 47.3 | Brush | 5745.5 | 3.759328 |
| Small white barn, north gable, 1901 | 45 32 23.457 | 724.2 | 183 39 56.5 | 3 40 01.9 | Grout | 2545.8 | 3.405823 |
| | 122 15 36.328 | 788.1 | 222 18 02.2 | 42 20 19.8 | Mount Zion | 6208.5 | 3.792990 |
| | | | 260 12 57.0 | 80 15 42.4 | Shepard | 5099.2 | 3.707498 |
| White house chimney, small,[1] 1901 | 45 33 50.79 | 1568.2 | 1 35 26 | 181 35 24 | Cliff | 2658.2 | 3.424584 |
| | 122 14 33.66 | 730.1 | 64 59 23 | 244 55 39 | Brush | 7510.0 | 3.875638 |
| Big barn, south gable,[1] 1901 | 45 33 55.68 | 1718.9 | 303 46 23 | 123 48 01 | Shepard | 3565.1 | 3.552070 |
| | 122 14 01.30 | 28.1 | 15 26 58 | 195 26 33 | Cliff | 2913.1 | 3.464359 |
| Mount Pleasant Church, 1901 | 45 33 50.419 | 1556.5 | 226 23 33.4 | 46 24 39.3 | Mount Zion | 2763.7 | 3.441493 |
| | 122 13 55.899 | 1212.3 | 302 35 20.9 | 122 36 54.6 | Shepard | 3378.3 | 3.528694 |
| | | | 16 39 17.4 | 198 38 48.0 | Cliff | 2792.2 | 3.445948 |

[1] No check on this position.

*Columbia River from the mouth of the Willamette River to the Cascade Locks*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Upper fish wheel, 1901 | 45 33 32.652 | 1008.0 | 296 35 41.3 | 116 37 04.9 | Shepard | 2839.5 | 3.453247 |
| | 122 13 41.734 | 905.2 | 29 47 23.9 | 209 46 44.4 | Cliff | 2416.3 | 3.383144 |
| | | | 71 45 49.0 | 251 41 28.1 | Brush | 8352.0 | 3.921792 |
| Red barn, cupola, 1901 | 45 32 23.395 | 722.3 | 135 37 02.7 | 315 35 40.8 | Grout | 3558.2 | 3.551228 |
| | 122 13 34.066 | 739.1 | 198 24 01.5 | 18 25 51.8 | Mount Zion | 4840.1 | 3.684858 |
| | | | 249 55 49.8 | 69 57 07.9 | Shepard | 2526.1 | 3.402459 |
| Barn, west gable, 1901 | 45 33 55.072 | 1700.2 | 313 20 03.2 | 133 21 11.7 | Shepard | 2861.2 | 3.456552 |
| | 122 13 20.624 | 447.2 | 30 44 14.6 | 210 43 20.0 | Cliff | 3244.9 | 3.511195 |
| | | | 68 29 58.0 | 248 25 22.0 | Brush | 9018.1 | 3.955115 |
| Sawmill, stack, 1901 | 45 32 32.016 | 988.4 | 122 52 23.1 | 302 50 27.0 | Grout | 4195.7 | 3.622806 |
| | 122 12 46.336 | 1005.3 | 186 30 05.1 | 6 30 21.3 | Mount Zion | 4354.4 | 3.638927 |
| | | | 245 49 16.1 | 65 50 00.1 | Shepard | 1466.0 | 3.166123 |
| Cape Horn tree, 1901 | 45 34 03.818 | 117.6 | 229 10 22.5 | 49 12 25.1 | Twin Mountain | 4918.0 | 3.691789 |
| | 122 11 55.104 | 1194.9 | 264 40 44.0 | 84 42 35.7 | Angel | 3406.3 | 3.532288 |
| | | | 354 13 26.0 | 174 13 32.4 | Shepard | 2245.3 | 3.351269 |
| Pyramid tree, 1901 | 45 35 17.351 | 535.8 | 254 03 31.5 | 74 05 20.5 | Twin Mountain | 3440.3 | 3.536593 |
| | 122 11 36.030 | 781.0 | 269 21 37.8 | 89 26 38.0 | Oneonta | 9110.2 | 3.959529 |
| | | | 303 16 36.5 | 123 18 14.6 | Angel | 3562.2 | 3.551712 |
| House in trees, cupola, 1901 | 45 33 18.379 | 567.4 | 71 08 49.2 | 251 06 09.8 | Cliff | 5120.1 | 3.709281 |
| | 122 10 53.730 | 1165.4 | 146 03 47.7 | 326 02 43.5 | Mount Zion | 3489.8 | 3.542801 |
| | | | 207 22 38.9 | 27 23 57.6 | Twin Mountain | 5199.9 | 3.715993 |
| Lone Rock, 1901 | 45 34 22.068 | 681.3 | 277 06 03.9 | 97 07 09.5 | Angel | 2007.3 | 3.302806 |
| | 122 10 50.550 | 1096.0 | 22 46 29.3 | 202 45 50.7 | Shepard | 3033.7 | 3.481976 |
| | | | 53 37 07.6 | 233 34 25.9 | Cliff | 6104.2 | 3.785628 |
| Bridal Veil sawmill,[1] 1901 | 45 33 26.74 | 825.6 | 140 01 48 | 320 00 35 | Mount Zion | 3441.1 | 3.536695 |
| | 122 10 41.63 | 903.0 | 206 01 51 | 26 03 01 | Twin Mountain | 4851.3 | 3.685854 |
| White house, north gable,[1] 1901 | 45 33 46.97 | 1450.2 | 123 46 34 | 303 44 55 | Mount Zion | 3620.7 | 3.558794 |
| | 122 10 04.78 | 103.6 | 199 36 20 | 19 37 04 | Twin Mountain | 3964.2 | 3.598151 |
| Dead tree (near Cabin Falls), 1901 | 45 34 28.407 | 877.0 | 96 30 22.8 | 276 29 49.9 | Railroad | 1006.8 | 3.002956 |
| | 122 07 53.336 | 1157.1 | 148 16 18.7 | 328 15 28.7 | Twin Mountain | 2886.6 | 3.460389 |
| | | | 212 12 42.7 | 32 14 10.7 | Bluff | 5009.0 | 3.699751 |
| Signboard, 1901 | 45 34 48.320 | 1491.8 | 201 38 14.2 | 21 39 01.6 | Bluff | 3897.5 | 3.590789 |
| | 122 06 56.465 | 1224.1 | 225 36 11.0 | 45 39 05.1 | Lookout | 7386.7 | 3.868449 |
| | | | 251 58 44.9 | 72 00 25.4 | Oneonta | 3206.9 | 3.506082 |
| Tall post, 1901 | 45 34 47.570 | 1468.6 | 139 13 19.5 | 319 12 26.5 | Twin Mountain | 2461.1 | 3.391124 |
| | 122 07 49.244 | 1067.6 | 215 17 20.2 | 35 18 45.3 | Bluff | 4467.2 | 3.650040 |
| | | | 231 02 28.8 | 51 06 00.5 | Lookout | 8257.7 | 3.916857 |
| Dead tree, back of bluff, 1901 | 45 36 49.487 | 1527.8 | 298 51 33.6 | 118 51 40.8 | Bluff | 244.6 | 2.388501 |
| | 122 06 00.028 | 0.6 | 326 24 20.7 | 146 25 20.9 | Oneonta | 3300.4 | 3.518570 |
| | | | 64 27 33.3 | 244 25 22.3 | Twin Mountain | 4405.0 | 3.643948 |
| McGowan's cannery, 1901 | 45 36 31.891 | 984.6 | 95 07 30.8 | 275 04 53.8 | Bluff | 4779.6 | 3.679391 |
| | 122 02 10.438 | 226.2 | 154 59 21.5 | 334 58 51.2 | Lookout | 2171.8 | 3.336828 |
| | | | 208 44 43.2 | 28 45 56.3 | Climb | 4604.1 | 3.663148 |
| | | | 254 54 26.1 | 74 54 52.2 | Dodson | 820.9 | 2.914278 |
| Barn near McGowan's, north gable, 1901. | 45 36 14.461 | 446.4 | 101 59 15.1 | 281 56 45.2 | Bluff | 4645.9 | 3.667074 |
| | 122 02 20.400 | 442.1 | 164 20 36.8 | 344 20 13.6 | Lookout | 2602.9 | 3.415453 |
| | | | 207 58 27.9 | 27 59 48.1 | Climb | 5180.2 | 3.714349 |
| Butlers Landing, ice house, 1901 | 45 36 53.336 | 1646.6 | 155 09 04.1 | 335 08 44.2 | Lookout | 1439.4 | 3.158167 |
| | 122 02 24.904 | 539.6 | 216 49 49.3 | 36 51 12.8 | Climb | 4216.3 | 3.624935 |
| | | | 292 03 44.1 | 112 04 20.6 | Dodson | 1193.4 | 3.076789 |
| Warrendale Church, spire, 1901 | 45 36 43.698 | 1349.1 | 90 34 14.7 | 270 30 42.9 | Bluff | 6421.6 | 3.807640 |
| | 122 00 53.793 | 1165.6 | 121 53 10.2 | 301 51 45.1 | Lookout | 3036.8 | 3.482420 |
| | | | 188 35 10.3 | 8 35 28.6 | Climb | 3713.5 | 3.569783 |
| Gorman's house, 1901 | 45 36 50.520 | 1559.7 | 116 40 26.0 | 296 38 54.5 | Lookout | 3104.4 | 3.491983 |
| | 122 00 44.769 | 970.0 | 185 55 17.1 | 5 55 29.0 | Climb | 3479.8 | 3.541556 |
| | | | 262 58 39.4 | 82 58 50.5 | Warren | 339.2 | 2.530431 |
| Castle Rock, 1901 | 45 37 41.863 | 1292.4 | 328 43 43.0 | 148 44 13.9 | Warren | 1806.0 | 3.256711 |
| | 122 01 12.498 | 270.8 | 13 22 38.3 | 193 22 23.0 | Dodson | 2000.8 | 3.301208 |
| | | | 84 57 29.3 | 264 56 17.6 | Lookout | 2181.8 | 3.338814 |
| Gorman's barn, 1901 | 45 36 52.228 | 1612.4 | 114 39 47.1 | 294 38 10.7 | Lookout | 3213.5 | 3.506983 |
| | 122 00 38.013 | 823.6 | 183 34 15.1 | 3 34 22.1 | Climb | 3415.1 | 3.533407 |
| | | | 273 23 30.0 | 93 23 36.2 | Warren | 190.6 | 2.280126 |
| Warren's cannery, 1901 | 45 36 55.280 | 1706.6 | 70 33 19.1 | 250 33 09.2 | Warren | 316.9 | 2.500938 |
| | 122 00 15.440 | 334.6 | 110 05 23.2 | 290 03 30.7 | Lookout | 3630.3 | 3.559939 |
| | | | 175 14 14.5 | 355 14 05.4 | Climb | 3325.8 | 3.521891 |
| Hamilton fish wheel, 1901 | 45 37 38.307 | 1182.6 | 57 35 17.8 | 237 34 03.3 | Warren | 2674.4 | 3.427228 |
| | 121 58 45.029 | 975.4 | 131 38 26.4 | 311 37 12.7 | Climb | 2989.3 | 3.475575 |
| | | | 180 25 07.8 | 0 25 08.6 | Aldrich | 2966.7 | 3.472277 |

[1] No check on this position.

*Columbia River from the mouth of the Willamette River to the Cascade Locks*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Railway water tank, 1901 | 45 38 11.686 | 360.8 | 22 08 03.4 | 202 07 50.0 | Bonneville | 1074.3 | 3.031139 |
| | 121 57 21.933 | 475.0 | 137 26 58.7 | 317 26 00.0 | Aldrich | 2628.5 | 3.419709 |
| | | | 271 57 06.7 | 91 58 14.9 | Bradford | 2065.3 | 3.314976 |
| Fish wheel on north shore opposite Bradford Island, 1901. | 45 38 45.224 | 1396.2 | 40 23 57.4 | 220 23 00.4 | Bonneville | 2666.1 | 3.425874 |
| | 121 56 20.852 | 451.6 | 89 10 05.8 | 269 07 09.0 | Climb | 5356.8 | 3.728902 |
| | | | 106 12 51.6 | 286 11 09.2 | Aldrich | 3228.4 | 3.508990 |
| Cascade Locks Church, 1901 | 45 40 11.476 | 354.3 | 39 18 05.1 | 219 16 23.3 | Bradford | 4869.7 | 3.687500 |
| | 121 53 24.224 | 524.3 | 95 41 03.1 | 275 38 48.0 | Moffat | 4106.3 | 3.613447 |
| | | | 139 41 30.9 | 319 41 25.3 | Locks | 265.1 | 2.423380 |
| | | | 210 11 49.7 | 30 13 13.1 | Stackhouse | 5012.8 | 3.700082 |
| Cascade Locks flagstaff, 1901 | 45 40 13.323 | 411.3 | 208 58 14.0 | 28 58 16.7 | Locks | 165.9 | 2.219922 |
| | 121 53 35.858 | 776.1 | 212 57 55.7 | 32 59 27.3 | Stackhouse | 5096.2 | 3.707247 |
| | | | 327 46 33.4 | 147 46 58.3 | Cascade | 1412.8 | 3.150068 |

*The secondary triangulation.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Principal points.* | | | | | | | |
| Roman, 1903 | 43 54 45.041 | 1390.1 | | | | | |
| | 123 44 14.987 | 334.5 | | | | | |
| Mary, 1903 | 44 30 17.369 | 536.1 | | | | | |
| | 123 33 05.732 | 126.6 | 12 47 13.03 | 192 39 26.37 | Roman | 67471.43 | 4.8291199 |
| Table, 1908 | 44 28 10.361 | 319.8 | 260 19 19.07 | 80 31 36.02 | Mary | 23566.77 | 4.3723001 |
| | 123 50 37.387 | 826.4 | 352 09 00.72 | 172 13 27.28 | Roman | 62474.59 | 4.7957034 |
| Cummins, 1908 | 44 14 10.036 | 309.8 | 204 25 54.36 | 24 32 07.18 | Table | 28500.31 | 4.4548496 |
| | 123 59 30.690 | 681.1 | 229 27 14.39 | 49 45 42.75 | Mary | 46075.76 | 4.6634725 |
| | | | 330 22 18.08 | 150 32 55.04 | Roman | 41329.31 | 4.6162582 |
| Foulweather, 1908 | 44 45 23.059 | 711.8 | 305 06 11.81 | 125 27 11.24 | Mary | 48405.24 | 4.6848924 |
| | 124 02 58.427 | 1285.1 | 332 47 19.52 | 152 55 59.96 | Table | 35820.58 | 4.5541326 |
| | | | 355 26 26.89 | 175 28 52.48 | Cummins | 57996.36 | 4.7634007 |
| Maple, 1908 | 43 54 20.294 | 626.3 | 181 06 56.67 | 1 07 19.08 | Cummins | 36727.91 | 4.5649062 |
| | 124 00 02.917 | 65.1 | 267 50 26.39 | 88 01 23.79 | Roman | 21166.02 | 4.3256392 |
| Fairview, 1908 | 44 11 59.942 | 1850.1 | 219 24 01.15 | 39 25 44.82 | Cummins | 5197.46 | 3.7157909 |
| | 124 01 59.351 | 1317.9 | 323 19 55.58 | 143 32 15.70 | Roman | 39768.92 | 4.5995438 |
| | | | 355 27 27.50 | 175 28 48.46 | Maple | 32808.04 | 4.5159803 |
| Cape, 1908 | 44 06 23.325 | 719.9 | 202 08 15.79 | 22 10 28.40 | Fairview | 11218.06 | 4.0499176 |
| | 124 05 09.727 | 216.3 | 307 30 46.81 | 127 45 18.57 | Roman | 35295.34 | 4.5477174 |
| | | | 342 56 28.17 | 163 00 01.32 | Maple | 23339.09 | 4.3680838 |
| Dean, 1908 | 43 41 44.174 | 1363.3 | 162 11 13.72 | 342 07 21.11 | Maple | 24515.71 | 4.3894444 |
| | 123 54 26.846 | 601.2 | 209 31 00.25 | 29 38 03.78 | Roman | 27710.52 | 4.4426447 |
| Trail, 1908 | 43 46 08.829 | 272.5 | 204 12 34.80 | 24 16 06.52 | Maple | 16634.75 | 4.2210162 |
| | 124 05 08.603 | 192.4 | 240 14 39.21 | 60 29 07.53 | Roman | 32219.95 | 4.5081248 |
| | | | 299 33 54.92 | 119 41 18.56 | Dean | 16522.67 | 4.2180801 |
| Schooner, 1908 | 43 41 54.965 | 1696.4 | 176 16 44.92 | 356 16 29.17 | Trail | 7851.53 | 3.8949541 |
| | 124 04 45.822 | 1026.1 | 271 19 01.01 | 91 26 08.62 | Dean | 13864.82 | 4.1419144 |
| Burn, 1908 | 43 43 18.358 | 566.6 | 215 50 21.06 | 35 52 18.56 | Trail | 6491.36 | 3.8123356 |
| | 124 07 58.535 | 1310.2 | 279 00 34.65 | 99 09 55.52 | Dean | 18403.79 | 4.2649073 |
| | | | 300 47 55.38 | 120 50 08.55 | Schooner | 5023.87 | 3.7010382 |
| Bald, 1908 | 44 58 31.806 | 981.8 | 3 45 23.13 | 183 43 25.61 | Table | 56344.68 | 4.7508529 |
| | 123 47 50.385 | 1104.0 | 39 23 52.54 | 219 13 11.96 | Foulweather | 31467.57 | 4.4978032 |
| Iron, 1908 | 44 41 35.609 | 1099.2 | 181 38 19.27 | 1 38 25.70 | Foulweather | 7023.85 | 3.8465752 |
| | 124 03 07.559 | 166.4 | 212 37 13.46 | 32 48 00.14 | Bald | 37280.92 | 4.5714867 |
| | | | 326 16 11.48 | 146 24 58.04 | Table | 29861.55 | 4.4751124 |
| Cascade, 1908 | 45 03 42.382 | 1308.3 | 305 29 34.83 | 125 36 48.19 | Bald | 16488.56 | 4.2171826 |
| | 123 58 03.055 | 66.8 | 10 50 20.26 | 190 46 51.73 | Foulweather | 34548.29 | 4.5384205 |
| Salmon, 1908 | 45 01 12.390 | 382.5 | 209 18 11.24 | 29 19 35.30 | Cascade | 5310.26 | 3.7251158 |
| | 124 00 01.845 | 40.4 | 287 07 14.41 | 107 15 51.61 | Bald | 16770.82 | 4.2245543 |
| | | | 7 33 00.18 | 187 30 55.57 | Foulweather | 29560.08 | 4.4707056 |
| Saddle Mountain 2, 1909 | 45 58 10.281 | 317.4 | 158 16 24.1 | 338 06 27.2 | Bear | 47777.0 | 4.679219 |
| | 123 41 04.267 | 91.9 | 189 24 23.6 | 9 29 35.0 | Ten | 56288.5 | 4.750420 |
| Tillamook Head, 1874 | 45 57 55.431 | 1711.4 | 185 02 04.5 | 5 04 17.8 | Bear | 44990.7 | 4.653123 |
| | 123 57 56.395 | 1214.3 | 208 46 48.1 | 29 04 10.2 | Ten | 63961.9 | 4.805921 |
| | | | 268 41 37.1 | 88 53 44.8 | Saddle Mountain 2 | 21796.8 | 4.338392 |
| Saddle Mountain, 1874 | 45 58 10.078 | 311.2 | 88 54 43.0 | 268 42 35.4 | Tillamook Head | 21792.2 | 4.338302 |
| | 123 41 04.471 | 96.3 | 140 44 47.6 | 320 29 05.1 | Battery | 44238.3 | 4.645798 |
| | | | 150 57 41.4 | 330 47 41.3 | Scarboro Hill 2 | 36739.6 | 4.565135 |
| Neahkahnie, 1875 | 45 44 39.064 | 1206.1 | 175 31 47.8 | 355 30 43.7 | Tillamook Head | 24662.6 | 4.392039 |
| | 123 56 27.126 | 586.5 | 218 23 26.7 | 38 34 28.8 | Saddle Mountain | 31087.3 | 4.504978 |

*The secondary triangulation*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Foley, 1875 | 45 39 07.551 | 233.1 | 138 00 36.2 | 317 55 31.0 | Neahkahnie | 13779.5 | 4.139233 |
| | 123 49 20.683 | 447.9 | 196 50 44.7 | 16 56 40.5 | Saddle Mountain | 36865.7 | 4.566623 |
| Crag, 1875 | 45 38 29.150 | 899.9 | 140 51 12.1 | 320 46 04.1 | Neahkahnie | 14735.0 | 4.168350 |
| | 123 49 16.805 | 363.9 | 175 56 56.9 | 355 56 54.1 | Foley | 1188.5 | 3.075011 |
| Miami, 1875 | 45 34 59.868 | 1848.3 | 171 25 53.1 | 351 24 23.9 | Neahkahnie | 18084.1 | 4.257297 |
| | 123 54 22.484 | 487.4 | 220 30 15.1 | 40 33 50.8 | Foley | 10061.2 | 4.002650 |
| | | | 225 40 48.9 | 45 44 27.4 | Crag | 9252.9 | 3.966279 |
| Boulder Point, 1866 | 45 29 33.102 | 1021.9 | 184 56 51.8 | 4 57 20.5 | Miami | 10125.9 | 4.005435 |
| | 123 55 02.769 | 60.1 | 204 21 07.6 | 24 25 14.6 | Crag | 18170.5 | 4.259366 |
| Shell Point, 1866 | 45 30 33.768 | 1042.5 | 51 06 19.7 | 231 05 03.5 | Boulder Point | 2982.2 | 3.474531 |
| | 123 53 15.878 | 344.7 | 170 01 52.7 | 350 01 05.1 | Miami | 8341.3 | 3.921236 |
| | | | 299 28 07.03 | 119 34 47.79 | Ginger | 14030.07 | 4.1470600 |
| | | | 342 23 49.07 | 162 29 27.59 | Hebo | 34326.78 | 4.5356331 |
| | | | 358 13 05.08 | 178 13 31.15 | Buzzard Butte | 25668.29 | 4.4093969 |
| Hebo, 1908 | 45 12 53.639 | 1655.9 | 7 03 16.91 | 187 01 30.49 | Bald | 26807.07 | 4.4282493 |
| | 123 45 20.130 | 439.2 | 44 29 00.95 | 224 20 00.18 | Cascade | 23821.76 | 4.3769739 |
| Buzzard Butte, 1908 | 45 16 42.722 | 1318.9 | 306 24 04.26 | 126 29 16.10 | Hebo | 11904.88 | 4.0757252 |
| | 123 52 39.259 | 855.7 | 349 21 14.73 | 169 24 39.44 | Bald | 34263.61 | 4.5348331 |
| | | | 16 23 24.96 | 196 19 35.32 | Cascade | 25105.88 | 4.3997755 |
| Ginger, 1908 | 45 26 49.816 | 1537.9 | 4 10 26.65 | 184 09 25.24 | Hebo | 25882.40 | 4.4130046 |
| | 123 43 53.794 | 1169.1 | 31 26 34.79 | 211 20 20.88 | Buzzard Butte | 21955.59 | 4.3415450 |
| White, 1904 | 43 07 14.428 | 445.2 | | | | | |
| | 123 02 14.761 | 336.0 | | | | | |
| Onion, 1904 | 42 41 31.762 | 980.1 | 198 11 21.87 | 18 19 13.10 | White | 50126.59 | 4.7000681 |
| | 123 13 46.921 | 1068.1 | | | | | |
| Camas, 1906 | 43 00 07.386 | 227.9 | 257 25 01.30 | 77 55 20.37 | White | 61709.33 | 4.7903508 |
| | 123 46 38.943 | 882.1 | 307 21 59.59 | 127 44 20.66 | Onion | 56482.19 | 4.7519116 |
| Boliver, 1907 | 42 47 31.996 | 987.3 | 191 27 11.94 | 11 29 33.88 | Camas | 23785.21 | 4.3763070 |
| | 123 50 07.463 | 169.6 | 282 25 36.66 | 102 50 16.60 | Onion | 50827.47 | 4.7060985 |
| | | | 240 27 50.25 | 61 00 27.85 | White | 74641.12 | 4.8729781 |
| Johnson, 1906 | 42 48 55.841 | 1723.1 | 231 06 18.98 | 51 19 12.89 | Camas | 33080.51 | 4.5195722 |
| | 124 05 35.651 | 809.9 | 276 54 21.44 | 97 04 52.14 | Boliver | 21249.13 | 4.3273412 |
| Bennett, 1906 | 42 57 32.991 | 1018.0 | 263 06 42.57 | 83 26 59.38 | Camas | 40720.28 | 4.6098108 |
| | 124 16 23.770 | 538.8 | 317 16 29.17 | 137 23 50.25 | Johnson | 21701.83 | 4.3364964 |
| | | | 297 15 06.24 | 117 32 58.78 | Boliver | 40297.64 | 4.6052796 |
| Sugar, 1906 | 43 03 50.680 | 1563.9 | 2 39 45.27 | 182 39 06.76 | Johnson | 27643.01 | 4.4415853 |
| | 124 04 39.128 | 885.4 | 53 55 25.08 | 233 47 24.41 | Bennett | 19760.81 | 4.2958048 |
| | | | 285 38 03.17 | 105 50 20.31 | Camas | 25406.29 | 4.4049412 |
| Westport, 1906 | 43 18 43.406 | 1339.5 | 334 08 05.88 | 154 14 49.67 | Sugar | 30601.77 | 4.4857465 |
| | 124 14 29.125 | 656.4 | 3 47 31.87 | 183 46 13.48 | Bennett | 39289.85 | 4.5942804 |
| Cathcart, 1906 | 43 21 06.027 | 186.0 | 13 42 57.70 | 193 39 01.78 | Sugar | 32883.95 | 4.5169840 |
| | 123 58 54.541 | 1228.4 | 78 16 54.65 | 258 06 13.32 | Westport | 21510.00 | 4.3326403 |
| | | | 28 37 48.86 | 208 25 51.20 | Bennett | 49632.87 | 4.6957694 |
| Noah, 1906 | 43 23 27.048 | 834.7 | 289 48 42.57 | 109 54 50.01 | Cathcart | 12808.62 | 4.1075023 |
| | 124 07 49.612 | 1116.6 | 45 49 34.79 | 225 45 00.54 | Westport | 12552.99 | 4.0987473 |
| Marshfield Hill, 1889 | 43 22 25.591 | 789.8 | 254 23 10.74 | 74 26 38.22 | Noah | 7059.32 | 3.8487629 |
| | 124 12 51.690 | 1163.7 | 17 45 27.90 | 197 44 21.02 | Westport | 7199.43 | 3.8572980 |
| | | | 277 20 29.71 | 97 30 04.49 | Cathcart | 19009.50 | 4.2789708 |
| Cape, 1907 | 42 50 13.493 | 416.4 | 240 12 18.42 | 60 24 11.90 | Bennett | 27376.30 | 4.4373747 |
| | 124 33 51.928 | 1179.3 | 317 43 05.75 | 137 51 24.83 | Bald | 24883.58 | 4.3959128 |
| Butler, 1907 | 42 46 03.896 | 120.2 | 37 35 53.08 | 217 31 47.07 | Bald | 13534.31 | 4.1314363 |
| | 124 15 34.116 | 775.7 | 176 58 13.25 | 356 57 39.47 | Bennett | 21293.94 | 4.3282559 |
| | | | 236 22 14.95 | 56 41 55.79 | Camas | 47201.51 | 4.6739559 |
| Madden, 1907 | 42 50 27.775 | 857.1 | 334 55 12.22 | 154 59 35.44 | Bald | 20829.17 | 4.3186720 |
| | 124 28 04.474 | 101.6 | 86 50 09.62 | 266 46 13.37 | Cape | 7902.94 | 3.8977888 |
| Sixes, 1869 | 42 50 39.870 | 1230.8 | 273 22 29.99 | 93 25 38.04 | Madden | 6291.19 | 3.7987331 |
| | 124 32 41.026 | 931.6 | 289 57 12.16 | 110 08 50.03 | Butler | 24838.89 | 4.3951322 |
| | | | 321 48 27.16 | 141 55 58.14 | Bald | 24464.60 | 4.3885381 |
| Heads, 1869 | 42 44 28.619 | 883.1 | 155 40 50.75 | 335 38 26.87 | Cape | 11680.08 | 4.0674457 |
| | 124 30 20.129 | 457.8 | 195 31 59.53 | 15 33 31.68 | Madden | 11503.53 | 4.0608312 |
| | | | 303 07 45.66 | 123 13 40.63 | Bald | 14231.66 | 4.1532554 |
| Port Orford astronomical 2, 1907 | 42 44 28.918 | 892.3 | 88 25 56.21 | 268 25 46.16 | Heads | 337.14 | 2.5278184 |
| | 124 30 05.312 | 120.8 | 193 55 03.04 | 13 56 25.13 | Madden | 11408.93 | 4.0572450 |
| | | | 303 55 12.49 | 124 00 57.42 | Bald | 13955.78 | 4.1447542 |
| Bald, 1907 | 42 40 16.220 | 500.5 | 192 30 03.35 | 12 33 36.06 | Bennett | 32773.00 | 4.5155162 |
| | 124 21 36.745 | 836.7 | 232 09 06.12 | 52 32 52.45 | Camas | 60173.67 | 4.7794065 |
| Squirrel, 1907 | 42 35 52.651 | 1624.6 | 101 49 06.96 | 281 29 35.00 | Bald | 40255.03 | 4.6048201 |
| | 123 52 46.417 | 1058.2 | 141 22 12.41 | 321 06 09.81 | Bennett | 51459.80 | 4.7114681 |
| | | | 190 30 11.72 | 10 34 21.43 | Camas | 45659.78 | 4.6595338 |

*The secondary triangulation*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Stack, 1907 | 42 25 00.206 | 6.4 | 167 36 51.35 | 347 33 47.03 | Bald | 28941.08 | 4.4615147 |
| | 124 17 04.139 | 94.6 | 238 41 36.86 | 58 58 01.82 | Squirrel | 38896.40 | 4.5899094 |
| Craggy, 1907 | 42 20 26.761 | 825.7 | 114 30 36.86 | 294 21 29.74 | Stack | 20397.06 | 4.3095676 |
| | 124 03 32.423 | 742.2 | 146 06 02.30 | 325 53 49.66 | Bald | 44271.02 | 4.6461195 |
| | | | 207 15 32.16 | 27 22 48.34 | Squirrel | 32155.68 | 4.5072576 |
| Bosley, 1907 | 42 12 34.365 | 1060.3 | 167 51 53.54 | 347 49 27.84 | Stack | 23540.67 | 4.3718189 |
| | 124 13 27.700 | 635.4 | 213 13 34.43 | 33 27 31.50 | Squirrel | 51645.44 | 4.7130320 |
| | | | 223 02 49.56 | 43 09 30.00 | Craggy | 19963.09 | 4.3002278 |
| Sundown 2, 1907 | 42 18 39.099 | 1206.4 | 204 29 20.26 | 24 31 58.14 | Stack | 12923.81 | 4.1113905 |
| | 124 20 58.445 | 1338.5 | 317 24 16.91 | 137 29 20.03 | Bosley | 15276.93 | 4.1840361 |
| Grizzly, 1907 | 42 23 51.572 | 1591.3 | 252 07 46.73 | 72 11 00.75 | Stack | 6911.31 | 3.8395603 |
| | 124 21 51.835 | 1185.5 | 331 01 35.95 | 151 07 15.26 | Bosley | 23873.53 | 4.3779167 |
| | | | 352 46 19.26 | 172 46 55.23 | Sundown 2 | 9718.53 | 3.9876006 |
| Pollywog, 1913 | 42 11 53.015 | 1635.7 | 94 59 23.31 | 274 52 10.16 | Bosley | 14847.11 | 4.1716419 |
| | 124 02 42.911 | 984.5 | 140 59 59.61 | 320 50 19.91 | Stack | 31289.40 | 4.4953973 |
| | | | 175 54 36.87 | 355 54 03.57 | Craggy | 15892.07 | 4.2011805 |
| Elk, 1913 | 42 01 52.188 | 1610.2 | 157 02 19.53 | 336 58 14.03 | Bosley | 21524.04 | 4.3329239 |
| | 124 07 21.656 | 498.2 | 199 01 51.71 | 19 04 58.64 | Pollywog | 19612.72 | 4.2925378 |
| Pack Saddle, 1913 | 42 01 51.972 | 1603.5 | 90 04 43.16 | 270 00 04.27 | Elk | 9581.88 | 3.9814508 |
| | 124 00 25.116 | 577.8 | 137 51 53.86 | 317 43 08.99 | Bosley | 26758.50 | 4.4274617 |
| | | | 170 19 32.16 | 350 17 59.75 | Pollywog | 18812.76 | 4.2744525 |
| High Divide, 1913 | 41 54 26.743 | 825.1 | 157 50 06.06 | 337 47 23.28 | Elk | 14842.40 | 4.1715040 |
| | 124 03 18.230 | 420.2 | 196 09 55.71 | 16 11 51.48 | Pack Saddle | 14303.33 | 4.1554370 |
| Long Ridge, 1913 | 41 55 03.031 | 93.5 | 84 06 25.52 | 264 01 13.43 | High Divide | 10825.21 | 4.0344362 |
| | 123 55 31.032 | 715.1 | 127 43 05.84 | 307 35 10.58 | Elk | 20665.31 | 4.3152420 |
| | | | 151 48 25.16 | 331 45 08.48 | Pack Saddle | 14319.14 | 4.1559170 |
| Bald Hill, 1913 | 41 45 38.401 | 1184.7 | 172 59 30.77 | 352 58 32.77 | High Divide | 16423.58 | 4.2154679 |
| | 124 01 51.288 | 1184.8 | 206 41 47.32 | 26 46 00.96 | Long Ridge | 19504.78 | 4.2901410 |
| Gordon, 1913 | 41 48 00.303 | 9.3 | 72 08 52.99 | 252 02 22.08 | Bald Hill | 14239.10 | 4.1534824 |
| | 123 52 04.575 | 105.6 | 127 33 34.77 | 307 26 05.28 | High Divide | 19586.29 | 4.2919522 |
| | | | 159 57 38.64 | 339 55 20.87 | Long Ridge | 13884.38 | 4.1425265 |
| Child, 1913 | 41 42 12.100 | 373.3 | 177 23 34.84 | 357 23 26.49 | Bald Hill | 6371.38 | 3.8042332 |
| | 124 01 38.743 | 895.8 | 230 56 44.22 | 51 03 06.56 | Gordon | 17069.89 | 4.2322307 |
| Rattle, 1914 | 41 37 30.317 | 935.3 | 142 45 25.97 | 322 42 15.89 | Child | 10924.11 | 4.0383860 |
| | 123 56 52.807 | 1222.4 | 198 53 48.46 | 18 57 00.25 | Gordon | 20546.61 | 4.3127402 |
| Red Mountain, 1913 | 41 31 29.256 | 902.6 | 153 16 01.72 | 333 11 14.71 | Child | 22213.77 | 4.3466223 |
| | 123 54 26.568 | 616.0 | 158 35 33.30 | 338 30 37.79 | Bald Hill | 28146.47 | 4.4494239 |
| | | | 163 05 46.77 | 343 04 09.73 | Rattle | 11642.90 | 4.0660612 |
| | | | 186 07 10.26 | 6 08 44.65 | Gordon | 30751.18 | 4.4878618 |
| Mound, 1914 | 41 33 31.106 | 959.6 | 237 10 05.14 | 57 15 33.52 | Rattle | 13628.42 | 4.1344456 |
| | 124 05 07.486 | 173.5 | 284 08 28.19 | 104 15 33.22 | Red Mountain | 15324.15 | 4.1853763 |
| Klamath South 2, 1914 | 41 31 56.380 | 1739.4 | 104 25 18.17 | 344 24 54.85 | Mound | 3033.87 | 3.4819974 |
| | 124 04 32.326 | 749.4 | 225 53 43.84 | 45 58 48.80 | Rattle | 14814.06 | 4.1706742 |
| | | | 273 21 15.05 | 93 27 56.66 | Red Mountain | 14068.69 | 4.1482537 |
| Flint Rock 2, 1914 | 41 31 29.990 | 925.2 | 177 15 58.78 | 357 15 53.68 | Mound | 3740.79 | 3.5729633 |
| | 124 04 59.787 | 1386.2 | 218 01 18.40 | 38 01 36.61 | Klamath South 2 | 1033.52 | 3.0143189 |
| Flint Ridge, 1872 | 41 31 31.492 | 971.5 | 86 25 15.18 | 266 24 54.02 | Flint Rock 2 | 741.39 | 2.8700489 |
| | 124 04 27.872 | 646.2 | 166 01 51.15 | 346 01 24.88 | Mound | 3802.73 | 3.5800956 |
| | | | 172 20 27.57 | 352 20 24.62 | Klamath South 2 | 774.75 | 2.8891597 |
| High Bluff, 1871 | 41 30 43.452 | 1340.5 | 166 02 39.27 | 346 02 29.07 | Flint Rock 2 | 1479.40 | 3.1700848 |
| | 124 04 44.398 | 1029.6 | 194 29 43.14 | 14 29 54.10 | Flint Ridge, 1872 | 1530.78 | 3.1849123 |
| *Supplementary points.* | | | | | | | |
| Yaquina Head Lighthouse, 1908 | 44 40 37.967 | 1172.0 | 194 37 25.0 | 14 38 38.4 | Foulweather | 9095.3 | 3.958818 |
| | 124 04 42.826 | 943.2 | 229 41 23.5 | 49 42 30.5 | Iron | 2750.9 | 3.439472 |
| | | | 320 58 01.0 | 141 07 54.4 | Table | 29673.3 | 4.472366 |
| Life, 1908 | 44 35 17.474 | 539.4 | 174 19 48.1 | 354 19 16.8 | Yaquina Head Lighthouse | 9941.6 | 3.997455 |
| | 124 03 58.231 | 1284.5 | 185 27 37.4 | 5 28 13.0 | Iron | 11725.4 | 4.069129 |
| | | | 306 37 39.8 | 126 47 01.4 | Table | 22057.3 | 4.343552 |
| Yaquina Lighthouse, old tower, 1908 | 44 37 28.640 | 884.0 | 183 53 30.6 | 3 54 02.5 | Foulweather | 14678.3 | 4.166676 |
| | 124 03 43.722 | 963.8 | 185 57 46.6 | 5 58 12.0 | Iron | 7664.9 | 3.884507 |
| | | | 314 42 56.5 | 134 52 08.1 | Table | 24234.9 | 4.384442 |
| | | | 4 31 12.3 | 184 31 02.1 | Life | 4061.4 | 3.608671 |
| Euchre Mountain, 1908 | 44 50 08.193 | 252.9 | 200 15 30 | 20 18 35 | Bald | 16573.8 | 4.219421 |
| | 123 52 12.293 | 270.1 | 357 02 52 | 177 03 59 | Table | 40732.2 | 4.609938 |
| | | | 29 32 34 | 209 24 18 | Life | 31582.1 | 4.499441 |
| | | | 42 23 25 | 222 15 44 | Iron | 21401.5 | 4.330445 |
| | | | 163 01 22 | 342 57 15 | Cascade | 26283.4 | 4.419682 |
| Hill, first east of Yaquina Lighthouse, 1908. | 44 40 33.570 | 1036.2 | 221 25 37 | 41 26 31 | Iron | 2554.4 | 3.407292 |
| | 124 04 24.317 | 535.6 | 321 25 21 | 141 35 01 | Table | 29312.2 | 4.467048 |
| | | | 356 37 29 | 176 37 48 | Life | 9774.0 | 3.990074 |

*The secondary triangulation*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Grass Mountain, 1908 | 44 25 22.31 | 688.6 | 49 15 12 | 229 00 09 | Fairview | 37846.4 | 4.578025 |
| | 123 40 28.10 | 621.7 | 111 07 00 | 290 59 53 | Table | 14436.9 | 4.159474 |
| | | | 141 20 43 | 321 04 55 | Foulweather | 47549.3 | 4.677144 |
| Cape Lookout, summit, 1908 | 45 21 49.696 | 1534.2 | 239 00 04 | 59 08 30 | Ginger | 18026.9 | 4.255920 |
| | 123 55 44.844 | 976.0 | 336 52 57 | 156 55 09 | Buzzard Butte | 10302.7 | 4.012952 |
| | | | 346 27 14 | 166 32 42 | Bald | 43380.1 | 4.647188 |
| | | | 355 52 24 | 175 52 54 | Round Top | 16180.0 | 4.208978 |
| Bill, 1907 | 43 00 57.102 | 1762.1 | 254 15 39.1 | 74 25 15.2 | Sugar | 19845.0 | 4.297651 |
| | 124 18 43.282 | 980.1 | 333 20 19.8 | 153 21 54.9 | Bennett | 7047.1 | 3.848013 |
| Edson, 1907 | 42 52 22.415 | 691.7 | 186 12 37.1 | 6 13 29.1 | Bill | 15976.4 | 4.203479 |
| | 124 19 59.602 | 1352.8 | 207 02 15.4 | 27 04 42.4 | Bennett | 10761.8 | 4.031883 |
| | | | 224 23 51.4 | 44 34 18.8 | Sugar | 29769.3 | 4.473775 |
| Cotton, 1907 | 42 57 23.382 | 721.5 | 260 09 47.8 | 80 10 39.3 | Bennett | 1737.1 | 3.239813 |
| | 124 17 39.281 | 890.3 | 18 55 48.3 | 198 54 12.8 | Edson | 9817.6 | 3.992003 |
| Coquille River Lighthouse, 1907 | 43 07 27.808 | 858.1 | 323 00 12.5 | 143 04 46.4 | Bill | 15088.6 | 4.178648 |
| | 124 25 24.242 | 548.0 | 326 15 55.1 | 146 22 04.0 | Bennett | 22058.8 | 4.343581 |
| | | | 330 31 15.0 | 150 36 32.3 | Cotton | 21416.6 | 4.330750 |
| | | | 345 13 24.7 | 165 17 06.1 | Edson | 28890.7 | 4.460759 |
| Camas, U. S. G. S.,[1] 1907 | 43 00 07.193 | 220.0 | 173 46 13 | 353 46 13 | Camas | 5.982 | 0.77685 |
| | 123 46 38.914 | 881.4 | | | | | |
| Rocky Peak, 1906 | 42 39 37.810 | 1166.7 | 182 37 33.5 | 2 38 05.8 | Edson | 23618.7 | 4.373256 |
| | 124 20 47.277 | 1076.7 | 190 12 15.6 | 10 15 14.7 | Bennett | 33713.5 | 4.527804 |
| | | | 349 19 46.9 | 169 22 17.8 | Stack | 27554.1 | 4.440186 |
| | | | 136 27 29.6 | 316 26 56.1 | Bald | 1635.2 | 3.213573 |
| Saddle Mountain, 1907 | 42 24 09.007 | 277.9 | 97 02 14.3 | 276 55 53.9 | Stack | 12991.5 | 4.113658 |
| | 124 07 40.213 | 919.6 | 147 28 25.0 | 327 18 59.4 | Bald | 35427.7 | 4.549343 |
| | | | 320 23 38.5 | 140 26 25.5 | Craggy | 8897.7 | 3.949277 |
| Tower Rock, 1907 | 42 52 35.122 | 1083.8 | 247 17 30.4 | 67 28 32.8 | Bennett | 23902.2 | 4.378437 |
| | 124 32 36.566 | 830.0 | 1 37 50.8 | 181 37 47.7 | Sixes | 3557.9 | 3.551189 |
| | | | 21 23 13.2 | 201 22 21.9 | Cape | 4693.4 | 3.671484 |
| Colliers Butte, 1907 | 42 21 56.586 | 1746.0 | 24 42 26.3 | 204 38 32.3 | Bosley | 19090.3 | 4.280813 |
| | 124 07 39.848 | 911.8 | 113 45 07.6 | 293 38 47.2 | Stack | 14095.9 | 4.149093 |
| | | | 150 41 51.5 | 330 32 26.0 | Bald | 38938.8 | 4.590383 |
| | | | 163 24 35.8 | 343 16 14.4 | Edson | 58807.5 | 4.769433 |
| Pilot Knob, 1907 | 42 50 18.556 | 572.6 | 115 15 50.8 | 295 11 47.8 | Edson | 8966.4 | 3.952619 |
| | 124 14 02.349 | 53.3 | 166 33 12.0 | 346 31 35.7 | Bennett | 13784.5 | 4.139391 |
| | | | 282 27 21.9 | 102 33 06.4 | Johnson | 11788.9 | 4.071474 |
| Salmon Mountain, 1907 | 42 46 19.368 | 597.6 | 54 50 16.0 | 234 42 22.8 | Bald | 19426.3 | 4.288391 |
| | 124 09 59.310 | 1348.4 | 104 41 32.9 | 284 26 07.4 | Sixes | 31967.0 | 4.504702 |
| | | | 231 03 59.2 | 51 19 52.2 | Camas | 40775.9 | 4.610403 |
| | | | 157 15 40.4 | 337 11 18.8 | Bennett | 22544.4 | 4.353039 |
| Mount Chetco or Mount Emery,[1] 1907 | 42 06 20.19 | 622.9 | 152 18 44.5 | 332 15 47.2 | Bosley | 13040.6 | 4.115299 |
| | 124 09 03.55 | 81.6 | 196 10 48.3 | 16 14 30.8 | Craggy | 27202.0 | 4.434601 |
| Red Mountain,[1] 1907 | 42 08 27.40 | 845.4 | 109 41 44.8 | 289 31 19.1 | Bosley | 22705.3 | 4.356128 |
| | 123 57 55.80 | 1281.4 | 160 51 26.2 | 340 47 39.8 | Craggy | 23499.2 | 4.371053 |
| Island Rock,[1] 1907 | 42 40 01.75 | 54.1 | 165 31 16 | 345 30 12 | Port Orford astronomic | 8514.7 | 3.930168 |
| | 124 28 31.72 | 722.3 | 267 15 23 | 87 20 04 | Bald | 9460.3 | 3.975906 |
| Sister Rock,[1] 1907 | 42 35 41.05 | 1266.7 | 203 56 32 | 23 58 24 | Bald | 9291.3 | 3.968078 |
| | 124 24 22.33 | 509.0 | 351 03 52 | 171 05 34 | Grizzly | 22159.7 | 4.345564 |
| Small hill southwest of Bosley, 1913 | 42 07 37.968 | 1171.5 | 181 03 52 | 1 03 57 | Bosley | 9146.7 | 3.961264 |
| | 124 13 35.106 | 806.3 | 242 12 45 | 62 20 03 | Pollywog | 16913.9 | 4.228244 |
| | | | 321 08 39 | 141 12 50 | Elk | 13693.3 | 4.136509 |
| St. Georges Reef Lighthouse, 1913 | 41 50 14.693 | 453.3 | 196 40 30.37 | 16 46 31.78 | Bosley | 43159.19 | 4.6350733 |
| | 124 22 27.574 | 636.2 | 224 02 20.64 | 44 12 26.04 | Elk | 29978.15 | 4.4768049 |
| | | | 234 39 04.85 | 54 53 48.62 | Pack Saddle | 37296.96 | 4.5716734 |
| | | | 253 32 31.11 | 73 45 18.26 | High Divide | 27621.82 | 4.4412523 |
| Bear Mountain, 1913 | 41 47 47.761 | 1473.5 | 111 14 40 | 290 59 18 | High Divide | 34168.0 | 4.533620 |
| | 123 40 16.503 | 381.0 | 124 58 26 | 304 40 20 | Elk | 45623.3 | 4.659187 |
| | | | 133 11 30 | 312 58 03 | Pack Saddle | 38134.1 | 4.581314 |
| Preston Peak, 1914 | 41 50 08.065 | 248.8 | 35 39 01 | 215 27 12 | Red Mountain | 42425.4 | 4.627626 |
| | 123 36 40.063 | 924.4 | 50 16 54 | 230 03 27 | Rattle | 36498.4 | 4.562274 |
| | | | 67 09 05 | 246 52 27 | Child | 37601.9 | 4.575210 |
| | | | 79 37 09 | 259 26 54 | Gordon | 21699.1 | 4.336441 |
| | | | 198 10 28 | 18 25 52 | Onion | 100216.0 | 5.000937 |
| | | | 251 09 12 | 71 38 15 | Sterling | 63419.8 | 4.802225 |
| Second Peak north of Preston Peak, 1914. | 41 52 10.179 | 314.0 | 70 13 33 | 250 03 16 | Gordon | 22692.7 | 4.355887 |
| | 123 36 39.595 | 913.1 | 96 40 12 | 276 22 24 | High Divide | 37096.2 | 4.569330 |
| | | | 118 47 52 | 298 31 58 | Pack Saddle | 37419.5 | 4.573098 |
| Preston Peak, south, 1914 | 41 50 00.703 | 21.7 | 36 00 09 | 215 48 15 | Red Mountain | 42332.4 | 4.626673 |
| | 123 36 33.305 | 768.5 | 50 42 50 | 230 29 18 | Rattle | 36474.1 | 4.561985 |
| | | | 67 33 48 | 247 17 05 | Child | 37658.2 | 4.575859 |

[1] No check on this position.

*The secondary triangulation*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Four Brothers, No. 1, 1914 | 41 44 59.702 | 1841.9 | 75 40 12 | 255 30 32 | Child | 20777.2 | 4.317588 |
| | 123 47 08.085 | 186.8 | 128 05 44 | 307 54 57 | High Divide | 28412.2 | 4.453505 |
| | | | 149 36 13 | 329 27 19 | Pack Saddle | 36235.6 | 4.559135 |
| Four Brothers, No. 2, 1914 | 41 44 22.008 | 679.0 | 78 38 03 | 258 28 33 | Child | 20198.3 | 4.305315 |
| | 123 47 22.297 | 515.3 | 130 18 36 | 310 07 59 | High Divide | 28892.9 | 4.460791 |
| | | | 150 56 52 | 330 48 08 | Pack Saddle | 37082.7 | 4.569171 |
| Four Brothers, No. 3, 1914 | 41 44 10.405 | 321.0 | 22 17 14 | 202 12 38 | Red Mountain | 25371.3 | 4.404342 |
| | 123 47 31.561 | 729.4 | 46 29 42 | 226 23 29 | Rattle | 17912.9 | 4.253165 |
| | | | 79 31 14 | 259 21 50 | Child | 19920.2 | 4.299293 |
| | | | 131 07 20 | 310 56 49 | High Divide | 28964.2 | 4.461861 |
| Four Brothers, No. 4, 1914 | 41 43 43.094 | 1329.5 | 22 33 42 | 202 29 13 | Red Mountain | 24509.4 | 4.389333 |
| | 123 47 40.975 | 947.0 | 48 01 54 | 227 55 48 | Rattle | 17181.2 | 4.235054 |
| | | | 81 49 45 | 261 40 28 | Child | 19568.9 | 4.291566 |
| | | | 132 38 18 | 312 27 54 | High Divide | 29364.6 | 4.467824 |
| Rock, 1914 | 41 34 46.403 | 1431.6 | 323 24 27.3 | 143 26 18.7 | Klamath South 2 | 6531.7 | 3.815023 |
| | 124 07 20.282 | 469.9 | 326 22 49.9 | 146 24 44.3 | Flint Ridge | 7219.6 | 3.858514 |
| | | | 331 44 08.9 | 151 45 42.1 | Flint Rock 2 | 6878.8 | 3.837515 |
| | | | 334 14 57.7 | 154 16 41.2 | High Bluff | 8320.5 | 3.920150 |
| Peak, No. 6,[1] 1914 | 41 39 ~~52~~.78 | 1628.3 | 53 59 42 | 233 49 31 | Red Mountain | 26371.8 | 4.421140 |
| | 123 39 ~~06.49~~ | 148.5 | 79 59 59 | 259 48 11 | Rattle | 25067.0 | 4.399103 |
| Sawtooth, North,[1] 1914 | 41 36 52.35 | 1615.1 | 58 49 24 | 238 41 33 | Red Mountain | 19218.5 | 4.283720 |
| | 123 42 37.37 | 865.2 | 93 27 49 | 273 18 21 | Rattle | 19839.0 | 4.297519 |
| Sawtooth, South,[1] 1914 | 41 36 46.33 | 1429.3 | 59 14 48 | 239 06 58 | Red Mountain | 19093.8 | 4.280892 |
| | 123 42 38.84 | 899.3 | 94 00 18 | 273 50 51 | Rattle | 19817.1 | 4.297039 |
| Peak, No. 8,[1] 1914 | 41 33 04.44 | 137.0 | 75 07 33 | 255 02 18 | Red Mountain | 11407.6 | 4.057193 |
| | 123 46 31.03 | 719.1 | 119 43 13 | 299 36 21 | Rattle | 16573.8 | 4.219422 |
| Redding Rock Lighthouse, 1914 | 41 20 26.735 | 824.8 | 201 04 58.42 | 21 08 43.62 | Flint Rock 2 | 21934.11 | 4.3411200 |
| | 124 10 40.095 | 932.2 | 201 49 58.05 | 21 54 01.44 | Klamath South 2 | 22925.07 | 4.3603107 |
| | | | 202 49 00.76 | 22 53 07.08 | Flint Ridge | 22254.45 | 4.3474169 |
| | | | 203 26 01.20 | 23 29 56.55 | High Bluff | 20741.26 | 4.3168352 |
| | | | 211 12 55.08 | 31 22 03.08 | Rattle | 36953.26 | 4.5676528 |

*Columbia River to Tillamook Bay.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Principal points.* | | | | | | | |
| Redwood, 1875 | 45 41 49.839 | 1538.7 | 176 27 57.5 | 356 27 46.8 | Neahkahnie | 5234.6 | 3.718880 |
| | 123 56 12.199 | 263.9 | 299 19 05.1 | 119 23 59.5 | Foley | 10219.4 | 4.009425 |
| Fishery, 1875 | 45 41 20.587 | 635.6 | 132 02 01.3 | 312 01 28.2 | Redwood | 1348.9 | 3.129989 |
| | 123 55 25.890 | 560.2 | 167 48 36.8 | 347 47 53.0 | Neahkahnie | 6269.2 | 3.797212 |
| Seely, 1875 | 45 42 39.637 | 1223.8 | 176 35 51.1 | 356 35 43.9 | Neahkahnie | 3693.6 | 3.567455 |
| | 123 56 16.985 | 367.4 | 355 37 40.5 | 155 38 17.1 | Fishery | 2679.2 | 3.428010 |
| | | | 356 08 50.6 | 176 08 54.0 | Redwood | 1540.9 | 3.187784 |
| Landing, 1875 | 45 39 53.751 | 1659.5 | 168 08 58.4 | 348 08 33.5 | Redwood | 3662.1 | 3.563733 |
| | 123 55 37.439 | 810.4 | 185 19 32.1 | 5 19 40.3 | Fishery | 2692.5 | 3.430162 |
| Point, 1875 | 45 40 12.394 | 382.7 | 178 42 10.7 | 358 42 08.4 | Redwood | 3009.2 | 3.478454 |
| | 123 56 09.051 | 195.9 | 203 55 18.1 | 23 55 49.0 | Fishery | 2303.2 | 3.362341 |
| | | | 310 03 54.5 | 130 04 17.1 | Landing | 894.2 | 2.951423 |
| Keaton, 1875 | 45 38 37.400 | 1154.7 | 182 39 12.2 | 2 39 21.3 | Redwood | 5947.6 | 3.774342 |
| | 123 56 24.926 | 540.0 | 186 40 57.3 | 6 41 08.7 | Point | 2952.9 | 3.470242 |
| | | | 194 13 38.9 | 14 14 21.2 | Fishery | 5197.7 | 3.715809 |
| | | | 203 33 40.5 | 23 34 14.5 | Landing | 2571.7 | 3.410217 |
| Carlton, 1875 | 45 44 54.592 | 1685.5 | 334 30 51.2 | 154 32 35.4 | Fishery | 7318.5 | 3.864421 |
| | 123 57 51.420 | 1111.4 | 339 22 30.8 | 159 23 41.9 | Redwood | 6094.2 | 3.784919 |
| | | | 345 43 47.2 | 165 45 00.6 | Point | 8989.4 | 3.953733 |
| Sherman, 1874 | 46 08 57.251 | 1767.7 | 153 17 31.4 | 333 13 30.3 | Battery | 15912.2 | 4.201731 |
| | 123 57 17.829 | 382.6 | 193 58 17.1 | 13 59 58.7 | Scarboro Hill 2 | 12483.6 | 4.096340 |
| Boom, 1874 | 46 07 03.681 | 113.7 | 155 18 33.4 | 335 13 58.8 | Battery | 19505.7 | 4.290161 |
| | 123 56 31.298 | 672.1 | 164 06 17.9 | 344 05 44.4 | Sherman | 3646.1 | 3.561824 |
| | | | 187 21 32.9 | 7 22 40.9 | Scarboro Hill 2 | 15750.2 | 4.197286 |
| Morrison, 1874 | 46 06 58.180 | 1796.4 | 99 31 01.7 | 279 30 27.7 | Boom | 1027.7 | 3.011863 |
| | 123 55 44.096 | 946.9 | 151 19 01.3 | 331 17 53.7 | Sherman | 4191.0 | 3.622320 |
| | | | 152 53 42.7 | 332 48 34.1 | Battery | 20101.3 | 4.303224 |
| | | | 183 38 49.4 | 3 39 23.5 | Scarboro Hill 2 | 15822.1 | 4.199264 |
| Goodwin, 1874 | 46 05 10.883 | 336.0 | 154 28 29.6 | 334 27 33.8 | Boom | 3859.7 | 3.586550 |
| | 123 55 13.843 | 297.4 | 168 54 20.5 | 348 53 58.7 | Morrison | 3376.0 | 3.528404 |
| Lake, 1874 | 46 04 59.607 | 1840.4 | 167 27 13.4 | 347 26 44.8 | Boom | 3924.7 | 3.593803 |
| | 123 55 51.594 | 1108.6 | 182 31 05.1 | 2 31 10.5 | Morrison | 3664.6 | 3.564026 |
| | | | 246 45 52.9 | 66 46 20.1 | Goodwin | 887.2 | 2.945793 |

[1] No check on this position.

*Columbia River to Tillamook Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Condit, 1874 | 46 03 25.781 | 796.0 | 157 57 50.5 | 337 57 11.2 | Lake | 3125.4 | 3.494901 |
| | 123 54 57.019 | 1225.6 | 173 38 38.9 | 353 38 26.8 | Goodwin | 3265.2 | 3.513908 |
| Callender, 1874 | 46 03 47.042 | 1452.4 | 172 36 38.5 | 352 36 28.8 | Lake | 2259.3 | 3.353966 |
| | 123 55 38.071 | 818.3 | 191 22 09.2 | 11 22 26.7 | Goodwin | 2640.5 | 3.421684 |
| | | | 306 38 34.3 | 126 39 03.9 | Condit | 1099.8 | 3.041317 |
| Gearhart, 1874 | 46 01 37.104 | 1145.6 | 176 57 49.1 | 356 57 42.0 | Callender | 4017.5 | 3.603960 |
| | 123 55 28.170 | 605.7 | 191 17 08.8 | 11 17 31.2 | Condit | 3421.6 | 3.534234 |
| Meadow, 1874 | 46 01 42.929 | 1325.4 | 62 55 41.4 | 242 55 29.6 | Gearhart | 395.1 | 2.596743 |
| | 123 55 11.811 | 254.0 | 171 37 16.6 | 351 36 57.7 | Callender | 3873.4 | 3.588095 |
| Loomis, 1874 | 46 00 33.994 | 1049.6 | 163 08 20.9 | 343 08 01.1 | Gearhart | 2036.1 | 3.308796 |
| | 123 55 00.712 | 15.3 | 173 36 01.8 | 353 35 53.8 | Meadow | 2141.7 | 3.330763 |
| Grimes, 1874 | 46 00 04.834 | 149.2 | 182 36 58.7 | 2 37 03.0 | Gearhart | 2851.8 | 3.455126 |
| | 123 55 34.223 | 736.4 | 218 41 08.3 | 38 41 32.4 | Loomis | 1153.5 | 3.062005 |
| Dunce, 1874 | 45 58 33.180 | 1024.4 | 199 54 09.5 | 19 55 18.3 | Gearhart | 6039.8 | 3.781020 |
| | 123 57 03.767 | 81.1 | 214 14 51.5 | 34 15 55.9 | Grimes | 3423.7 | 3.534502 |
| Rivulet, 1874 | 45 58 25.885 | 799.2 | 204 14 49.9 | 24 16 18.8 | Gearhart | 6475.8 | 3.811291 |
| | 123 57 31.820 | 685.0 | 219 37 45.6 | 39 39 10.2 | Grimes | 3967.3 | 3.598496 |
| | | | 249 32 39.2 | 69 32 59.4 | Dunce | 644.6 | 2.809259 |
| Cliff, 1874 | 45 58 05.576 | 172.2 | 208 27 46.8 | 28 29 45.2 | Gearhart | 7430.1 | 3.870994 |
| | 123 58 12.813 | 275.9 | 222 02 21.6 | 42 04 39.8 | Loomis | 6171.9 | 3.790422 |
| | | | 222 48 59.9 | 42 50 54.0 | Grimes | 5021.0 | 3.700786 |
| Ledge, 1874 | 45 58 11.379 | 351.3 | 207 44 34.8 | 27 46 26.5 | Gearhart | 7177.8 | 3.855994 |
| | 123 58 03.525 | 75.9 | 222 31 04.7 | 42 32 52.1 | Grimes | 4753.7 | 3.677030 |
| | | | 236 43 31.2 | 56 43 54.0 | Rivulet | 816.4 | 2.911903 |
| *Supplementary points.* | | | | | | | |
| Islet 1, 1874 | 45 56 48.948 | 1511.3 | 173 40 02.7 | 353 37 45.6 | Battery | 36923.8 | 4.567306 |
| | 123 59 41.636 | 896.8 | 189 59 17.2 | 10 02 42.2 | Scarboro Hill 2 | 35135.8 | 4.545750 |
| | | | 192 09 04.6 | 12 11 21.6 | Boom | 19416.5 | 4.288171 |
| | | | 198 04 03.0 | 18 06 48.5 | Lake | 15937.1 | 4.202408 |
| | | | 202 04 17.6 | 22 07 12.8 | Callender | 13932.0 | 4.144012 |
| | | | 211 29 26.6 | 31 32 28.9 | Gearhart | 10436.3 | 4.018545 |
| Islet 2, 1874 | 45 56 46.927 | 1448.9 | 173 45 22.1 | 353 43 06.7 | Battery | 36980.1 | 4.567968 |
| | 123 59 44.004 | 947.8 | 190 03 06.4 | 10 06 33.2 | Scarboro Hill 2 | 35206.1 | 4.546618 |
| | | | 192 15 31.7 | 12 17 50.4 | Boom | 19488.3 | 4.289773 |
| | | | 198 10 16.8 | 18 13 04.0 | Lake | 16012.2 | 4.204451 |
| Pinnacle Rock, 1874 | 45 56 49.184 | 1518.6 | 191 36 39.5 | 11 38 50.1 | Boom | 19370.5 | 4.287140 |
| | 123 59 32.860 | 707.7 | 197 25 43.3 | 17 28 22.4 | Lake | 15872.5 | 4.200645 |
| | | | 201 21 36.7 | 21 24 25.6 | Callender | 13855.3 | 4.141615 |
| | | | 210 37 10.8 | 30 40 06.8 | Gearhart | 10332.5 | 4.014206 |
| Dexter,[1] 1874 | 45 58 35.387 | 1092.6 | 86 26 18.5 | 266 25 42.0 | Dunce | 1095.1 | 3.039469 |
| | 123 56 12.994 | 279.7 | 189 44 59.1 | 9 45 31.3 | Gearhart | 5692.9 | 3.755330 |
| Flagstaff, 1874 | 45 58 51.142 | 1579.0 | 68 11 41.1 | 248 10 54.8 | Dunce | 1492.5 | 3.173926 |
| | 123 55 59.396 | 1278.6 | 187 28 00.9 | 7 28 23.4 | Gearhart | 5168.0 | 3.713321 |
| Sea-Side House, cupola,[1] 1874 | 45 58 43.081 | 1330.1 | 79 46 51.1 | 259 45 54.5 | Dunce | 1721.7 | 3.235968 |
| | 123 55 45.057 | 970.0 | 183 52 02.0 | 3 52 14.1 | Gearhart | 5385.3 | 3.731207 |
| Tillamook Rock Lighthouse, 1909 | 45 56 15.939 | 492.1 | 176 31 27.2 | 356 30 10.0 | Battery | 37786.1 | 4.577332 |
| | 124 01 04.858 | 104.7 | 192 28 03.0 | 12 32 27.9 | Scarboro Hill 2 | 36484.8 | 4.562112 |
| | | | 232 51 45.2 | 52 54 00.7 | Tillamook Head | 5090.3 | 3.706740 |
| Outermost Rock of Tillamook Bay,[1] 1875. | 45 29 41.52 | 1281.8 | 189 20 08 | 9 22 10 | Redwood | 22788.2 | 4.357710 |
| | 123 59 03.06 | 66.4 | 190 56 40 | 10 58 45 | Point | 19838.8 | 4.297516 |
| Eastern Peak Double Rock,[1] 1875 | 45 34 05.98 | 184.6 | 188 41 58 | 8 43 10 | Redwood | 14487.9 | 4.161004 |
| | 123 57 53.48 | 1159.7 | 191 18 00 | 11 19 15 | Point | 11536.4 | 4.062070 |
| Flagstaff,[1] 1875 | 45 39 16.23 | 501.1 | 169 27 36 | 349 27 25 | Point | 1763.8 | 3.246442 |
| | 123 55 54.15 | 1172.5 | 197 20 17 | 17 20 29 | Landing | 1213.6 | 3.084066 |
| Middle Peak Neahkahnie, 1875 | 45 44 38.089 | 1176.0 | 260 38 27 | 80 38 33 | Neahkahnie | 188.0 | 2.27418 |
| | 123 56 35.709 | 771.9 | 351 49 23 | 171 50 04 | Landing | 8868.5 | 3.94785 |
| | | | 354 24 27 | 174 24 43 | Redwood | 5219.3 | 3.71761 |
| | | | 355 58 34 | 175 58 53 | Point | 8223.2 | 3.91504 |
| Southwest Peak Neahkahnie, 1875 | 45 44 38.583 | 1191.2 | 267 28 21 | 87 28 32 | Neahkahnie | 336.5 | 2.52704 |
| | 123 56 42.679 | 922.6 | 350 52 53 | 170 53 20 | Landing | 8906.4 | 3.94970 |
| | | | 352 47 09 | 172 47 32 | Redwood | 5251.3 | 3.72027 |
| | | | 354 56 17 | 174 56 41 | Point | 8251.1 | 3.91651 |
| Cape Falcon Rock, 1875 | 45 45 52.872 | 1632.4 | 312 42 14.9 | 132 49 42.5 | Foley | 18429.2 | 4.265507 |
| | 123 59 46.150 | 997.2 | 328 19 23.2 | 148 21 56.4 | Redwood | 8814.8 | 3.945213 |
| | | | 335 54 33.7 | 155 57 09.2 | Point | 11512.7 | 4.061178 |
| Onion Peak, 1875 | 45 49 00.633 | 19.5 | 345 18 01.5 | 165 20 40.3 | Foley | 18928.4 | 4.277113 |
| | 123 53 02.507 | 54.1 | 11 14 08.6 | 191 12 17.6 | Landing | 17213.3 | 4.235864 |
| | | | 13 54 26.2 | 193 52 12.6 | Point | 16799.9 | 4.225307 |

[1] No check on this position.

*Columbia River to Tillamook Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Falcon, 1875 | 45 45 45.575 | 1407.1 | 331 55 01.9 | 151 57 26.2 | Fishery | 9271.2 | 3.967135 |
| | 123 58 47.585 | 1028.5 | 335 12 16.2 | 155 14 07.4 | Redwood | 8016.2 | 3.903967 |
| | | | 341 32 58.7 | 161 34 52.2 | Point | 10842.9 | 4.035147 |
| | | | 346 50 42.0 | 166 52 24.1 | Keaton | 13574.7 | 4.132731 |
| Bend,[1] 1875 | 45 41 17.41 | 537.5 | 106 37 56 | 286 36 05 | Redwood | 3501.0 | 3.544192 |
| | 123 53 37.15 | 803.9 | 149 27 21 | 329 25 19 | Neahkahnie | 7230.1 | 3.859147 |
| Large rock off Carlton,[1] 1875 | 45 45 05.18 | 159.9 | 338 02 50 | 158 04 10 | Redwood | 6501.9 | 3.813037 |
| | 123 58 04.55 | 98.3 | 344 32 22 | 164 33 45 | Point | 9378.2 | 3.972119 |
| A,[1] 1875 | 45 47 20.40 | 629.8 | 358 58 41 | 178 58 49 | Landing | 13791.9 | 4.139625 |
| | 123 55 48.80 | 1054.1 | 1 53 59 | 181 53 45 | Point | 13221.4 | 4.121278 |
| E,[1] 1875 | 45 47 17.59 | 543.1 | 6 20 50 | 186 19 59 | Landing | 13787.2 | 4.139476 |
| | 123 54 27.03 | 583.8 | 9 32 58 | 189 31 45 | Point | 13311.4 | 4.124223 |
| F,[1] 1875 | 45 48 38.58 | 1191.1 | 7 52 13 | 187 50 59 | Landing | 16357.1 | 4.213706 |
| | 123 53 53.97 | 1165.2 | 10 35 52 | 190 34 15 | Point | 15898.3 | 4.201351 |
| Hill a,[1] 1875 | 45 47 24.03 | 741.9 | 331 19 00 | 151 23 37 | Foley | 17465.7 | 4.242187 |
| | 123 55 47.84 | 1033.2 | 9 28 00 | 189 27 32 | Neahkahnie | 5163.4 | 3.712934 |
| Hill b,[1] 1875 | 45 47 18.90 | 583.5 | 333 28 27 | 153 32 37 | Foley | 16949.2 | 4.229150 |
| | 123 55 10.27 | 221.8 | 18 36 27 | 198 35 32 | Neahkahnie | 5206.6 | 3.716556 |
| Hill c,[1] 1875 | 45 45 29.89 | 922.8 | 327 25 28 | 147 29 37 | Foley | 14002.4 | 4.146202 |
| | 123 55 08.86 | 191.5 | 47 09 28 | 227 08 32 | Neahkahnie | 2307.3 | 3.363109 |

*Tillamook Bay.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Principal points.* | | | | | | | |
| Doty, 1908 | 45 32 13.758 | 424.7 | 316 40 13.6 | 136 45 23.0 | Ginger | 13738.7 | 4.137946 |
| | 123 51 07.607 | 165.0 | 42 03 24.2 | 222 01 52.6 | Shell Point | 4156.8 | 3.618756 |
| | | | 45 50 44.8 | 225 47 57.0 | Boulder Point | 7117.2 | 3.852307 |
| Green Hill 2, 1908 | 45 33 44.811 | 1383.4 | 294 21 57.2 | 114 25 21.2 | Doty | 6806.2 | 3.832907 |
| | 123 55 53.361 | 1157.3 | 309 17 08.6 | 129 25 41.9 | Ginger | 20203.2 | 4.305421 |
| | | | 329 53 55.7 | 149 55 48.1 | Shell Point | 6816.3 | 3.833550 |
| | | | 351 57 12.1 | 171 57 48.2 | Boulder Point | 7848.1 | 3.894762 |
| Pitcher Point, 1866 | 45 30 25.282 | 780.5 | 187 48 21.5 | 7 48 49.3 | Green Hill 2 | 6217.6 | 3.793626 |
| | 123 56 32.300 | 701.1 | 266 27 53.1 | 86 30 13.2 | Shell Point | 4272.0 | 3.630628 |
| | | | 309 38 26.9 | 129 39 30.8 | Boulder Point | 2524.6 | 3.402191 |
| Tillamook Bay west base, 1866 | 45 30 10.264 | 316.9 | 67 34 35.9 | 247 33 04.6 | Boulder Point | 3006.1 | 3.478002 |
| | 123 52 54.797 | 1189.7 | 147 45 40.2 | 327 45 25.1 | Shell Point | 857.9 | 2.933431 |
| Rock Point, 1866 | 45 29 04.669 | 144.1 | 133 05 32.5 | 313 05 01.7 | Boulder Point | 1285.0 | 3.108888 |
| | 123 54 19.555 | 424.7 | 206 40 45.0 | 26 41 30.4 | Shell Point | 3078.6 | 3.488352 |
| | | | 222 15 24.6 | 42 16 25.1 | Tillamook Bay west base | 2736.4 | 3.437183 |
| Mud, 1866 | 45 29 27.668 | 854.2 | 70 43 22.0 | 250 42 15.3 | Rock Point | 2149.7 | 3.332372 |
| | 123 52 46.120 | 1001.4 | 93 14 58.1 | 273 13 20.6 | Boulder Point | 2972.0 | 3.473046 |
| | | | 171 50 54.3 | 351 50 48.1 | Tillamook Bay west base | 1328.5 | 3.123349 |
| Slough, 1866 | 45 29 20.626 | 636.8 | 79 55 29.8 | 259 53 58.7 | Rock Point | 2812.4 | 3.449077 |
| | 123 52 12.045 | 261.6 | 106 22 32.5 | 286 22 08.2 | Mud | 771.2 | 2.887178 |
| | | | 148 47 57.3 | 328 47 26.8 | Tillamook Bay west base | 1791.6 | 3.253253 |
| Tillamook Bay east base, 1866 | 45 30 10.968 | 338.6 | 351 26 22.1 | 171 26 29.8 | Slough | 1571.7 | 3.196364 |
| | 123 52 22.818 | 495.4 | 20 43 56.8 | 200 43 40.2 | Mud | 1429.3 | 3.155131 |
| | | | 88 12 32.7 | 268 12 09.9 | Tillamook Bay west base | 694.588 | 2.841727 |
| Sand (1908), 1908 | 45 32 57.737 | 1782.5 | 225 01 42.9 | 45 02 30.8 | Green Hill 2 | 2056.6 | 3.313143 |
| | 123 57 00.448 | 9.7 | 280 01 23.2 | 100 05 35.1 | Doty | 7774.3 | 3.890659 |
| Pyramid Rock, 1908 | 45 29 46.512 | 1435.9 | 203 59 24.2 | 24 00 50.6 | Sand (1908) | 6462.4 | 3.810394 |
| | 123 59 01.573 | 34.2 | 209 01 05.5 | 29 03 19.8 | Green Hill 2 | 8414.6 | 3.925032 |
| | | | 246 06 46.8 | 66 12 25.0 | Doty | 11221.1 | 4.050036 |
| Spit, 1908 | 45 32 56.737 | 1751.6 | 102 07 17.2 | 282 07 12.5 | Sand (1908) | 147.1 | 2.167569 |
| | 123 56 53.819 | 1167.4 | 221 27 18.8 | 41 28 02.0 | Green Hill 2 | 1980.5 | 3.296777 |
| | | | 25 17 07.0 | 205 15 35.8 | Pyramid Rock | 6494.3 | 3.812533 |
| Cape Mears Lighthouse, 1908 | 45 29 13.038 | 402.5 | 154 27 04.0 | 334 26 47.8 | Pyramid Rock | 1145.5 | 3.058978 |
| | 123 58 38.821 | 843.0 | 197 05 51.9 | 17 07 02.0 | Sand (1908) | 7258.2 | 3.860828 |
| | | | 198 15 08.0 | 18 16 22.9 | Spit | 7272.5 | 3.861681 |
| Stump, 1866 | 45 29 38.402 | 1185.6 | 64 49 25.4 | 244 49 02.3 | Mud | 778.9 | 2.891466 |
| | 123 52 13.659 | 296.6 | 137 45 52.5 | 317 45 23.2 | Tillamook Bay west base | 1328.7 | 3.123416 |
| | | | 168 48 44.6 | 348 48 38.1 | Tillamook Bay east base | 1024.9 | 3.010678 |
| Sandstone Point, 1866 | 45 31 48.683 | 1503.0 | 340 57 59.3 | 160 58 25.5 | Shell Point | 2446.5 | 3.388549 |
| | 123 53 52.633 | 1142.2 | 19 59 39.0 | 199 58 49.0 | Boulder Point | 4454.0 | 3.648748 |
| | | | 53 24 12.9 | 233 22 19.0 | Pitcher Point | 4317.2 | 3.635207 |

[1] No check on this position.

*Tillamook Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Flat, 1866 | 45 32 10.820 | 334.0 | 281 39 34.9 | 101 41 23.7 | Sandstone Point | 3377.3 | 3.528574 |
| | 123 56 25.062 | 543.8 | 2 45 39.0 | 182 45 33.9 | Pitcher Point | 3262.0 | 3.513484 |
| Memalust Head, 1866 | 45 32 52.465 | 1619.7 | 341 10 28.5 | 161 10 50.6 | Sandstone Point | 2080.4 | 3.318140 |
| | 123 54 23.569 | 511.2 | 31 35 43.4 | 211 34 11.6 | Pitcher Point | 5333.9 | 3.727048 |
| | | | 64 00 34.9 | 243 59 08.2 | Flat | 2932.6 | 3.467258 |
| Sand Hill, 1866 | 45 33 02.541 | 78.4 | 276 12 24.7 | 96 13 58.6 | Memalust Head | 2871.1 | 3.458052 |
| | 123 56 35.147 | 762.4 | 352 11 47.6 | 172 11 54.8 | Flat | 1611.7 | 3.207279 |
| Bailey Point, 1866 | 45 33 28.030 | 865.4 | 311 45 18.6 | 131 45 59.1 | Memalust Head | 1648.6 | 3.217107 |
| | 123 55 20.262 | 439.4 | 30 32 06.7 | 210 31 20.6 | Flat | 2767.3 | 3.442055 |
| | | | 64 09 31.4 | 244 08 38.0 | Sand Hill | 1804.9 | 3.256444 |
| Green Hill, 1866 | 45 33 45.257 | 1397.2 | 309 53 37.4 | 129 54 41.5 | Memalust Head | 2540.7 | 3.404955 |
| | 123 55 53.429 | 1158.7 | 13 14 48.3 | 193 14 25.7 | Flat | 2995.2 | 3.476422 |
| | | | 34 27 33.0 | 214 27 03.2 | Sand Hill | 1599.3 | 3.203936 |
| Brush, 1866 | 45 32 06.014 | 185.7 | 299 24 18.7 | 119 27 04.6 | Shell Point | 5796.2 | 3.763146 |
| | 123 57 08.493 | 184.3 | 329 57 23.2 | 149 58 52.9 | Boulder Point | 5452.8 | 3.736619 |
| | | | 345 49 15.0 | 165 49 40.8 | Pitcher Point | 3207.5 | 3.506170 |
| Middle, 1866 | 45 31 10.126 | 312.6 | 213 35 52.1 | 33 36 33.0 | Flat | 2249.7 | 3.352128 |
| | 123 57 22.438 | 487.0 | 230 50 05.4 | 50 52 13.1 | Memalust Head | 5004.5 | 3.699364 |
| | | | 321 49 28.0 | 141 50 03.8 | Pitcher Point | 1761.0 | 3.245760 |
| Sand, 1866 | 45 33 23.691 | 731.4 | 231 39 31.6 | 51 39 59.3 | Green Hill | 1073.3 | 3.030741 |
| | 123 56 32.248 | 699.5 | 289 02 29.2 | 109 04 01.0 | Memalust Head | 2953.0 | 3.470261 |
| *Supplementary points.* | | | 5 30 05.1 | 185 30 03.0 | Sand Hill | 656.0 | 2.816895 |
| Bailey's house, southeast gable, 1866 | 45 33 27.903 | 861.4 | 314 16 16.9 | 134 16 53.8 | Memalust Head | 1567.2 | 3.195114 |
| | 123 55 15.298 | 331.8 | 329 38 40.4 | 149 39 39.4 | Sandstone Point | 3549.5 | 3.550173 |
| | | | 32 27 38.6 | 212 26 48.8 | Flat | 2820.2 | 3.450281 |
| New house, near Bailey's, east gable, 1866. | 45 33 30.563 | 943.6 | 323 10 59.6 | 143 11 28.6 | Memalust Head | 1469.2 | 3.167067 |
| | 123 55 04.154 | 90.1 | 35 29 37.6 | 215 28 40.0 | Flat | 3023.5 | 3.480506 |
| | | | 77 22 56.2 | 257 22 44.7 | Bailey Point | 358.0 | 2.553898 |
| Morgan's new barn, south gable, 1866. | 45 30 14.795 | 456.8 | 49 27 52.4 | 229 26 29.3 | Rock Point | 3330.3 | 3.522485 |
| | 123 52 23.008 | 499.5 | 78 32 41.6 | 258 32 19.0 | Tillamook Bay west base | 704.1 | 2.847658 |
| | | | 117 02 32.4 | 297 01 54.7 | Shell Point | 1288.6 | 3.110102 |
| House No. 6, 1866 | 45 28 41.257 | 1273.7 | 207 59 12.9 | 28 00 00.9 | Tillamook Bay west base | 3112.0 | 3.493036 |
| | 123 54 02.063 | 44.8 | 229 00 33.1 | 49 01 27.3 | Mud | 2184.7 | 3.339398 |
| | | | 233 08 28.8 | 53 09 46.1 | Stump | 2941.8 | 3.468620 |
| House No. 3, south gable, 1866 | 45 29 09.261 | 285.9 | 119 16 22.3 | 299 15 49.0 | Mud | 1162.4 | 3.065337 |
| | 123 51 59.427 | 1290.6 | 147 27 08.8 | 327 26 29.3 | Tillamook Bay west base | 2234.3 | 3.349148 |
| | | | 165 04 26.8 | 345 04 10.1 | Tillamook Bay east base | 1971.6 | 3.294820 |
| House No. 2, north gable, 1866 | 45 29 10.734 | 331.4 | 117 07 34.7 | 297 07 15.1 | Slough | 669.9 | 2.825083 |
| | 123 51 44.591 | 968.3 | 140 19 57.9 | 320 19 07.8 | Tillamook Bay west base | 2387.8 | 3.377991 |
| | | | 155 56 58.4 | 335 56 31.1 | Tillamook Bay east base | 2036.4 | 3.308866 |
| Clark's house, chimney, 1866 | 45 30 15.994 | 493.8 | 359 05 09.9 | 179 05 10.8 | Slough | 1709.6 | 3.232882 |
| | 123 52 13.300 | 288.7 | 0 23 03.6 | 180 23 03.3 | Stump | 1160.6 | 3.064680 |
| | | | 25 32 00.1 | 205 31 36.7 | Mud | 1653.4 | 3.218373 |
| Log, 1866 | 45 30 24.940 | 770.0 | 36 03 04.6 | 216 02 05.4 | Rock Point | 3064.8 | 3.486406 |
| | 123 52 56.502 | 1226.6 | 59 44 14.5 | 239 42 44.5 | Boulder Point | 3174.4 | 3.501656 |
| | | | 122 56 30.1 | 302 56 16.3 | Shell Point | 501.2 | 2.700013 |
| Gap, 1866 | 45 30 37.552 | 1159.3 | 206 17 31.3 | 26 18 18.1 | Flat | 3211.9 | 3.506756 |
| | 123 57 30.632 | 664.9 | 245 04 49.5 | 65 07 25.1 | Sandstone Point | 5216.1 | 3.717346 |
| | | | 271 11 05.7 | 91 14 07.5 | Shell Point | 5531.3 | 3.742824 |

*Nestuggu Bay.*

| *Principal points.* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
|---|---|---|---|---|---|---|---|
| Round Top, 1908 | 45 13 06.937 | 214.1 | 203 23 26.3 | 23 25 00.2 | Buzzard Butte | 7258.7 | 3.860858 |
| | 123 54 51.469 | 1123.0 | 271 49 47.1 | 91 56 32.6 | Hebo | 12473.3 | 4.095980 |
| Flat, 1908 | 45 10 21.015 | 648.7 | 166 19 08.1 | 346 18 27.6 | Round Top | 5271.8 | 3.721961 |
| | 123 53 54.323 | 1186.3 | 187 54 16.8 | 7 55 10.1 | Buzzard Butte | 11896.9 | 4.075433 |
| | | | 247 10 40.4 | 67 16 45.2 | Hebo | 12173.0 | 4.085396 |
| Fletcher, 1883 | 45 09 29.427 | 908.4 | 196 29 54.1 | 16 30 58.8 | Round Top | 7003.4 | 3.845306 |
| | 123 56 22.622 | 494.1 | 243 48 03.6 | 63 49 48.8 | Flat | 3609.1 | 3.557404 |
| Bozley, 1883 | 45 09 13.150 | 405.9 | 207 24 16.3 | 27 26 18.0 | Round Top | 8130.7 | 3.910130 |
| | 123 57 42.985 | 939.0 | 247 13 08.1 | 67 15 50.4 | Flat | 5415.7 | 3.733656 |
| | | | 254 01 05.4 | 74 02 02.4 | Fletcher | 1825.9 | 3.261473 |
| Gage B, 1908 | 45 11 08.964 | 276.7 | 204 39 22.0 | 24 40 16.5 | Round Top | 4007.5 | 3.602875 |
| | 123 56 08.091 | 176.6 | 296 51 44.9 | 116 53 19.9 | Flat | 3274.4 | 3.515130 |
| | | | 5 53 49.6 | 185 53 39.3 | Fletcher | 3089.1 | 3.489834 |
| | | | 30 06 23.8 | 210 05 16.5 | Bozley | 4132.4 | 3.616204 |

*Nestugga Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Haystack Rock, 1883 | 45 12 45.422 | 1402.2 | 263 14 16.1 | 83 17 19.0 | Round Top | 5662.0 | 3.752971 |
| | 123 59 09.165 | 200.0 | 269 06 53.5 | 89 16 41.9 | Hebo | 18092.1 | 4.257489 |
| | | | 302 56 17.9 | 123 00 01.3 | Flat | 8191.9 | 3.913382 |
| | | | 330 32 32.5 | 150 40 33.3 | Bald | 30243.9 | 4.480637 |
| | | | 343 58 18.5 | 163 59 19.6 | Bozley | 6817.7 | 3.833640 |
| Sheep Hill, 1883 | 45 09 41.514 | 1281.6 | 285 44 13.8 | 105 44 56.8 | Fletcher | 1375.3 | 3.138382 |
| | 123 57 23.225 | 507.3 | 26 14 30.1 | 206 14 16.1 | Bozley | 976.2 | 2.989548 |
| Fern Hill, 1883 | 45 08 54.821 | 1692.4 | 126 26 11.3 | 306 25 46.4 | Bozley | 952.7 | 2.978977 |
| | 123 57 07.895 | 172.5 | 166 55 25.3 | 346 55 14.3 | Sheep Hill | 1479.8 | 3.170211 |
| | | | 222 47 12.2 | 42 47 44.3 | Fletcher | 1455.8 | 3.163096 |
| Goose, 1883 | 45 09 59.068 | 1823.5 | 357 22 11.3 | 177 22 12.7 | Fletcher | 916.0 | 2.961901 |
| | 123 56 24.546 | 536.1 | 25 31 26.4 | 205 30 55.7 | Fern Hill | 2197.8 | 3.341982 |
| | | | 67 05 03.9 | 247 04 22.3 | Sheep Hill | 1391.4 | 3.143452 |
| Craven, 1883 | 45 09 58.424 | 1803.6 | 35 54 20.2 | 215 53 59.2 | Fletcher | 1105.1 | 3.043405 |
| | 123 55 52.950 | 1156.4 | 91 39 16.2 | 271 38 53.8 | Goose | 690.3 | 2.839048 |
| Vine Maple, 1883 | 45 10 20.715 | 639.5 | 303 03 50.9 | 123 04 25.2 | Craven | 1261.2 | 3.100770 |
| | 123 56 41.346 | 902.9 | 331 13 52.1 | 151 14 04.0 | Goose | 762.3 | 2.882150 |
| | | | 345 30 58.7 | 165 31 12.0 | Fletcher | 1635.3 | 3.213587 |
| Gage, 1883 | 45 10 33.138 | 1023.0 | 358 24 55.4 | 178 24 56.3 | Craven | 1072.0 | 3.030211 |
| | 123 55 54.307 | 1185.9 | 32 07 31.6 | 212 07 10.1 | Goose | 1241.8 | 3.094068 |
| | | | 69 31 53.8 | 249 31 20.4 | Vine Maple | 1096.4 | 3.039966 |
| Grass, 1883 | 45 10 51.508 | 1590.1 | 303 53 21.6 | 123 53 49.0 | Gage | 1017.0 | 3.007305 |
| | 123 56 32.969 | 719.8 | 331 55 36.6 | 151 56 04.9 | Craven | 1857.2 | 3.268853 |
| | | | 10 53 32.9 | 190 53 27.0 | Vine Maple | 968.0 | 2.985886 |
| Nestucca, 1883 | 45 09 31.691 | 978.3 | 253 10 08.1 | 73 10 40.7 | Sheep Hill | 1047.6 | 3.020178 |
| | 123 58 09.133 | 199.5 | 315 03 32.1 | 135 03 50.7 | Bozley | 808.6 | 2.907733 |
| Point, 1883 | 45 10 00.058 | 20.3 | 298 54 46.6 | 118 55 21.3 | Sheep Hill | 1222.2 | 3.087131 |
| | 123 58 12.208 | 266.6 | 336 28 43.0 | 156 29 03.8 | Bozley | 1599.5 | 3.203977 |
| | | | 355 42 19.5 | 175 42 21.7 | Nestucca | 896.7 | 2.952669 |
| Shersinger, 1883 | 45 09 54.941 | 1696.1 | 39 02 44.2 | 219 02 25.3 | Nestucca | 924.1 | 2.965720 |
| | 123 57 42.481 | 927.8 | 105 12 45.5 | 285 12 24.4 | Point | 672.8 | 2.827862 |
| Beach, 1883 | 45 10 41.818 | 1291.0 | 332 42 49.9 | 152 43 21.0 | Sheep Hill | 2094.6 | 3.321102 |
| | 123 58 07.190 | 157.0 | 339 32 58.5 | 159 33 16.0 | Shersinger | 1544.4 | 3.188770 |
| | | | 4 55 45.1 | 184 55 41.5 | Point | 1275.3 | 3.105625 |
| Green Bluff, 1883 | 45 10 19.734 | 609.2 | 29 51 47.1 | 209 51 32.8 | Shersinger | 882.6 | 2.945740 |
| | 123 57 22.360 | 488.3 | 61 35 35.4 | 241 35 00.0 | Point | 1237.6 | 3.092597 |
| | | | 124 51 33.4 | 304 51 01.6 | Beach | 1192.9 | 3.076605 |
| Red Rock, 1883 | 45 10 53.886 | 1663.5 | 14 49 26.3 | 194 49 17.2 | Green Bluff | 1090.6 | 3.037663 |
| | 123 57 09.582 | 209.2 | 21 32 50.2 | 201 32 26.8 | Shersinger | 1956.4 | 3.291449 |
| | | | 73 30 23.7 | 253 29 42.8 | Beach | 1311.8 | 3.117876 |
| Talbert, 1883 | 45 08 37.929 | 1170.9 | 171 52 52.4 | 351 52 47.4 | Bozley | 1098.3 | 3.040725 |
| | 123 57 35.884 | 784.0 | 229 32 19.2 | 49 32 39.0 | Fern Hill | 803.6 | 2.905061 |
| Shortridge, 1883 | 45 08 54.583 | 1685.0 | 230 14 15.3 | 50 14 37.7 | Bozley | 896.2 | 2.952419 |
| | 123 58 14.524 | 317.3 | 269 42 11.0 | 89 42 58.2 | Fern Hill | 1455.6 | 3.163037 |
| | | | 301 20 17.9 | 121 20 45.3 | Talbert | 988.4 | 2.994925 |
| Faulconer, 1883 | 45 08 01.989 | 61.4 | 187 18 03.6 | 7 18 10.3 | Shortridge | 1636.9 | 3.214016 |
| | 123 58 24.046 | 525.5 | 223 28 48.3 | 43 29 22.4 | Talbert | 1529.2 | 3.184454 |
| | | | 225 33 47.4 | 45 34 41.3 | Fern Hill | 2329.9 | 3.367332 |
| Spruce, 1883 | 45 10 45.146 | 1393.7 | 244 00 39.9 | 64 00 53.0 | Grass | 448.2 | 2.651505 |
| | 123 56 51.423 | 1122.8 | 286 32 56.4 | 106 33 36.9 | Gage | 1301.0 | 3.114289 |
| | | | 318 28 36.4 | 138 29 17.8 | Craven | 1926.3 | 3.284727 |
| | | | 124 14 20.1 | 304 14 07.2 | Red Rock | 479.6 | 2.680862 |
| Adler Point, 1883 | 45 10 55.357 | 1708.9 | 313 49 44.8 | 133 49 48.8 | Grass | 171.6 | 2.234452 |
| | 123 56 38.638 | 843.6 | 3 09 53.4 | 183 09 51.5 | Vine Maple | 1071.0 | 3.029804 |
| | | | 41 31 36.9 | 221 31 27.8 | Spruce | 421.0 | 2.624330 |
| Mullaney, 1883 | 45 11 27.300 | 842.8 | 325 07 31.3 | 145 07 53.6 | Alder Point | 1201.9 | 3.079874 |
| | 123 57 10.115 | 220.8 | 342 35 13.3 | 162 35 26.5 | Spruce | 1363.8 | 3.134751 |
| | | | 359 21 12.5 | 179 21 12.8 | Red Rock | 1031.6 | 3.013493 |
| Sand Dune, 1883 | 45 11 14.913 | 460.4 | 246 11 06.6 | 66 11 34.7 | Mullaney | 947.1 | 2.976414 |
| | 123 57 49.809 | 1087.4 | 306 27 52.7 | 126 28 21.1 | Red Rock | 1092.1 | 3.038254 |
| Buckhorn, 1883 | 45 11 03.478 | 107.4 | 222 16 11.9 | 42 16 22.3 | Sand Dune | 477.0 | 2.678548 |
| | 123 58 04.506 | 98.4 | 283 51 57.6 | 103 52 36.5 | Red Rock | 1235.2 | 3.091725 |
| | | | 5 00 32.1 | 185 00 30.1 | Beach | 671.2 | 2.826881 |
| Barnhart, 1883 | 45 10 54.925 | 1695.6 | 122 54 59.2 | 302 54 28.2 | Sand Dune | 1135.6 | 3.055243 |
| | 123 57 06.140 | 134.0 | 175 02 14.9 | 355 02 12.1 | Mullaney | 1003.2 | 3.001386 |
| | | | 268 43 28.1 | 88 43 47.5 | Alder Point | 600.6 | 2.778577 |
| | | | 313 12 42.4 | 133 12 52.7 | Spruce | 440.9 | 2.644323 |
| Horseshoe Dune, 1883 | 45 11 32.471 | 1002.4 | 283 25 00.2 | 103 25 21.9 | Mullaney | 687.9 | 2.837506 |
| | 123 57 40.766 | 889.9 | 326 53 06.0 | 146 53 30.6 | Barnhart | 1383.8 | 3.141072 |
| | | | 330 14 50.0 | 150 15 12.0 | Red Rock | 1372.0 | 3.137340 |
| | | | 20 00 44.3 | 200 00 37.9 | Sand Dune | 576.9 | 2.761068 |

*Nestugga Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Hardy Rock, 1883 | 45 11 24.944 | 770.0 | 243 04 40.6 | 63 04 55.5 | Horseshoe Dune | 513.2 | 2.710313 |
| | 123 58 01.729 | 37.8 | 319 57 21.0 | 139 57 29.5 | Sand Dune | 404.5 | 2.606903 |
| | | | 5 13 40.4 | 185 13 38.4 | Buckhorn | 665.4 | 2.823093 |
| Nestugga Bay southeast base, 1883 | 45 11 47.627 | 1470.3 | 324 29 05.5 | 144 29 20.0 | Mullaney | 770.9 | 2.887000 |
| | 123 57 30.630 | 668.6 | 25 18 37.5 | 205 18 30.3 | Horseshoe Dune | 517.5 | 2.713941 |
| Drift, 1883 | 45 11 46.288 | 1429.0 | 266 13 37.1 | 86 13 57.5 | Nestugga Bay southeast base | 628.6 | 2.798405 |
| | 123 57 59.368 | 1295.9 | 316 24 22.8 | 136 24 36.0 | Horseshoe Dune | 588.9 | 2.770042 |
| | | | 4 28 22.2 | 184 28 20.5 | Hardy Rock | 660.9 | 2.820134 |
| Nestugga Bay northwest base, 1883 | 45 12 05.779 | 178.4 | 328 39 55.5 | 148 40 06.6 | Nestugga Bay southeast base | 656.0 | 2.816920 |
| | 123 57 46.259 | 1009.6 | 353 20 51.1 | 173 20 55.0 | Horseshoe Dune | 1035.2 | 3.015015 |
| | | | 25 26 00.4 | 205 25 51.1 | Drift | 666.2 | 2.823637 |

*Yaquina Bay and River.*

| *Principal points.* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Jet, 1914 | 44 36 59.380 | 1832.9 | 173 00 00.2 | 352 59 56.7 | Yaquina Head Lighthouse, old tower. | 910.0 | 2.959026 |
| | 124 03 38.692 | 853.1 | | | | | |
| Port, 1914 | 44 37 46.219 | 1426.7 | 14 32 09.1 | 194 31 57.2 | Jet | 1493.6 | 3.174239 |
| | 124 03 21.689 | 478.1 | 41 49 59.5 | 221 49 44.1 | Yaquina Head Lighthouse, old tower. | 728.3 | 2.862284 |
| Wire, 1914 | 44 37 10.047 | 310.1 | 68 10 01.6 | 248 09 35.4 | Jet | 885.2 | 2.947031 |
| | 124 03 01.424 | 31.4 | 121 36 54.4 | 301 36 24.7 | Yaquina Head Lighthouse, old tower. | 1095.0 | 3.039405 |
| | | | 158 11 42.5 | 338 11 28.2 | Port | 1202.6 | 3.080130 |
| Mack, 1914 | 44 37 38.354 | 1183.9 | 59 22 39.6 | 239 21 52.6 | Wire | 1715.1 | 3.234282 |
| | 124 01 54.481 | 1201.0 | 97 12 23.1 | 277 11 21.8 | Port | 1937.7 | 3.287276 |
| Yaquina east base, 1914 | 44 37 12.842 | 396.4 | 136 10 00.5 | 316 09 29.0 | Port | 1428.3 | 3.154827 |
| | 124 02 36.813 | 811.6 | 229 50 16.0 | 49 50 45.7 | Mack | 1221.1 | 3.086746 |
| Yaquina west base, 1914 | 44 37 13.591 | 419.5 | 158 50 43.2 | 338 50 30.8 | Port | 1080.0 | 3.033404 |
| | 124 03 04.008 | 88.4 | 243 29 16.8 | 63 30 05.6 | Mack | 1712.8 | 3.233702 |
| | | | 272 12 13.2 | 92 12 32.3 | Yaquina east base | 600.001 | 2.778152 |
| Hint, 1914 | 44 36 52.370 | 1616.5 | 105 31 27.2 | 285 30 24.6 | Wire | 2039.7 | 3.309575 |
| | 124 01 32.282 | 711.8 | 124 34 57.9 | 304 33 41.0 | Port | 2929.3 | 3.466760 |
| | | | 160 58 39.9 | 340 58 24.3 | Mack | 1501.4 | 3.176503 |
| Bend, 1914 | 44 37 22.652 | 699.2 | 61 43 05.4 | 241 42 10.1 | Hint | 1972.3 | 3.294973 |
| | 124 00 13.509 | 297.8 | 102 17 38.8 | 282 16 27.9 | Mack | 2278.1 | 3.357571 |
| Quill, 1914 | 44 36 41.359 | 1276.6 | 105 34 52.9 | 285 34 14.1 | Hint | 1265.7 | 3.102346 |
| | 124 00 36.985 | 815.5 | 135 50 44.2 | 315 49 49.8 | Mack | 2452.4 | 3.389592 |
| | | | 202 05 58.4 | 22 06 14.9 | Bend | 1375.7 | 3.138520 |
| Made, 1914 | 44 36 24.105 | 744.1 | 123 57 36.9 | 303 56 55.7 | Hint | 1562.1 | 3.193700 |
| | 124 00 33.521 | 739.2 | 171 50 14.4 | 351 50 12.0 | Quill | 538.1 | 2.730822 |
| Case, 1914 | 44 36 22.145 | 683.6 | 146 32 28.3 | 326 32 08.7 | Hint | 1118.3 | 3.048563 |
| | 124 01 04.318 | 95.2 | 225 27 31.7 | 45 27 50.9 | Quill | 845.6 | 2.927160 |
| | | | 264 54 25.9 | 84 54 47.5 | Made | 681.8 | 2.833678 |
| Yaq, 1914 | 44 36 10.802 | 333.4 | 117 20 52.5 | 297 20 31.0 | Case | 762.2 | 2.882081 |
| | 124 00 33.617 | 741.4 | 180 17 43.7 | 0 17 43.8 | Made | 410.6 | 2.613439 |
| Soft, 1914 | 44 36 05.288 | 163.2 | 157 47 13.1 | 337 47 06.4 | Case | 562.0 | 2.749765 |
| | 124 00 54.683 | 1206.0 | 218 46 47.9 | 38 47 02.8 | Made | 745.1 | 2.872200 |
| | | | 249 52 40.0 | 69 52 54.8 | Yaq | 494.8 | 2.694409 |
| Out, 1914 | 44 35 51.065 | 1576.2 | 185 55 03.2 | 5 55 04.6 | Soft | 441.4 | 2.644835 |
| | 124 00 56.746 | 1251.6 | 219 56 10.3 | 39 56 26.5 | Yaq | 794.6 | 2.900150 |
| Wise, 1914 | 44 35 44.008 | 1358.4 | 121 19 05.4 | 301 18 54.0 | Out | 419.1 | 2.622286 |
| | 124 00 40.514 | 893.6 | 154 33 34.3 | 334 33 24.3 | Soft | 727.4 | 2.861780 |
| | | | 190 25 15.3 | 10 25 20.1 | Yaq | 840.9 | 2.924765 |
| Log, 1914 | 44 35 36.802 | 1136.0 | 210 49 35.2 | 30 49 43.6 | Out | 512.7 | 2.709871 |
| | 124 01 08.659 | 191.0 | 250 16 56.1 | 70 17 15.9 | Wise | 659.4 | 2.819166 |
| Et, 1914 | 44 35 24.093 | 743.7 | 149 57 07.1 | 329 56 59.9 | Log | 453.2 | 2.656306 |
| | 124 00 58.370 | 1287.5 | 182 27 46.3 | 2 27 47.5 | Out | 833.3 | 2.920824 |
| | | | 212 38 39.8 | 32 38 52.4 | Wise | 730.1 | 2.863381 |
| Stump, 1914 | 44 35 10.146 | 313.2 | 203 52 20.9 | 23 52 32.5 | Log | 899.8 | 2.954147 |
| | 124 01 25.169 | 555.2 | 233 55 58.4 | 53 56 17.2 | Et | 731.3 | 2.864092 |
| Water, 1914 | 44 35 10.103 | 311.9 | 90 10 51.7 | 270 10 38.3 | Stump | 422.9 | 2.626203 |
| | 124 01 06.000 | 132.4 | 175 55 43.5 | 355 55 41.7 | Log | 826.2 | 2.917095 |
| | | | 201 17 28.3 | 21 17 33.7 | Et | 463.5 | 2.666018 |

*Yaquina Bay and River*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Mud, 1914 | 44 34 51.468 | 1588.7 | 155 34 40.6 | 335 34 32.3 | Stump | 633.2 | 2.801544 |
| | 124 01 13.301 | 293.4 | 195 38 32.2 | 15 38 37.3 | Water | 597.4 | 2.776226 |
| Road, 1914 | 44 35 04.863 | 150.1 | 36 18 01.8 | 216 17 52.1 | Mud | 513.0 | 2.710136 |
| | 124 00 59.534 | 1313.3 | 106 05 20.8 | 286 05 02.8 | Stump | 588.6 | 2.769780 |
| | | | 138 35 46.3 | 318 35 41.7 | Water | 215.7 | 2.333769 |
| Caf, 1914 | 44 34 46.812 | 445.0 | 111 08 36.9 | 291 08 25.1 | Mud | 398.5 | 2.600388 |
| | 124 00 56.456 | 1245.7 | 173 03 01.7 | 353 02 59.6 | Road | 561.3 | 2.749199 |
| Rail, 1914 | 44 35 02.915 | 90.0 | 6 16 24.6 | 186 16 22.9 | Caf | 500.1 | 2.699028 |
| | 124 00 53.979 | 1190.8 | 50 20 41.8 | 230 20 28.3 | Mud | 553.7 | 2.743262 |
| | | | 116 07 35.0 | 296 07 31.2 | Road | 136.5 | 2.135139 |
| Can, 1914 | 44 35 00.617 | 19.0 | 66 41 25.5 | 246 40 54.1 | Caf | 1076.7 | 3.032100 |
| | 124 00 11.635 | 256.7 | 94 20 49.7 | 274 20 20.0 | Rail | 936.8 | 2.971652 |
| King, 1914 | 44 34 43.071 | 1329.5 | 96 24 11.0 | 276 23 38.3 | Caf | 1036.2 | 3.015425 |
| | 124 00 09.783 | 215.8 | 122 08 34.6 | 302 08 03.6 | Rail | 1151.5 | 3.061251 |
| | | | 175 41 09.3 | 355 41 08.0 | Can | 543.1 | 2.734913 |
| Gravel, 1914 | 44 34 38.197 | 1179.0 | 112 24 34.1 | 292 24 22.5 | King | 394.7 | 2.596264 |
| | 123 59 53.244 | 1174.7 | 149 37 10.8 | 329 36 57.9 | Can | 802.2 | 2.904298 |
| Slope, 1914 | 44 34 54.474 | 1681.5 | 21 08 46.5 | 201 08 40.3 | Gravel | 538.7 | 2.731371 |
| | 123 59 44.435 | 980.3 | 57 48 51.0 | 237 48 33.2 | King | 660.8 | 2.820055 |
| | | | 107 32 17.3 | 287 31 58.2 | Can | 629.3 | 2.798854 |
| Low, 1914 | 44 34 46.084 | 1422.5 | 67 41 21.5 | 247 41 02.6 | Gravel | 641.3 | 2.807054 |
| | 123 59 26.353 | 581.4 | 122 59 37.3 | 302 59 24.6 | Slope | 475.6 | 2.677246 |
| Shell, 1914 | 44 34 31.393 | 969.0 | 121 14 50.7 | 301 14 39.7 | Gravel | 404.8 | 2.607255 |
| | 123 59 37.557 | 828.7 | 167 58 37.7 | 347 58 32.9 | Slope | 728.4 | 2.862380 |
| | | | 208 35 41.1 | 28 35 49.0 | Low | 516.5 | 2.713036 |
| Pile, 1914 | 44 34 18.272 | 564.0 | 112 56 37.8 | 292 56 07.3 | Shell | 1039.2 | 3.016680 |
| | 123 58 54.185 | 1195.6 | 140 25 16.6 | 320 24 54.0 | Low | 1113.9 | 3.046837 |
| Pine, 1914 | 44 34 34.149 | 1054.1 | 83 44 43.5 | 263 44 18.8 | Shell | 780.5 | 2.892348 |
| | 123 59 02.395 | 52.8 | 124 52 33.7 | 304 52 16.9 | Low | 644.3 | 2.809083 |
| | | | 339 42 53.6 | 159 42 59.4 | Pile | 522.5 | 2.718086 |
| Cut, 1914 | 44 34 31.993 | 987.5 | 36 10 11.5 | 216 10 01.7 | Pile | 524.6 | 2.719857 |
| | 123 58 40.153 | 885.9 | 97 43 37.0 | 277 43 21.4 | Pine | 495.2 | 2.694812 |
| Clay, 1914 | 44 34 17.817 | 550.0 | 91 49 12.6 | 271 48 58.6 | Pile | 442.7 | 2.646071 |
| | 123 58 34.134 | 753.2 | 128 57 28.3 | 308 57 08.5 | Pine | 801.9 | 2.904101 |
| | | | 163 07 03.1 | 343 06 58.9 | Cut | 457.3 | 2.660186 |
| Shelf, 1914 | 44 34 17.374 | 536.3 | 91 12 40.3 | 271 12 19.7 | Clay | 647.5 | 2.811220 |
| | 123 58 04.797 | 105.8 | 120 02 57.4 | 300 02 32.6 | Cut | 901.2 | 2.954825 |
| Boone, 1914 | 44 34 31.422 | 969.9 | 45 43 27.4 | 225 43 13.7 | Clay | 601.6 | 2.779277 |
| | 123 58 14.614 | 322.4 | 91 47 31.6 | 271 47 13.7 | Cut | 563.8 | 2.751090 |
| | | | 333 27 18.8 | 153 27 25.7 | Shelf | 484.7 | 2.685486 |
| Slue, 1914 | 44 34 35.460 | 1094.6 | 15 53 09.8 | 195 53 04.7 | Shelf | 580.4 | 2.763749 |
| | 123 57 57.596 | 1270.8 | 71 38 14.4 | 251 38 02.4 | Boone | 395.6 | 2.597272 |
| Wharf, 1914 | 44 34 30.696 | 947.5 | 54 52 14.4 | 234 51 55.8 | Shelf | 714.6 | 2.854044 |
| | 123 57 38.311 | 845.3 | 91 36 23.6 | 271 35 58.1 | Boone | 801.3 | 2.903791 |
| | | | 109 04 02.8 | 289 03 49.3 | Slue | 450.2 | 2.653404 |
| Slip, 1914 | 44 34 48.034 | 1482.7 | 18 04 00.3 | 198 03 54.7 | Wharf | 562.9 | 2.750466 |
| | 123 57 30.398 | 670.6 | 57 06 24.3 | 237 06 05.2 | Slue | 714.7 | 2.854091 |
| Hill, 1914 | 44 34 50.357 | 1554.4 | 2 55 19.1 | 182 55 18.3 | Slue | 460.4 | 2.663159 |
| | 123 57 56.532 | 1247.2 | 277 05 07.4 | 97 05 25.7 | Slip | 581.0 | 2.764183 |
| | | | 326 28 35.7 | 146 28 48.4 | Wharf | 728.0 | 2.862108 |
| Red, 1914 | 44 35 08.306 | 256.4 | 32 23 19.8 | 212 23 08.6 | Hill | 656.1 | 2.816984 |
| | 123 57 40.601 | 895.6 | 340 12 50.7 | 160 12 57.8 | Slip | 665.0 | 2.822826 |
| Spit, 1914 | 44 35 03.692 | 114.0 | 2 34 58.4 | 182 34 57.7 | Slip | 483.8 | 2.684678 |
| | 123 57 29.410 | 648.8 | 55 28 37.0 | 235 28 18.0 | Hill | 726.3 | 2.861096 |
| | | | 119 58 53.1 | 299 58 45.3 | Red | 285.0 | 2.454889 |
| Near, 1914 | 44 35 06.161 | 190.2 | 59 33 12.9 | 239 33 08.8 | Spit | 150.4 | 2.177220 |
| | 123 57 23.533 | 519.1 | 99 58 33.9 | 279 58 22.0 | Red | 382.3 | 2.582425 |
| Mill, 1914 | 44 35 12.774 | 394.3 | 54 08 18.2 | 234 08 12.2 | Red | 235.4 | 2.371839 |
| | 123 57 31.953 | 704.9 | 317 42 00.0 | 137 42 05.9 | Near | 276.0 | 2.440903 |
| | | | 348 41 03.2 | 168 41 05.0 | Spit | 285.9 | 2.456221 |
| Dead, 1914 | 44 35 22.789 | 703.4 | 43 53 26.3 | 223 53 10.6 | Near | 712.2 | 2.852598 |
| | 123 57 01.151 | 25.4 | 65 32 20.6 | 245 31 59.0 | Mill | 746.5 | 2.873019 |
| Alder, 1914 | 44 35 09.653 | 298.0 | 79 08 18.0 | 259 08 00.1 | Near | 572.0 | 2.757363 |
| | 123 56 58.070 | 1281.0 | 97 20 50.8 | 277 20 27.0 | Mill | 753.6 | 2.877155 |
| | | | 170 29 10.3 | 350 29 08.1 | Dead | 411.1 | 2.613972 |
| Soap, 1914 | 44 35 17.106 | 528.0 | 66 06 16.1 | 246 05 59.6 | Alder | 567.8 | 2.754206 |
| | 123 56 34.537 | 761.8 | 106 38 27.8 | 286 38 09.1 | Dead | 612.7 | 2.787267 |

*Yaquina Bay and River*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Grass, 1914 | 44 35 28.336 | 874.7 | 37 43 10.3 | 217 42 56.1 | Alder | 729.0 | 2.862735 |
| | 123 56 37.852 | 834.9 | 71 34 39.2 | 251 34 22.8 | Dead | 541.7 | 2.733753 |
| | | | 348 05 12.5 | 168 05 14.8 | Soap | 354.3 | 2.549347 |
| Apple, 1914 | 44 35 37.876 | 1169.1 | 15 22 35.1 | 195 22 29.5 | Soap | 664.9 | 2.822773 |
| | 123 56 26.544 | 585.5 | 40 15 58.1 | 220 15 50.2 | Grass | 385.9 | 2.586492 |
| Dark, 1914 | 44 35 33.762 | 1042.1 | 46 25 44.2 | 226 25 27.0 | Soap | 745.9 | 2.872676 |
| | 123 56 10.038 | 221.4 | 74 44 01.0 | 254 43 41.5 | Grass | 636.0 | 2.803427 |
| | | | 109 13 53.9 | 289 13 42.3 | Apple | 385.6 | 2.586118 |
| Field, 1914 | 44 35 51.717 | 1596.4 | 0 04 21.2 | 180 04 21.2 | Dark | 554.2 | 2.743695 |
| | 123 56 10.006 | 220.7 | 40.29 26.7 | 220 29 15.1 | Apple | 561.8 | 2.749556 |
| Dune, 1914 | 44 35 48.633 | 1501.2 | 4 04 23.5 | 184 04 22.7 | Apple | 332.9 | 2.522299 |
| | 123 56 25.472 | 561.8 | 254 24 19.9 | 74 24 30.7 | Field | 354.1 | 2.549172 |
| | | | 323 26 19.7 | 143 26 30.5 | Dark | 571.5 | 2.757011 |
| Hump, 1914 | 44 36 12.664 | 390.9 | 314 32 01.7 | 134 32 22.6 | Field | 921.9 | 2.964677 |
| | 123 56 39.802 | 877.7 | 336 55 18.0 | 156 55 28.1 | Dune | 806.3 | 2.906492 |
| Dike, 1914 | 44 36 16.779 | 517.9 | 62 13 54.4 | 242 13 46.7 | Hump | 272.6 | 2.435596 |
| | 123 56 28.863 | 636.5 | 331 44 15.3 | 151 44 28.5 | Field | 878.3 | 2.943642 |
| | | | 355 04 49.0 | 175 04 51.4 | Dune | 872.0 | 2.940522 |
| Flat, 1914 | 44 36 37.344 | 1152.7 | 332 31 54.9 | 152 32 05.4 | Dike | 715.4 | 2.854562 |
| | 123 56 43.827 | 966.4 | 353 21 17.8 | 173 21 20.6 | Hump | 767.0 | 2.884772 |
| High, 1914 | 44 36 35.918 | 1108.7 | 260 21 27.8 | 80 21 36.1 | Flat | 262.8 | 2.419614 |
| | 123 56 55.576 | 1225.5 | 315 04 47.2 | 135 05 06.0 | Dike | 834.3 | 2.921307 |
| | | | 334 08 37.2 | 154 08 48.3 | Hump | 797.6 | 2.901805 |
| Saw, 1914 | 44 36 59.092 | 1824.0 | 5 30 56.6 | 185 30 54.3 | High | 718.6 | 2.856512 |
| | 123 56 52.444 | 1156.3 | 344 11 46.4 | 164 11 52.4 | Flat | 697.7 | 2.843650 |
| Launch, 1914 | 44 36 51.500 | 1589.7 | 23 19 35.2 | 203 19 29.2 | Flat | 475.8 | 2.677471 |
| | 123 56 35.282 | 777.9 | 42 56 12.1 | 222 55 57.8 | High | 657.0 | 2.817531 |
| | | | 121 46 18.0 | 301 46 06.0 | Saw | 445.1 | 2.648442 |
| City, 1914 | 44 37 07.483 | 231.0 | 47 06 59.8 | 227 06 42.9 | Launch | 724.9 | 2.860299 |
| | 123 56 11.191 | 246.7 | 74 06 32.3 | 254 06 03.4 | Saw | 945.7 | 2.975753 |
| Last, 1914 | 44 37 17.287 | 533.6 | 34 21 36.0 | 214 21 23.8 | Saw | 680.3 | 2.832714 |
| | 123 56 35.029 | 772.3 | 299 55 51.7 | 119 56 08.4 | City | 606.5 | 2.782870 |
| | | | 0 24 05.2 | 180 24 05.0 | Launch | 796.0 | 2.900904 |
| *Supplementary points.* | | | | | | | |
| Sea, 1914 | 44 35 58.627 | 1809.7 | 184 12 08.5 | 4 12 15.0 | Yaquina Head Lighthouse, old tower. | 2786.0 | 3.444978 |
| | 124 03 52.983 | 1168.5 | | | | | |
| | | | 189 32 16.4 | 9 32 26.4 | Jet | 1901.6 | 3.279120 |
| | | | 191 44 01.4 | 11 44 23.3 | Port | 3392.1 | 3.530462 |
| Yaquina Jetty light, 1914 | 44 36 55.552 | 1714.7 | 189 20 12.3 | 9 20 17.7 | Yaquina Head Lighthouse, old tower. | 1035.1 | 3.014966 |
| | 124 03 51.339 | 1131.9 | | | | | |
| | | | 247 02 06.3 | 67 02 15.2 | Jet | 302.9 | 2.481248 |
| | | | 247 52 16.6 | 67 52 51.7 | Wire | 1188.0 | 3.074817 |
| Wet,[1] 1914 | 44 37 09.24 | 285.2 | 263 12 50 | 83 13 26 | Yaquina west base | 1138.6 | 3.056351 |
| | 124 03 55.29 | 1299.0 | 309 44 13 | 129 44 25 | Jet | 475.9 | 2.677493 |
| Round,[1] 1914 | 44 37 02.91 | 89.8 | 158 12 28 | 338 12 18 | Yaquina Head Lighthouse, old tower. | 855.4 | 2.932170 |
| | 124 03 29.32 | 646.4 | | | | | |
| | | | 187 10 07 | 7 10 13 | Port | 1347.4 | 3.129507 |
| Pavilion, 1914 | 44 37 11.350 | 350.3 | 62 07 07.8 | 242 06 45.5 | Jet | 790.0 | 2.897619 |
| | 124 03 07.021 | 154.8 | 123 24 49.3 | 303 24 23.5 | Yaquina Head Lighthouse, old tower. | 969.3 | 2.986452 |
| | | | 163 16 47.9 | 343 16 37.5 | Port | 1123.9 | 3.050719 |
| Mast, 1914 | 44 37 27.217 | 840.1 | 289 43 51.7 | 109 44 31.1 | Yaquina east base | 1314.0 | 3.118580 |
| | 124 03 32.912 | 725.6 | 303 25 29.6 | 123 25 49.9 | Yaquina west base | 763.5 | 2.882826 |
| | | | 8 26 03.8 | 188 25 59.8 | Jet | 868.7 | 2.938853 |
| Boathouse, east gable, 1914 | 44 37 31.140 | 961.2 | 298 56 28.8 | 118 57 01.3 | Yaquina east base | 1167.0 | 3.067056 |
| | 124 03 23.134 | 510.0 | 322 06 04.1 | 142 06 17.5 | Yaquina west base | 686.5 | 2.836610 |
| | | | 19 17 03.9 | 199 16 53.0 | Jet | 1038.6 | 3.016454 |
| Dry, 1914 | 44 37 18.608 | 574.4 | 193 42 33.9 | 13 42 36.3 | Yaquina Head Lighthouse, old tower. | 318.8 | 2.503446 |
| | 124 03 47.149 | 1039.4 | | | | | |
| | | | 279 15 20.7 | 99 14 50.9 | Yaquina west base | 963.7 | 2.983950 |
| | | | 342 33 32.1 | 162 33 38.0 | Jet | 622.1 | 2.793873 |
| Old hotel, northeast corner, 1914 | 44 37 35.745 | 1103.4 | 267 36 45.9 | 87 37 47.7 | Mack | 1941.0 | 3.288023 |
| | 124 03 22.456 | 495.0 | 298 51 11.3 | 118 52 28.7 | Hint | 2773.5 | 3.443029 |
| | | | 329 41 29.2 | 149 41 44.0 | Wire | 918.8 | 2.963216 |
| Nye,[1] 1914 | 44 38 01.53 | 47.2 | 321 28 46 | 141 28 58 | Port | 604.2 | 2.781186 |
| | 124 03 38.76 | 854.3 | 6 08 57 | 186 08 53 | Yaquina Head Lighthouse, old tower. | 1021.2 | 3.009129 |
| Bridge, 1914 | 44 37 55.902 | 1725.5 | 4 52 21.4 | 184 52 17.6 | Wire | 1420.6 | 3.152468 |
| | 124 02 55.950 | 1233.3 | 7 44 44.1 | 187 44 38.4 | Yaquina west base | 1318.1 | 3.119940 |
| | | | 342 23 19.6 | 162 23 33.0 | Yaquina east base | 1394.5 | 3.144419 |

[1] No check on this position.

*Yaquina Bay and River*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Middle Ground light, 1914 | 44 37 49.710 | 1534.4 | 7 03 52.6 | 187 03 47.9 | Wire | 1233.7 | 3.091204 |
| | 124 02 54.542 | 1202.3 | 10 36 09.9 | 190 36 03.3 | Yaquina west base | 1134.3 | 3.054720 |
| | | | 341 02 41.4 | 161 02 53.9 | Yaquina east base | 1203.3 | 3.080357 |
| House, large green, cupola, 1914 | 44 37 59.030 | 1822.1 | 8 22 23.5 | 188 22 16.4 | Wire | 1528.3 | 3.184200 |
| | 124 02 51.330 | 1131.4 | 29 33 38.2 | 209 33 04.9 | Jet | 2116.6 | 3.325644 |
| | | | 347 20 52.8 | 167 21 02.9 | Yaquina east base | 1461.2 | 3.164694 |
| Yaquina Bar front range light, 1914 | 44 37 27.031 | 834.4 | 53 19 20.6 | 233 19 02.9 | Yaquina west base | 694.5 | 2.841687 |
| | 124 02 38.741 | 854.1 | 122 02 07.5 | 302 01 37.4 | Port | 1116.7 | 3.047945 |
| | | | 354 27 07.7 | 174 27 09.1 | Yaquina east base | 440.0 | 2.643483 |
| Yaquina Bar rear range light, 1914 | 44 37 39.468 | 1218.3 | 42 40 41.9 | 222 40 17.7 | Yaquina east base | 1117.9 | 3.048388 |
| | 124 02 02.442 | 53.8 | 55 04 26.2 | 235 03 44.8 | Wire | 1586.0 | 3.200314 |
| | | | 335 25 08.1 | 155 25 29.3 | Hint | 1598.6 | 3.203752 |
| Phone, 1914 | 44 37 21.006 | 648.4 | 65 07 15.3 | 245 06 58.0 | Yaquina east base | 598.9 | 2.777331 |
| | 124 02 12.170 | 268.3 | 78 40 49.4 | 258 40 13.0 | Yaquina west base | 1165.5 | 3.066518 |
| | | | 216 03 40.8 | 36 03 53.2 | Mack | 662.5 | 2.821155 |
| Back, 1914 | 44 36 43.288 | 1336.2 | 145 25 56.0 | 325 25 13.4 | Port | 2359.2 | 3.372758 |
| | 124 02 20.965 | 462.2 | 159 02 36.2 | 339 02 25.1 | Yaquina east base | 976.9 | 2.989851 |
| | | | 198 57 21.9 | 18 57 40.5 | Mack | 1797.2 | 3.254606 |
| Beacon 8, 1914 | 44 37 06.274 | 193.7 | 99 24 41.1 | 279 24 02.1 | Yaquina east base | 1240.6 | 3.093648 |
| | 124 01 41.297 | 910.5 | 163 38 38.2 | 343 38 28.9 | Mack | 1032.0 | 3.013083 |
| | | | 255 21 09.8 | 75 22 11.5 | Bend | 2000.4 | 3.301113 |
| Beacon 10, 1914 | 44 36 48.800 | 1506.3 | 101 37 44.9 | 281 37 27.9 | Hint | 546.7 | 2.737762 |
| | 124 01 07.995 | 176.3 | 288 33 55.1 | 108 34 16.9 | Quill | 721.3 | 2.858119 |
| | | | 354 22 18.0 | 174 22 20.6 | Case | 826.8 | 2.917380 |
| Old Rock, 1914 | 44 36 42.525 | 1312.6 | 36 33 08.8 | 216 32 54.0 | Case | 783.1 | 2.893796 |
| | 124 00 43.170 | 951.9 | 105 40 51.6 | 285 40 17.2 | Hint | 1124.7 | 3.051044 |
| | | | 339 28 53.2 | 159 29 00.0 | Made | 607.1 | 2.783245 |
| Coquille Point light, 1914 | 44 36 39.268 | 1212.1 | 42 55 59.8 | 222 55 44.2 | Case | 721.9 | 2.858454 |
| | 124 00 42.021 | 926.6 | 110 03 13.5 | 290 02 38.3 | Hint | 1179.7 | 3.071777 |
| | | | 338 10 24.0 | 158 10 30.0 | Made | 504.2 | 2.702584 |
| Beacon 12, 1914 | 44 36 35.056 | 1082.1 | 28 12 51.5 | 208 12 44.7 | Case | 452.3 | 2.655396 |
| | 124 00 54.622 | 1204.4 | 122 46 05.5 | 302 45 39.1 | Hint | 987.5 | 2.994536 |
| | | | 305 59 45.7 | 126 00 00.5 | Made | 575.1 | 2.759776 |
| Far,[1] 1914 | 44 36 31.72 | 979.1 | 234 30 12 | 54 31 22 | Bend | 2708.1 | 3.432660 |
| | 124 01 53.52 | 1180.2 | 259 59 43 | 80 00 36 | Quill | 1713.6 | 3.233911 |
| Full, 1914 | 44 37 46.958 | 1449.5 | 13 43 53.4 | 193 43 40.3 | Hint | 1734.5 | 3.239185 |
| | 124 01 13.609 | 300.0 | 299 30 59.4 | 119 31 41.6 | Bend | 1522.5 | 3.182569 |
| | | | 338 15 24.4 | 158 15 50.1 | Quill | 2179.9 | 3.338435 |
| Church, flagstaff, 1914 | 44 36 31.204 | 963.2 | 6 06 02.3 | 186 06 00.1 | Yaq | 633.3 | 2.801640 |
| | 124 00 30.565 | 674.0 | 33 37 15.7 | 213 36 58.7 | Soft | 960.6 | 2.982556 |
| | | | 69 24 45.1 | 249 24 21.4 | Case | 795.1 | 2.900430 |
| Shade, 1914 | 44 35 21.740 | 671.1 | 216 23 40.0 | 36 23 50.9 | Log | 577.6 | 2.761623 |
| | 124 01 24.196 | 533.7 | 262 43 57.5 | 82 44 15.6 | Et | 574.3 | 2.759136 |
| | | | 345 34 24.0 | 165 34 32.5 | Mud | 964.9 | 2.984459 |
| Old wharf, 1914 | 44 35 01.569 | 48.4 | 63 17 58.4 | 243 17 29.6 | Caf | 1013.6 | 3.005874 |
| | 124 00 15.411 | 340.0 | 325 51 57.1 | 145 52 12.6 | Gravel | 871.6 | 2.940300 |
| | | | 347 43 54.3 | 167 43 58.2 | King | 584.3 | 2.766653 |
| Schoolhouse, chimney,[1] 1914 | 44 34 40.88 | 1261.9 | 185 00 48 | 5 00 50 | Can | 611.5 | 2.786398 |
| | 124 00 14.06 | 310.2 | 237 17 48 | 57 18 09 | Slope | 776.6 | 2.890202 |
| Hill (U. S. E.),[1] 1914 | 44 34 34.47 | 1064.0 | 310 39 08 | 130 39 08 | Pine | 15.1 | 1.17840 |
| | 123 59 02.91 | 64.2 | | | | | |
| Old House, 1914 | 44 34 15.118 | 466.7 | 121 28 20.7 | 301 27 54.6 | Shell | 962.4 | 2.983356 |
| | 123 59 00.354 | 7.8 | 141 19 29.7 | 321 18 58.8 | Slope | 1556.2 | 3.192061 |
| | | | 149 02 02.8 | 329 01 44.6 | Low | 1114.8 | 3.047188 |
| Front Range 1, 1914 | 44 34 17.318 | 534.6 | 125 20 06.2 | 305 19 42.9 | Pine | 898.4 | 2.953458 |
| | 123 58 29.178 | 643.8 | 151 52 22.0 | 331 52 14.3 | Cut | 513.6 | 2.710656 |
| | | | 216 25 46.9 | 36 25 57.1 | Boone | 541.1 | 2.733291 |
| Rear Range 1, 1914 | 44 34 16.745 | 516.9 | 124 56 39.4 | 304 56 15.0 | Pine | 938.0 | 2.972199 |
| | 123 58 27.546 | 607.8 | 149 25 05.1 | 329 24 56.3 | Cut | 546.7 | 2.737750 |
| | | | 212 12 10.8 | 32 12 19.9 | Boone | 535.4 | 2.728692 |
| Front Range 2, 1914 | 44 34 59.590 | 1839.4 | 21 20 27.0 | 201 20 23.5 | Hill | 306.0 | 2.485691 |
| | 123 57 51.485 | 1135.8 | 226 37 56.8 | 46 38 10.5 | Mill | 592.7 | 2.772834 |
| | | | 255 25 20.0 | 75 25 35.5 | Spit | 503.2 | 2.701730 |
| Rear Range 2, 1914 | 44 34 56.903 | 1750.4 | 231 17 21.7 | 51 17 35.7 | Red | 562.9 | 2.750401 |
| | 123 58 00.511 | 11.3 | 250 41 26.5 | 70 41 52.4 | Near | 864.4 | 2.936703 |
| | | | 253 00 46.1 | 73 01 07.9 | Spit | 717.4 | 2.855768 |
| Rock (U. S. E.),[1] 1914 | 44 35 06.91 | 213.3 | 221 25 58 | 41 25 59 | Red | 57.3 | 1.75838 |
| | 123 57 42.32 | 933.6 | | | | | |

[1] No check on this position.

*Yaquina Bay and River*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Mill 4 (U. S. E.),[1] 1914 | 44 35 10.87 | 735.5 | 232 48 26 | 52 48 28 | Mill | 97.1 | 1.98713 |
| | 123 57 35.46 | 782.2 | | | | | |
| Front Range 3, 1914 | 44 35 36.759 | 1134.7 | 350 30 17.9 | 170 30 18.4 | Dark | 93.8 | 1.972127 |
| | 123 56 10.739 | 236.9 | 95 39 11.7 | 275 39 00.6 | Apple | 350.3 | 2.544440 |
| | | | 138 26 39.8 | 318 26 29.5 | Dune | 489.8 | 2.690054 |
| Rear Range 3, 1914 | 44 35 42.803 | 1321.2 | 58 29 19.8 | 238 28 56.6 | Grass | 854.3 | 2.931614 |
| | 123 56 04.833 | 106.6 | 72 22 59.9 | 252 22 44.6 | Apple | 502.4 | 2.701083 |
| | | | 111 34 24.1 | 291 34 09.6 | Dune | 489.5 | 2.689750 |
| Front Range 5, 1914 | 44 35 38.200 | 1179.1 | 30 16 55.8 | 210 16 53.2 | Dark | 158.6 | 2.200424 |
| | 123 56 06.411 | 141.4 | 88 42 42.4 | 268 42 28.2 | Apple | 444.2 | 2.647555 |
| | | | 127 27 19.0 | 307 27 05.6 | Dune | 529.6 | 2.723932 |
| Rear Range 5,[1] 1914 | 44 35 35.88 | 1107.5 | 130 15 00 | 310 14 45 | Dune | 609.1 | 2.784694 |
| | 123 56 04.39 | 96.8 | 165 47 15 | 345 47 11 | Field | 504.2 | 2.702575 |
| Hanson (U. S. E.),[1] 1914 | 44 35 38.84 | 1198.8 | 348 33 36 | 168 33 36 | Apple | 30.2 | 1.47986 |
| | 123 56 26.82 | 591.6 | | | | | |
| Front Range 4, 1914 | 44 35 43.012 | 1327.7 | 356 51 14.6 | 176 51 15.1 | Dark | 286.0 | 2.456308 |
| | 123 56 10.750 | 237.1 | 118 07 10.3 | 298 07 00.0 | Dune | 368.2 | 2.566046 |
| | | | 183 29 28.8 | 3 29 29.3 | Field | 269.2 | 2.430085 |
| Rear Range 4, 1914 | 44 35 49.005 | 1512.7 | 4 13 00.9 | 184 12 59.8 | Dark | 471.8 | 2.673763 |
| | 123 56 08.465 | 186.7 | 88 14 52.5 | 268 14 40.6 | Dune | 375.3 | 2.574343 |
| | | | 157 54 04.1 | 337 54 03.0 | Field | 90.4 | 1.955906 |
| Front Range 6, 1914 | 44 35 56.291 | 1737.6 | 43 44 56.5 | 223 44 49.3 | Dune | 327.2 | 2.514814 |
| | 123 56 15.214 | 335.5 | 132 59 12.8 | 312 58 55.4 | Hump | 741.3 | 2.869984 |
| | | | 154 32 54.4 | 334 32 44.8 | Dike | 700.4 | 2.845357 |
| Rear Range 6, 1914 | 44 36 04.267 | 131.7 | 22 16 10.5 | 202 16 04.2 | Dune | 521.5 | 2.717232 |
| | 123 56 16.512 | 364.2 | 116 46 44.4 | 296 46 27.9 | Hump | 575.3 | 2.759910 |
| | | | 144 48 30.1 | 324 48 21.4 | Dike | 472.6 | 2.674496 |
| Barn (U. S. E.),[1] 1914 | 44 36 10.055 | 310.4 | 156 52 13 | 336 52 12 | Hump | 87.6 | 1.94241 |
| | 123 56 38.242 | 843.4 | | | | | |
| Front Range 7, 1914 | 44 36 32.183 | 993.4 | 233 04 58.6 | 53 05 05.4 | Flat | 265.2 | 2.423564 |
| | 123 56 53.442 | 1178.5 | 311 15 24.8 | 131 15 42.1 | Dike | 721.0 | 2.857949 |
| | | | 333 28 10.6 | 153 28 20.2 | Hump | 673.4 | 2.828290 |
| Rear Range 7, 1914 | 44 36 33.734 | 1041.3 | 245 15 33.4 | 65 15 41.1 | Flat | 266.3 | 2.425324 |
| | 123 56 54.794 | 1208.2 | 312 27 46.6 | 132 28 04.8 | Dike | 775.2 | 2.889390 |
| | | | 333 03 13.4 | 153 03 23.9 | Hump | 729.6 | 2.863068 |
| Front Range 8, 1914 | 44 36 48.301 | 1490.9 | 258 30 09.4 | 78 30 24.9 | Launch | 495.5 | 2.695067 |
| | 123 56 57.305 | 1263.5 | 318 41 33.2 | 138 41 42.7 | Flat | 450.2 | 2.653431 |
| | | | 340 39 52.2 | 160 40 04.5 | Hump | 1165.8 | 3.066608 |
| Rear Range 8, 1914 | 44 36 49.474 | 1527.1 | 262 49 59.5 | 82 50 15.3 | Launch | 501.5 | 2.700237 |
| | 123 56 57.847 | 1275.5 | 320 27 11.5 | 140 27 21.3 | Flat | 485.6 | 2.686234 |
| | | | 340 41 52.6 | 160 42 05.2 | Hump | 1203.9 | 3.080585 |
| Lower Dike Light, 1914 | 44 35 52.521 | 1621.2 | 37 00 09.7 | 217 00 06.9 | Dune | 150.3 | 2.176852 |
| | 123 56 21.371 | 471.3 | 275 39 04.1 | 95 39 12.1 | Field | 251.9 | 2.401211 |
| | | | 336 38 56.6 | 156 39 04.6 | Dark | 630.7 | 2.799822 |
| Toledo Beacon 10, 1914 | 44 36 53.328 | 1646.1 | 9 20 14.9 | 189 20 12.0 | High | 544.6 | 2.736077 |
| | 123 56 51.569 | 1137.0 | 278 55 33.4 | 98 55 44.8 | Launch | 363.5 | 2.560530 |
| | | | 340 54 46.5 | 160 54 51.9 | Flat | 522.1 | 2.717731 |
| Toledo Beacon 12, 1914 | 44 36 58.111 | 1793.7 | 22 35 34.6 | 202 35 25.5 | High | 742.0 | 2.870382 |
| | 123 56 42.649 | 940.3 | 321 28 38.1 | 141 28 43.3 | Launch | 260.8 | 2.416342 |
| | | | 2 19 10.7 | 182 19 09.9 | Flat | 641.5 | 2.807225 |
| Stream, 1914 | 44 36 47.064 | 1452.7 | 103 27 51.6 | 283 27 33.3 | Launch | 588.3 | 2.769594 |
| | 123 56 09.334 | 205.8 | 111 20 27.3 | 291 19 57.0 | Saw | 1020.5 | 3.008798 |
| | | | 148 44 02.8 | 328 43 44.7 | Last | 1091.5 | 3.038006 |
| Day Beacon, 1914 | 44 36 57.606 | 1778.1 | 96 15 17.7 | 276 15 04.4 | Saw | 421.4 | 2.624677 |
| | 123 56 33.446 | 737.4 | 176 42 41.7 | 356 42 40.6 | Last | 608.5 | 2.784275 |
| | | | 238 08 28.8 | 58 08 44.4 | City | 577.7 | 2.761696 |
| Hog, 1914 | 44 36 58.546 | 1807.1 | 55 28 36.2 | 235 28 26.1 | Launch | 383.7 | 2.583978 |
| | 123 56 20.945 | 461.8 | 151 46 34.4 | 331 46 24.5 | Last | 656.6 | 2.817282 |
| | | | 217 56 09.8 | 37 56 16.6 | City | 349.8 | 2.543824 |
| Front Range 9, 1914 | 44 37 03.041 | 93.9 | 61 06 49.3 | 241 06 42.3 | Saw | 252.4 | 2.402000 |
| | 123 56 42.423 | 935.3 | 200 20 22.2 | 20 20 27.4 | Last | 469.0 | 2.671132 |
| | | | 336 09 24.7 | 156 09 29.7 | Launch | 389.5 | 2.590492 |
| Rear Range 9, 1914 | 44 37 03.868 | 119.4 | 58 26 38.7 | 238 26 31.1 | Saw | 281.7 | 2.449781 |
| | 123 56 41.557 | 916.2 | 199 09 34.8 | 19 09 39.4 | Last | 438.5 | 2.641955 |
| | | | 340 04 45.6 | 160 04 50.0 | Launch | 406.1 | 2.608591 |
| Depot Slough light, 1914 | 44 36 55.866 | 1724.4 | 68 10 48.7 | 248 10 38.0 | Launch | 362.5 | 2.559335 |
| | 123 56 20.018 | 441.4 | 153 24 45.0 | 333 24 34.5 | Last | 739.4 | 2.868884 |
| | | | 208 29 25.7 | 28 29 31.9 | City | 408.0 | 2.610666 |

[1] No check on this position.

*Yaquina Bay and River*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Front Range 11, 1914 | 44 36 55.482 | 1712.6 | 74 46 11.3 | 254 45 56.9 | Launch | 467.8 | 2.670051 |
| | 123 56 14.811 | 326.6 | 97 39 10.8 | 277 38 44.4 | Saw | 837.2 | 2.922823 |
| | | | 146 29 10.9 | 326 28 56.7 | Last | 807.3 | 2.907024 |
| Rear Range 11, 1914 | 44 36 54.909 | 1694.9 | 78 34 41.8 | 258 34 25.2 | Launch | 531.2 | 2.725282 |
| | 123 56 11.666 | 257.2 | 98 10 35.6 | 278 10 07.0 | Saw | 908.3 | 2.958235 |
| | | | 143 17 23.5 | 323 17 07.1 | Last | 861.7 | 2.935332 |
| Front Range 10, 1914 | 44 37 02.513 | 77.6 | 5 01 19.1 | 185 01 18.1 | Launch | 341.3 | 2.533075 |
| | 123 56 33.927 | 748.0 | 75 29 58.2 | 255 29 45.2 | Saw | 421.7 | 2.624997 |
| | | | 252 58 57.2 | 72 59 13.1 | City | 524.2 | 2.719522 |
| Rear Range 10, 1914 | 44 37 03.126 | 96.5 | 9 56 08.2 | 189 56 06.2 | Launch | 364.3 | 2.561478 |
| | 123 56 32.431 | 715.0 | 74 14 38.0 | 254 14 24.0 | Saw | 458.5 | 2.661314 |
| | | | 253 58 26.7 | 73 58 41.6 | City | 487.2 | 2.687732 |
| Courthouse, flagstaff, 1914 | 44 37 12.863 | 397.0 | 43 32 56.6 | 223 32 36.6 | Launch | 909.8 | 2.958930 |
| | 123 56 06.854 | 151.1 | 67 04 51.5 | 247 04 19.5 | Saw | 1091.3 | 3.037955 |
| | | | 102 24 02.7 | 282 23 42.9 | Last | 636.0 | 2.803452 |
| Schoolhouse, cupola, 1914 | 44 37 09.277 | 286.4 | 61 59 21.1 | 241 58 48.2 | Launch | 1168.2 | 3.067520 |
| | 123 55 48.506 | 1069.4 | 77 26 03.6 | 257 25 18.7 | Saw | 1444.3 | 3.159660 |
| | | | 103 33 27.1 | 283 32 54.4 | Last | 1055.1 | 3.023277 |

*Heceta Head and Siuslaw River.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Principal points.* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Spur, 1908 | 43 57 44.180 | 1363.6 | 175 06 51.9 | 355 06 09.1 | Cape | 16081.6 | 4.206330 |
| | 124 04 08.145 | 181.6 | 186 10 46.6 | 6 12 16.2 | Fairview | 26567.8 | 4.424355 |
| | | | 318 58 42.8 | 139 01 32.9 | Maple | 8337.7 | 3.921044 |
| Cannery Hill, 1883 | 44 00 21.222 | 655.0 | 195 14 46.1 | 15 16 21.4 | Cape | 11584.5 | 4.063879 |
| | 124 07 26.701 | 594.8 | 317 35 09.3 | 137 37 27.2 | Spur | 6563.1 | 3.817106 |
| Sugar Loaf 2, 1908 | 44 01 35.767 | 1103.9 | 200 13 36.5 | 20 15 18.8 | Cape | 9459.5 | 3.975869 |
| | 124 07 36.780 | 819.1 | 326 56 23.4 | 146 58 48.3 | Spur | 8526.5 | 3.930772 |
| | | | 354 25 33.1 | 174 25 40.1 | Cannery Hill | 2311.7 | 3.363932 |
| Green, 1908 | 44 00 06.525 | 201.4 | 97 08 11.0 | 277 06 17.8 | Cannery Hill | 3659.4 | 3.563407 |
| | 124 04 43.714 | 973.9 | 125 33 43.7 | 305 31 43.4 | Sugar Loaf 2 | 4737.9 | 3.675589 |
| | | | 177 09 07.3 | 357 08 49.3 | Cape | 11644.2 | 4.066108 |
| | | | 349 46 05.6 | 169 46 30.4 | Spur | 4464.3 | 3.649749 |
| High Bald Peak, 1908 | 44 16 41.73 | 1288.0 | 75 47 02 | 255 29 15 | Fairview | 35057.5 | 4.544781 |
| | 123 36 28.88 | 640.2 | 81 26 59 | 261 10 54 | Cummins | 31009.4 | 4.491494 |
| | | | 138 36 42 | 318 26 48 | Table | 28367.4 | 4.452819 |
| Cape Ridge, 1908 | 44 05 51.56 | 1591.4 | 21 23 12 | 201 21 07 | Cannery Hill | 10948.4 | 4.039352 |
| | 124 04 27.49 | 611.5 | 28 06 15 | 208 04 03 | Sugar Loaf 2 | 8948.7 | 3.951760 |
| | | | 175 29 49 | 355 29 33 | Snag | 6518.9 | 3.814172 |
| Snag, 1908 | 44 09 22.114 | 682.6 | 217 57 25.3 | 37 59 24.6 | Fairview | 6179.7 | 3.790966 |
| | 124 04 50.524 | 1122.8 | 4 25 32.0 | 184 25 18.7 | Cape | 5534.8 | 3.743102 |
| Loaf, 1908 | 44 09 23.188 | 715.7 | 270 41 13.6 | 90 42 38.8 | Snag | 2717.8 | 3.434225 |
| | 124 06 52.822 | 1173.9 | 337 33 25.9 | 157 34 27.7 | Cape | 6006.0 | 3.778582 |
| Plateau, 1908 | 44 11 57.592 | 1777.6 | 268 59 10.4 | 89 01 21.5 | Fairview | 4175.5 | 3.620704 |
| | 124 05 07.361 | 163.4 | 355 32 30.9 | 175 32 42.6 | Snag | 4813.4 | 3.682452 |
| | | | 26 11 14.2 | 206 10 00.7 | Loaf | 5310.3 | 3.723123 |
| Heceta, 1908 | 44 08 26.001 | 802.5 | 201 23 14.7 | 21 23 36.4 | Loaf | 1895.6 | 3.277758 |
| | 124 07 23.931 | 531.9 | 243 03 19.1 | 63 05 06.0 | Snag | 3824.1 | 3.582526 |
| Turn, 1908 | 44 07 57.794 | 1783.9 | 176 39 52.7 | 356 39 51.1 | Heceta | 872.1 | 2.940561 |
| | 124 07 21.648 | 481.2 | 232 12 58.1 | 52 14 43.3 | Snag | 4249.1 | 3.628302 |
| Tree, 1908 | 44 08 22.366 | 690.3 | 38 30 50.9 | 218 30 32.0 | Turn | 969.2 | 2.986432 |
| | 124 06 54.498 | 1211.4 | 99 44 03.8 | 279 43 43.3 | Heceta | 663.8 | 2.822017 |
| | | | 181 08 12.8 | 1 08 14.0 | Loaf | 1877.6 | 3.273612 |
| | | | 236 11 37.0 | 56 13 03.4 | Snag | 3315.5 | 3.520546 |
| Head, 1908 | 44 08 18.316 | 565.3 | 230 14 19.3 | 50 14 28.2 | Heceta | 370.9 | 2.569206 |
| | 124 07 36.757 | 817.0 | 332 03 55.1 | 152 04 05.6 | Turn | 717.0 | 2.855489 |
| *Supplementary points.* | | | | | | | |
| Heceta Head Lighthouse, 1908 | 44 08 16.371 | 505.3 | 211 17 07.6 | 31 17 08.8 | Head | 70.2 | 1.846632 |
| | 124 07 38.398 | 853.5 | 227 15 06.0 | 47 15 16.1 | Heceta | 437.9 | 2.641366 |
| | | | 327 00 01.6 | 147 00 13.3 | Turn | 683.7 | 2.834847 |
| Rock, southerly of two, south of lighthouse, 1908. | 44 08 09.157 | 282.6 | 192 19 24 | 12 19 26 | Head | 289.4 | 2.461453 |
| | 124 07 39.535 | 878.8 | 213 42 30 | 33 42 41 | Heceta | 625.0 | 2.795863 |
| | | | 311 24 43 | 131 24 56 | Turn | 530.2 | 2.724436 |
| Keeper's house, chimney,[1] 1908 | 44 08 13.38 | 412.9 | 342 00 10 | 162 00 15 | Turn | 505.8 | 2.703943 |
| | 124 07 28.68 | 637.5 | 130 19 15 | 310 19 00 | Head | 235.5 | 2.372064 |

[1] No check on this position.

*Umpqua River.*

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points.* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Umpqua River Lighthouse, 1908 | 43 39 45.935 | 1417.7 | 186 34 25.0 | 6 34 43.1 | Cab | 5117.5 | 3.709058 |
| | 124 11 51.518 | 1154.3 | 188 00 37.4 | 8 00 49.3 | Beach 1908 | 2776.5 | 3.443505 |
| | | | 202 44 43.6 | 22 45 53.1 | Sand Hill 2 | 5829.5 | 3.765628 |
| Wind, 1908 | 43 41 49.083 | 1514.8 | 33 21 38.7 | 213 21 17.4 | Beach, 1908 | 1258.6 | 3.099877 |
| | 124 11 03.340 | 74.8 | 158 59 29.3 | 338 59 14.1 | Cab | 1374.6 | 3.138163 |
| Beach, 1903 | 43 41 21.728 | 670.6 | 82 54 50.5 | 262 53 59.2 | Beach | 1676.1 | 3.224311 |
| | 124 10 19.975 | 447.4 | 131 00 19.8 | 310 59 49.8 | Wind | 1286.8 | 3.109516 |
| Brushy Hill 2, 1908 | 43 43 47.951 | 1479.9 | 238 01 20.0 | 58 04 55.6 | Trail | 8216.8 | 3.914704 |
| | 124 10 20.229 | 452.8 | 286 03 06.4 | 106 04 44.4 | Burn | 3300.4 | 3.518561 |
| Cab, 1908 | 43 42 30.660 | 946.3 | 211 25 23.1 | 31 26 08.1 | Brushy Hill 2 | 2795.6 | 3.446471 |
| | 124 11 25.351 | 567.6 | 252 20 30.4 | 72 22 53.4 | Burn | 4858.3 | 3.686482 |
| Sand Hill 2, 1908 | 43 42 40.118 | 1238.2 | 80 04 53.5 | 260 04 02.0 | Cab | 1693.4 | 3.228771 |
| | 124 10 10.844 | 242.8 | 174 16 13.4 | 354 16 06.9 | Brushy Hill 2 | 2104.0 | 3.323053 |
| Beach, 1908 | 43 41 15.022 | 463.6 | 184 52 27.0 | 4 52 33.1 | Cab | 2342.9 | 3.369748 |
| | 124 11 34.242 | 766.9 | 199 20 18.3 | 19 21 09.4 | Brushy Hill 2 | 5002.2 | 3.699165 |
| | | | 215 24 27.5 | 35 25 25.1 | Sand Hill 2 | 3222.6 | 3.508202 |
| Snipe, 1885 | 43 38 54.357 | 1677.6 | 337 16 54.1 | 157 17 29.1 | Faun 2 | 2947.8 | 3.469495 |
| | 124 12 31.160 | 698.3 | 8 06 06.3 | 188 05 56.8 | Bear | 2184.9 | 3.339437 |
| Deer, 1885 | 43 39 15.509 | 478.6 | 354 50 19.8 | 174 50 29.2 | Faun 2 | 3385.7 | 3.529648 |
| | 124 11 53.968 | 1209.3 | 2 06 40.8 | 182 06 35.4 | Hammock | 4714.0 | 3.673390 |
| | | | 22 04 14.9 | 202 03 39.7 | Bear | 3038.5 | 3.482658 |
| | | | 51 56 05.0 | 231 55 39.3 | Snipe | 1058.7 | 3.024774 |
| South Point 2, 1885 | 43 39 45.925 | 1417.3 | 328 37 27.3 | 148 37 44.9 | Deer | 1099.4 | 3.041175 |
| | 124 12 19.512 | 437.2 | 8 37 05.7 | 188 36 48.1 | Bear | 3797.5 | 3.579496 |
| | | | 9 18 53.9 | 189 18 45.8 | Snipe | 1612.8 | 3.207573 |
| Beach, 1885 | 43 42 53.711 | 1657.7 | 319 21 14.0 | 139 21 56.3 | Army Hill | 2105.2 | 3.323284 |
| | 124 11 19.982 | 447.3 | 9 04 30.3 | 189 04 21.0 | Umpqua north base | 1916.4 | 3.282482 |
| Sand Hill 3, 1885 | 43 42 39.322 | 1213.6 | 52 03 02.0 | 232 02 04.7 | Umpqua north base | 2354.7 | 3.371933 |
| | 124 10 10.561 | 236.4 | 105 57 14.0 | 285 56 26.0 | Beach 1885 | 1616.3 | 3.208533 |
| Dune, 1885 | 43 43 31.358 | 967.8 | 322 31 55.3 | 142 32 33.3 | Sand Hill 3 | 2023.3 | 3.306052 |
| | 124 11 05.536 | 123.9 | 339 12 20.8 | 159 12 53.1 | Army Hill | 2951.5 | 3.470036 |
| | | | 11 34 42.1 | 191 34 22.8 | Umpqua north base | 3117.7 | 3.493832 |
| | | | 15 33 13.1 | 195 33 03.1 | Beach 1885 | 1206.0 | 3.081356 |
| Lake View, 1885 | 43 39 25.680 | 792.5 | 19 01 39.5 | 199 01 36.2 | Deer | 332.0 | 2.521195 |
| | 124 11 49.137 | 1101.1 | 44 15 14.3 | 224 14 45.4 | Snipe | 1349.6 | 3.130199 |
| | | | 132 33 16.4 | 312 32 55.5 | South Point 2 | 923.9 | 2.965632 |
| Stage Landing, 1885 | 43 40 11.138 | 343.7 | 4 53 30.7 | 184 53 27.0 | Lake View | 1408.1 | 3.148626 |
| | 124 11 43.778 | 980.8 | 45 49 06.2 | 225 48 41.6 | South Point 2 | 1116.5 | 3.047843 |
| Umpqua south base, 1885 | 43 41 13.775 | 425.1 | 6 02 27.4 | 186 02 16.5 | Lake View | 3354.7 | 3.525652 |
| | 124 11 33.381 | 747.6 | 6 52 13.6 | 186 52 06.4 | Stage Landing | 1947.1 | 3.289388 |
| | | | 20 52 06.9 | 200 51 35.1 | South Point 2 | 2901.5 | 3.462627 |
| Umpqua north base, 1885 | 43 41 52.394 | 1617.0 | 359 53 35.1 | 179 53 35.2 | Umpqua south base | 1191.9 | 3.076229 |
| | 124 11 33.480 | 749.7 | 4 13 19.5 | 184 13 12.4 | Stage Landing | 3133.5 | 3.496029 |
| | | | 14 48 07.0 | 194 47 35.3 | South Point 2 | 4037.0 | 3.606062 |
| Army Hill, 1885 | 43 42 01.952 | 60.2 | 29 07 17.8 | 209 06 19.1 | Stage Landing | 3914.5 | 3.592681 |
| | 124 10 18.742 | 419.7 | 48 21 10.1 | 228 20 18.6 | Umpqua south base | 2237.1 | 3.349683 |
| | | | 80 00 39.4 | 259 59 47.8 | Umpqua north base | 1699.4 | 3.230284 |
| Brushy Hill, 1885 | 43 43 47.742 | 1473.5 | 354 08 32.9 | 174 08 39.6 | Sand Hill 3 | 2122.7 | 3.326888 |
| | 124 10 20.238 | 453.0 | 359 24 45.0 | 179 24 46.0 | Army Hill | 3265.1 | 3.513898 |
| | | | 38 44 03.2 | 218 43 21.9 | Beach 1885 | 2137.5 | 3.329911 |
| | | | 63 29 49.5 | 243 29 18.2 | Dune | 1133.0 | 3.054217 |
| Carson Tree, 1885 | 43 44 53.361 | 1646.9 | 359 43 35.9 | 179 43 36.5 | Sand Hill 3 | 4136.8 | 3.616669 |
| | 124 10 11.443 | 256.0 | 1 46 11.1 | 181 46 06.0 | Army Hill | 5292.6 | 3.723673 |
| | | | 18 12 28.3 | 198 11 31.6 | Umpqua north base | 5879.2 | 3.769320 |
| | | | 22 33 51.4 | 202 33 04.0 | Beach 1885 | 3998.6 | 3.601911 |
| Diercks, 1885 | 43 45 02.976 | 91.8 | 295 15 39.9 | 115 15 59.3 | Carson Tree | 695.3 | 2.842177 |
| | 124 10 39.548 | 884.8 | 12 47 01.9 | 192 46 33.9 | Beach 1885 | 4090.8 | 3.611808 |
| Wreck Tacoma, 1885 | 43 45 01.959 | 60.5 | 267 34 34.5 | 87 32 57.5 | Diercks | 743.4 | 2.871247 |
| | 124 11 12.747 | 285.2 | 356 41 48.0 | 176 41 53.0 | Dune | 2800.8 | 3.447289 |
| | | | 2 20 35.6 | 182 20 30.7 | Beach 1885 | 3961.4 | 3.597845 |
| Schroader, 1885 | 43 46 04.538 | 140.1 | 348 30 14.7 | 168 30 28.5 | Carson Tree | 2241.7 | 3 350574 |
| | 124 10 31.411 | 702.6 | 5 28 23.1 | 185 28 17.5 | Diercks | 1908.7 | 3.280733 |
| | | | 25 35 16.3 | 205 34 47.6 | Wreck Tacoma | 2141.3 | 3.330683 |
| North End, 1885 | 43 47 03.396 | 104.8 | 357 18 19.8 | 177 18 25.6 | Carson Tree | 4017.7 | 3.603978 |
| | 124 10 19.885 | 444.7 | 6 45 02.5 | 186 44 49.0 | Diercks | 3742.4 | 3.573156 |
| | | | 8 04 39.1 | 188 04 31.1 | Schroader | 1834.7 | 3.263573 |
| | | | 17 30 51.3 | 197 30 14.7 | Wreck Tacoma | 3930.0 | 3.594393 |
| Corral, 1885 | 43 44 07.783 | 240.2 | 45 48 16.1 | 225 46 49.4 | Sand Hill 3 | 3915.5 | 3.592792 |
| | 124 08 05.168 | 115.7 | 78 26 55.4 | 258 25 22.0 | Brushy Hill | 3085.5 | 3.489323 |

*Umpqua River*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Cliff, 1885 | 43 44 56.772 | 1752.2 | 331 00 22.5 | 151 00 48.4 | Corral | 1728.5 | 3.237674 |
| | 124 08 42.607 | 953.3 | 24 54 06.0 | 204 53 05.2 | Sand Hill 3 | 4676.6 | 3.669928 |
| | | | 45 43 46.5 | 225 42 39.0 | Brushy Hill | 3051.5 | 3.484520 |
| Marsh, 1885 | 43 44 56.648 | 1748.3 | 25 14 54.1 | 205 14 32.1 | Corral | 1667.4 | 3.222028 |
| | 124 07 33.388 | 747.0 | 60 21 02.7 | 240 19 07.3 | Brushy Hill | 4296.8 | 3.633149 |
| | | | 90 08 54.9 | 270 08 07.0 | Cliff | 1548.7 | 3.189964 |
| Gardiner, 1885 | 43 44 01.299 | 40.1 | 95 30 55.6 | 275 29 51.5 | Corral | 2085.4 | 3.319195 |
| | 124 06 32.412 | 725.4 | 120 27 13.5 | 300 25 43.5 | Cliff | 3379.1 | 3.528806 |
| | | | 141 23 23.2 | 321 22 41.1 | Marsh | 2186.3 | 3.339701 |
| Leeds, 1885 | 43 44 04.416 | 136.3 | 144 26 42.8 | 324 26 07.1 | Cliff | 1986.3 | 3.298038 |
| | 124 07 50.985 | 1141.1 | 193 43 28.9 | 13 43 41.1 | Marsh | 1659.4 | 3.219953 |
| | | | 273 07 26.6 | 93 08 20.9 | Gardiner | 1761.0 | 3.245769 |
| Umpquah, 1885 | 43 42 33.258 | 1026.4 | 148 24 50.4 | 328 23 57.0 | Leeds | 3302.9 | 3.518899 |
| | 124 06 33.681 | 754.1 | 163 12 11.7 | 343 11 30.5 | Marsh | 4622.8 | 3.664901 |
| | | | 180 35 55.4 | 0 35 56.3 | Gardiner | 2717.3 | 3.434144 |
| *Supplementary points.* | | | | | | | |
| Breakwater, 1885 | 43 43 18.167 | 560.7 | 9 02 43.7 | 189 02 36.9 | Umpquah | 1403.5 | 3.147199 |
| | 124 06 23.826 | 533.4 | 126 12 05.3 | 306 11 05.1 | Leeds | 2417.2 | 3.383315 |
| | | | 134 25 50.2 | 314 24 14.3 | Cliff | 4348.2 | 3.638312 |
| Cannery smokestack, 1885 | 43 43 35.446 | 1094.0 | 177 29 24.3 | 357 29 20.9 | Marsh | 2508.5 | 3.399418 |
| | 124 07 28.478 | 637.4 | 237 32 36.6 | 57 33 15.3 | Gardiner | 1487.0 | 3.172312 |
| | | | 327 24 40.5 | 147 25 18.4 | Umpquah | 2277.8 | 3.357515 |
| Mill, smokestack, 1885 | 43 43 54.907 | 1694.6 | 355 26 22.1 | 175 26 28.3 | Umpquah | 2527.9 | 3.402762 |
| | 124 06 42.659 | 954.7 | 100 52 15.0 | 280 51 27.8 | Leeds | 1557.0 | 3.192295 |
| | | | 125 26 15.9 | 305 24 53.0 | Cliff | 3293.9 | 3.517710 |
| | | | 149 13 15.8 | 329 12 40.8 | Marsh | 2218.0 | 3.345960 |
| Old Mill smokestack, 1885 | 43 43 37.199 | 1148.1 | 116 08 07.1 | 296 07 14.2 | Leeds | 1907.4 | 3.280452 |
| | 124 06 34.467 | 771.5 | 130 35 25.1 | 310 33 56.5 | Cliff | 3775.4 | 3.576965 |
| | | | 151 44 13.1 | 331 43 32.4 | Marsh | 2784.0 | 3.444676 |
| Smith River,[1] 1885 | 43 42 36.81 | 1136.1 | 87 15 42 | 267 14 31 | Umpquah | 2283.5 | 3.358598 |
| | 124 04 51.80 | 1159.7 | 121 47 39 | 301 46 35 | Breakwater | 2423.4 | 3.384433 |

*Umpqua River to Coos Bay.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Principal points.* | | | | | | | |
| Coos Bay Tree, 1885 | 43 26 20.130 | 621.2 | 301 57 58.6 | 121 59 38.0 | Simpson | 3835.9 | 3.583867 |
| | 124 15 51.313 | 1154.0 | 328 27 53.1 | 148 28 35.9 | Pony | 2678.6 | 3.427908 |
| | | | 19 22 12.8 | 199 21 49.1 | Hutchinson 2 | 2342.0 | 3.369581 |
| Lagoon, 1885 | 43 26 23.693 | 731.2 | 313 47 22.2 | 133 48 30.5 | Simpson | 3094.1 | 3.490537 |
| | 124 15 05.943 | 133.7 | 350 58 11.7 | 170 58 23.3 | Pony | 2423.1 | 3.384378 |
| | | | 83 51 14.0 | 263 50 42.8 | Coos Bay Tree | 1026.2 | 3.011236 |
| North Sand 2, 1885 | 43 26 40.240 | 1241.8 | 339 39 43.6 | 159 40 13.6 | Simpson | 2828.5 | 3.451550 |
| | 124 14 10.352 | 232.8 | 16 41 03.0 | 196 40 36.4 | Pony | 3031.3 | 3.481035 |
| | | | 67 47 07.0 | 247 46 28.8 | Lagoon | 1350.4 | 3.130461 |
| | | | 74 43 16.0 | 254 42 06.6 | Coos Bay Tree | 2353.7 | 3.371748 |
| Lion Tree, 1885 | 43 27 24.511 | 756.4 | 4 26 41.6 | 184 26 32.0 | Simpson | 4030.6 | 3.605367 |
| | 124 13 12.767 | 287.0 | 43 28 00.5 | 223 27 20.9 | North Sand 2 | 1882.3 | 3.274692 |
| Late, 1885 | 43 28 09.563 | 295.1 | 327 11 02.2 | 147 11 29.6 | Lion Tree | 1654.3 | 3.218617 |
| | 124 13 52.645 | 1183.4 | 353 49 48.4 | 173 50 06.2 | Simpson | 5440.3 | 3.735623 |
| | | | 8 13 09.8 | 188 12 57.6 | North Sand 2 | 2785.2 | 3.444859 |
| Unknown, 1885 | 43 27 41.101 | 1268.4 | 253 31 28.2 | 73 32 59.2 | Late | 3099.5 | 3.491287 |
| | 124 16 04.873 | 109.6 | 277 31 17.3 | 97 33 15.7 | Lion Tree | 3902.9 | 3.591392 |
| | | | 306 05 53.1 | 126 07 11.9 | North Sand 2 | 3187.1 | 3.503400 |
| | | | 330 58 44.8 | 150 59 25.5 | Lagoon | 2731.8 | 3.436447 |
| | | | 353 02 29.9 | 173 02 39.4 | Coos Bay Tree | 2517.4 | 3.400953 |
| Kilstrom, 1885 | 43 28 54.100 | 1669.6 | 298 17 33.8 | 118 18 51.9 | Late | 2898.9 | 3.462232 |
| | 124 15 46.205 | 1038.4 | 308 42 10.2 | 128 43 55.7 | Lion Tree | 4420.4 | 3.645458 |
| | | | 10 33 09.3 | 190 32 56.4 | Unknown | 2291.6 | 3.360139 |
| Whale, 1885 | 43 29 58.137 | 1794.2 | 330 12 04.4 | 150 13 03.1 | Late | 3861.0 | 3.586099 |
| | 124 15 18.006 | 404.5 | 329 17 29.1 | 149 18 55.1 | Lion Tree | 5513.7 | 3.741441 |
| | | | 17 46 45.7 | 197 46 26.3 | Kilstrom | 2075.3 | 3.317091 |
| Brushy Ridge, 1885 | 43 29 20.395 | 629.4 | 47 17 51.2 | 227 16 38.6 | Late | 3222.7 | 3.508214 |
| | 124 12 07.283 | 163.7 | 80 39 14.8 | 260 36 44.1 | Kilstrom | 4986.1 | 3.697757 |
| | | | 105 13 27.0 | 285 11 15.7 | Whale | 4440.7 | 3.647455 |
| Jarvis, 1885 | 43 31 29.889 | 922.4 | 319 24 11.7 | 139 25 56.6 | Brushy Ridge | 5262.0 | 3.721152 |
| | 124 14 39.668 | 890.8 | 16 55 09.1 | 196 54 42.7 | Whale | 2959.7 | 3.471241 |
| | | | 17 16 36.3 | 197 15 50.5 | Kilstrom | 5034.9 | 3.701988 |
| Doe, 1885 | 43 31 50.319 | 1552.9 | 29 46 14.3 | 209 44 39.0 | Kilstrom | 6264.4 | 3.796880 |
| | 124 13 27.797 | 624.2 | 35 34 30.7 | 215 33 14.8 | Whale | 4256.0 | 3.629003 |
| | | | 68 40 07.9 | 248 39 18.4 | Jarvis | 1732.7 | 3.238728 |

*Umpqua River to Coos Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Wheeler, 1885 | 43 32 41.926 | 1293.9 | 328 06 26.6 | 148 06 57.0 | Doe | 1875.8 | 3.273181 |
| | 124 14 11.931 | 267.9 | 15 39 08.1 | 195 38 49.0 | Jarvis | 2308.8 | 3.363377 |
| Camp Hill, 1885 | 43 33 50.406 | 1555.6 | 18 42 44.0 | 198 42 05.5 | Doe | 3912.8 | 3.592486 |
| | 124 12 31.895 | 715.8 | 33 29 43.8 | 213 28 15.8 | Jarvis | 5199.4 | 3.715956 |
| | | | 46 44 39.8 | 226 43 30.9 | Wheeler | 3083.6 | 3.489054 |
| Ten Mile, 1885 | 43 34 20.248 | 624.9 | 301 31 21.5 | 121 32 07.6 | Camp Hill | 1761.2 | 3.245810 |
| | 124 13 38.790 | 870.4 | 356 56 46.1 | 176 56 53.7 | Doe | 4633.6 | 3.665923 |
| | | | 13 46 35.8 | 193 46 13.0 | Wheeler | 3124.2 | 3.494743 |
| Sea Lion, 1885 | 43 35 44.059 | 1359.7 | 345 13 33.8 | 165 14 02.2 | Camp Hill | 3627.4 | 3.559596 |
| | 124 13 13.111 | 294.1 | 12 33 33.1 | 192 33 15.4 | Ten Mile | 2049.9 | 3.423235 |
| Indian 2, 1885 | 43 36 12.150 | 375.0 | 14 01 36.1 | 194 01 02.5 | Camp Hill | 4508.8 | 3.654064 |
| | 124 11 43.201 | 968.9 | 36 54 45.9 | 216 53 26.2 | Ten Mile | 4318.6 | 3.635348 |
| | | | 66 44 46.5 | 246 43 44.5 | Sea Lion | 2195.1 | 3.341453 |
| Hammock, 1885 | 43 36 42.869 | 1323.0 | 336 20 58.6 | 156 21 11.4 | Indian 2 | 1035.0 | 3.014924 |
| | 124 12 01.712 | 38.4 | 26 19 59.9 | 206 18 53.0 | Ten Mile | 4910.8 | 3.691150 |
| | | | 41 25 41.4 | 221 24 52.2 | Sea Lion | 2420.4 | 3.383890 |
| Bear, 1885 | 43 37 44.267 | 1366.2 | 332 55 47.6 | 152 56 17.4 | Hammock | 2127.9 | 3.327955 |
| | 124 12 44.895 | 1006.5 | 9 40 53.6 | 189 40 34.2 | Sea Lion | 3763.4 | 3.575584 |
| Faun 2, 1885 | 43 37 26.250 | 810.1 | 1 34 57.8 | 181 34 55.9 | Indian 2 | 2287.8 | 3.359409 |
| | 124 11 40.383 | 905.4 | 19 39 34.7 | 199 39 20.0 | Hammock | 1421.7 | 3.152803 |
| | | | 33 24 28.6 | 213 23 24.7 | Sea Lion | 3777.7 | 3.577224 |
| | | | 111 02 08.5 | 291 01 24.0 | Bear | 1549.5 | 3.190200 |

*Coos Bay.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Principal points.* | | | | | | | |
| Mill, 1906 | 43 23 16.604 | 512.4 | 267 26 53.7 | 87 30 37.1 | Noah | 7328.5 | 3.865017 |
| | 124 13 14.903 | 335.4 | 341 38 09.4 | 161 38 25.3 | Marshfield Hill | 1658.7 | 3.219777 |
| White Point 3, 1906 | 43 22 12.536 | 386.9 | 137 31 16.0 | 317 30 20.8 | Mill | 2681.1 | 3.428321 |
| | 124 11 54.459 | 1226.1 | 247 19 49.9 | 67 22 38.1 | Noah | 5972.1 | 3.776128 |
| | | | 107 22 08.6 | 287 21 29.3 | Marshfield Hill | 1350.0 | 3.130340 |
| Pierce, 1863 | 43 24 01.553 | 47.9 | 2 51 45.4 | 182 51 40.3 | White Point 3 | 3368.5 | 3.527443 |
| | 124 11 46.986 | 1057.3 | 54 58 28.5 | 234 57 28.1 | Mill | 2416.4 | 3.383175 |
| | | | 26 11 34.2 | 206 10 49.8 | Marshfield Hill | 3300.2 | 3.518538 |
| Porter, 1889 | 43 23 55.949 | 1726.6 | 264 30 59.1 | 84 31 54.2 | Pierce | 1812.5 | 3.258279 |
| | 124 13 07.162 | 161.2 | 352 52 47.3 | 172 52 57.9 | Marshfield Hill | 2810.2 | 3.448731 |
| | | | 332 50 42.1 | 152 51 32.0 | White Point 3 | 3586.5 | 3.554672 |
| Stump, 1889 | 43 24 12.984 | 400.7 | 279 39 59.7 | 99 41 02.9 | Pierce | 2099.0 | 3.322021 |
| | 124 13 18.939 | 426.2 | 349 30 47.0 | 169 31 05.7 | Marshfield Hill | 3370.5 | 3.527694 |
| Dewey, 1862 | 43 24 18.720 | 577.7 | 285 04 08.8 | 105 05 08.9 | Pierce | 2036.6 | 3.308915 |
| | 124 13 14.379 | 323.5 | 346 59 13.8 | 166 59 18.8 | Porter | 721.3 | 2.858095 |
| Mabry, 1862 | 43 25 39.133 | 1207.7 | 348 54 13.7 | 168 54 31.7 | Pierce | 3068.8 | 3.486654 |
| | 124 12 13.232 | 297.7 | 20 51 48.5 | 200 51 11.5 | Porter | 3407.7 | 3.532464 |
| | | | 29 00 24.0 | 208 59 42.0 | Dewey | 2837.4 | 3.452924 |
| | | | 29 04 52.4 | 209 04 07.2 | Stump | 3042.0 | 3.483157 |
| North Bend 2, 1889 | 43 25 14.526 | 448.3 | 236 05 35.6 | 56 06 10.1 | Mabry | 1361.5 | 3.134034 |
| | 124 13 03.466 | 78.0 | 322 36 34.5 | 142 37 27.1 | Pierce | 2834.2 | 3.452401 |
| Russell, 1862 | 43 26 02.037 | 62.9 | 298 35 06.5 | 118 35 46.1 | Mabry | 1477.1 | 3.169405 |
| | 124 13 10.895 | 245.0 | 333 04 33.3 | 153 05 31.0 | Pierce | 4170.0 | 3.620138 |
| | | | 353 29 51.6 | 173 29 56.7 | North Bend 2 | 1475.7 | 3.169008 |
| North Slough '89, 1889 | 43 25 55.706 | 1719.2 | 262 48 29.8 | 82 49 17.2 | Russell | 1562.2 | 3.193736 |
| | 124 14 19.808 | 445.5 | 280 10 20.7 | 100 11 47.8 | Mabry | 2892.6 | 3.461286 |
| | | | 336 37 53.8 | 156 38 35.7 | Stump | 3453.2 | 3.538225 |
| Simpson, 1862 | 43 25 14.300 | 441.3 | 136 54 31.0 | 316 53 54.4 | North Slough '89 | 1750.0 | 3.243043 |
| | 124 13 26.653 | 599.6 | 193 31 35.5 | 13 31 46.3 | Russell | 1515.3 | 3.180643 |
| | | | 245 06 01.2 | 65 06 51.6 | Mabry | 1820.7 | 3.260248 |
| Pony, 1862 | 43 25 06.148 | 189.7 | 203 15 36.0 | 23 15 56.1 | North Slough '89 | 1664.8 | 3.221353 |
| | 124 14 49.038 | 1103.2 | 231 59 23.0 | 52 00 30.4 | Russell | 2801.5 | 3.447392 |
| | | | 262 15 42.5 | 82 16 39.1 | Simpson | 1870.3 | 3.271919 |
| North Slough, 1862 | 43 25 58.422 | 1803.0 | 317 30 19.1 | 137 30 57.2 | Simpson | 1846.5 | 3.266359 |
| | 124 14 22.103 | 497.1 | 20 35 13.5 | 200 34 55.0 | Pony | 1723.2 | 3.236347 |
| Ridge, 1863 | 43 25 36.276 | 1119.5 | 247 06 14.0 | 67 07 03.5 | North Slough | 1757.1 | 3.244806 |
| | 124 15 34.073 | 766.4 | 250 14 44.4 | 70 15 35.5 | North Slough '89 | 1774.8 | 3.249143 |
| | | | 283 18 00.3 | 103 19 27.9 | Simpson | 2945.4 | 3.469144 |
| | | | 312 32 28.0 | 132 32 59.0 | Pony | 1375.1 | 3.138322 |
| Hutchinson, 1862 | 43 25 08.423 | 259.9 | 233 35 58.9 | 53 36 34.5 | Ridge | 1448.7 | 3.160966 |
| | 124 16 25.911 | 582.9 | 240 59 56.7 | 61 01 21.7 | North Slough | 3183.8 | 3.502947 |
| | | | 242 45 54.5 | 62 47 21.2 | North Slough '89 | 3189.9 | 3.503774 |
| | | | 271 50 09.8 | 91 51 16.4 | Pony | 2180.4 | 3.338542 |

*Coos Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Tophet, 1862 | 43 24 39.709 | 1225.5 | 126 33 06.4 | 306 32 29.9 | Hutchinson | 1488.1 | 3.172636 |
| | 124 15 32.772 | 737.3 | 179 02 22.6 | 359 02 21.7 | Ridge | 1746.0 | 3.242032 |
| | | | 213 11 43.5 | 33 12 32.0 | North Slough | 2903.1 | 3.462861 |
| Henderson, 1861 | 43 24 44.112 | 1361.4 | 211 19 33.8 | 31 19 47.8 | Hutchinson | 878.3 | 2.943656 |
| | 124 16 46.210 | 1039.7 | 225 13 22.0 | 45 14 11.6 | Ridge | 2285.8 | 3.359045 |
| | | | 274 41 38.0 | 94 42 28.5 | Tophet | 1657.9 | 3.219546 |
| Cemetery, 1861 | 43 24 06.694 | 206.6 | 141 58 36.1 | 321 58 08.5 | Henderson | 1466.0 | 3.166120 |
| | 124 16 06.075 | 136.7 | 166 48 58.6 | 346 48 45.0 | Hutchinson | 1956.6 | 3.291506 |
| | | | 194 35 37.8 | 14 35 59.8 | Ridge | 2856.8 | 3.455882 |
| | | | 215 23 16.6 | 35 24 29.6 | North Slough '89 | 4127.2 | 3.615652 |
| Coos Bay north base, 1861 | 43 24 17.188 | 530.4 | 195 54 45.5 | 15 54 52.7 | Henderson | 864.0 | 2.936528 |
| | 124 16 56.739 | 1276.7 | 249 47 38.4 | 69 48 36.1 | Tophet | 2013.1 | 3.303861 |
| | | | 285 51 09.7 | 105 51 44.5 | Cemetery | 1185.2 | 3.073778 |
| Coos Bay south base, 1861 | 43 23 58.846 | 1816.1 | 207 03 38.1 | 27 03 59.9 | Henderson | 1568.7 | 3.195548 |
| | 124 17 17.930 | 403.4 | 220 06 35.7 | 40 06 50.3 | Coos Bay north base | 740.1 | 2.869305 |
| | | | 261 28 28.2 | 81 29 17.6 | Cemetery | 1635.0 | 3.213520 |
| Telegraph, 1862 | 43 23 56.677 | 1749.1 | 92 58 47.0 | 272 58 07.6 | Coos Bay south base | 1290.0 | 3.110587 |
| | 124 16 20.683 | 465.5 | 127 57 46.8 | 307 57 22.0 | Coos Bay north base | 1029.0 | 3.012434 |
| | | | 158 34 45.2 | 338 34 27.6 | Henderson | 1572.5 | 3.196601 |
| Ridge 2, 1889 | 43 25 36.617 | 1130.0 | 252 42 50.4 | 72 43 48.3 | North Slough '89 | 1983.5 | 3.297425 |
| | 124 15 44.012 | 989.9 | 282 33 10.8 | 102 34 45.2 | Simpson | 3165.7 | 3.500465 |
| | | | 307 14 36.0 | 127 15 13.8 | Pony | 1553.5 | 3.191325 |
| | | | 10 08 32.6 | 190 08 17.5 | Cemetery | 2819.2 | 3.450123 |
| Hutchinson 2, 1889 | 43 25 08.537 | 263.5 | 227 21 02.9 | 47 21 31.6 | Ridge 2 | 1279.2 | 3.106938 |
| | 124 16 25.841 | 581.3 | 242 48 30.0 | 62 49 56.6 | North Slough '89 | 3186.9 | 3.503366 |
| | | | 271 55 46.6 | 91 56 53.1 | Pony | 2179.0 | 3.338252 |
| | | | 346 52 49.9 | 166 53 03.5 | Cemetery | 1959.7 | 3.292185 |
| Pest, 1889 | 43 24 10.408 | 321.2 | 220 08 12.1 | 40 08 58.3 | Hutchinson 2 | 2346.7 | 3.370463 |
| | 124 17 33.085 | 744.5 | 233 12 30.4 | 53 14 43.2 | North Slough '89 | 5428.3 | 3.734663 |
| | | | 273 20 31.2 | 93 21 31.0 | Cemetery | 1961.3 | 3.292546 |
| Empire 2, 1889 | 43 23 44.577 | 1375.7 | 120 13 21.7 | 300 12 39.9 | Pest | 1583.9 | 3.199738 |
| | 124 16 32.263 | 726.1 | 183 11 27.7 | 3 11 32.1 | Hutchinson 2 | 2595.1 | 3.414156 |
| | | | 197 25 32.9 | 17 26 06.0 | Ridge 2 | 3624.1 | 3.559200 |
| Midway, 1889 | 43 22 44.169 | 1363.1 | 171 41 05.9 | 351 40 54.0 | Pest | 2689.7 | 3.429702 |
| | 124 17 15.799 | 355.7 | 207 43 26.5 | 27 43 56.4 | Empire 2 | 2106.1 | 3.323479 |
| Grove, 1889 | 43 23 07.918 | 244.4 | 209 38 25.2 | 29 38 58.7 | Pest | 2218.9 | 3.346145 |
| | 124 18 21.852 | 491.9 | 245 20 58.9 | 65 22 14.2 | Empire 2 | 2713.6 | 3.433547 |
| | | | 296 14 00.4 | 116 14 45.8 | Midway | 1657.7 | 3.219501 |
| Pigeon 2, 1889 | 43 21 41.655 | 1285.5 | 176 30 56.5 | 356 30 51.5 | Grove | 2667.1 | 3.426033 |
| | 124 18 14.651 | 329.9 | 191 30 58.4 | 11 31 26.9 | Pest | 4685.0 | 3.670710 |
| | | | 214 28 34.8 | 34 29 15.2 | Midway | 2340.4 | 3.369294 |
| | | | 211 16 22.7 | 31 17 33.0 | Empire 2 | 4438.8 | 3.647266 |
| North Spit, 1889 | 43 21 55.334 | 1707.6 | 205 32 03.6 | 25 32 36.2 | Grove | 2482.5 | 3.394897 |
| | 124 19 09.394 | 211.5 | 239 28 43.6 | 59 30 01.6 | Midway | 2968.5 | 3.472533 |
| | | | 288 53 58.5 | 108 54 36.1 | Pigeon 2 | 1302.9 | 3.114920 |
| Fossil 2, 1889 | 43 21 29.456 | 909.0 | 138 40 14.6 | 318 39 53.2 | North Spit | 1063.6 | 3.026761 |
| | 124 18 38.200 | 860.2 | 186 54 17.8 | 6 54 29.0 | Grove | 3060.8 | 3.485837 |
| | | | 218 48 50.5 | 38 49 47.1 | Midway | 2959.4 | 3.471209 |
| Surf, 1889 | 43 22 27.793 | 857.7 | 259 37 40.7 | 79 39 05.0 | Midway | 2810.1 | 3.448728 |
| | 124 19 18.592 | 418.6 | 314 40 40.0 | 134 41 23.9 | Pigeon 2 | 2024.8 | 3.306389 |
| | | | 333 11 42.2 | 153 12 09.9 | Fossil 2 | 2017.0 | 3.304705 |
| | | | 348 19 06.2 | 168 19 12.5 | North Spit | 1022.9 | 3.009829 |
| Coos Head 2, 1889 | 43 21 05.138 | 158.6 | 204 33 16.7 | 24 33 52.4 | Surf | 2804.5 | 3.447861 |
| | 124 20 10.360 | 233.3 | 221 32 35.6 | 41 33 17.5 | North Spit | 2069.9 | 3.315953 |
| | | | 246 36 02.8 | 66 37 22.3 | Pigeon 2 | 2839.0 | 3.453163 |
| | | | 260 06 40.5 | 70 07 43.8 | Fossil 2 | 2207.0 | 3.343798 |
| Empire 3, 1909 | 43 23 44.585 | 1376.0 | 31 17 17.8 | 211 16 07.5 | Pigeon 2 | 4438.9 | 3.647275 |
| | 124 16 32.273 | 726.5 | 65 21 49.4 | 245 20 34.1 | Grove | 2713.5 | 3.433531 |
| Jetty, 1909 | 43 21 48.857 | 1507.8 | 294 51 05.0 | 24 51 39.4 | Grove | 2688.9 | 3.429582 |
| | 124 19 12.058 | 271.5 | 225 11 18.0 | 45 13 07.8 | Empire 3 | 5068.8 | 3.704909 |
| | | | 279 45 04.2 | 99 45 43.6 | Pigeon 2 | 1311.6 | 3.117809 |
| Ocean, 1909 | 43 22 17.223 | 531.5 | 303 58 05.0 | 123 58 54.7 | Pigeon 2 | 1964.2 | 3.293190 |
| | 124 19 26.995 | 607.8 | 338 58 56.6 | 158 59 06.9 | Jetty | 937.8 | 2.972098 |
| Coos Head 3, 1909 | 43 21 05.116 | 157.9 | 203 40 52.3 | 23 41 22.0 | Ocean | 2430.0 | 3.385600 |
| | 124 20 10.345 | 233.0 | 224 11 30.3 | 44 12 10.3 | Jetty | 1882.8 | 3.274812 |
| | | | 246 35 09.6 | 66 36 29.0 | Pigeon 2 | 2838.9 | 3.453156 |
| Cape Arago Lighthouse, 1909 | 43 20 30.006 | 926.0 | 230 54 29.6 | 50 56 33.8 | Ocean | 5249.3 | 3.720102 |
| | 124 22 27.957 | 629.7 | 241 06 06.6 | 61 08 21.1 | Jetty | 5038.4 | 3.702294 |
| | | | 248 47 23.8 | 68 50 17.7 | Pigeon 2 | 6118.3 | 3.786632 |
| | | | 250 43 05.3 | 70 44 39.8 | Coos Head 3 | 3283.4 | 3.516321 |

*Coos Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Crawford 2, 1889 | 43 23 22.559 | 696.2 | 52 17 50.5 | 232 16 41.1 | Marshfield Hill | 2874.1 | 3.458502 |
| | 124 11 10.683 | 240.5 | 111 28 11.1 | 291 26 51.1 | Porter | 2816.7 | 3.449734 |
| | | | 145 49 47.1 | 325 49 22.1 | Pierce | 1454.5 | 3.162719 |
| Timmermann, 1889 | 43 21 56.221 | 1735.1 | 117 36 26.3 | 297 35 33.4 | Marshfield Hill | 1956.4 | 3.291455 |
| | 124 11 34.684 | 781.2 | 150 36 44.1 | 330 35 40.6 | Porter | 4240.9 | 3.627462 |
| | | | 175 54 21.7 | 355 54 13.2 | Pierce | 3877.8 | 3.588580 |
| | | | 191 27 38.1 | 11 27 54.6 | Crawford 2 | 2718.7 | 3.434362 |
| White Point 2, 1889 | 43 22 12.545 | 387.2 | 107 21 30.3 | 287 20 51.0 | Marshfield Hill | 1349.8 | 3.130279 |
| | 124 11 54.463 | 1226.3 | 152 51 29.7 | 332 50 39.8 | Porter | 3586.2 | 3.554635 |
| | | | 182 51 47.6 | 2 51 52.7 | Pierce | 3368.3 | 3.527406 |
| | | | 204 30 51.8 | 24 31 21.9 | Crawford 2 | 2374.8 | 3.375630 |
| Isthmus 2, 1889 | 43 21 52.531 | 1621.2 | 141 09 07.3 | 321 08 42.2 | Marshfield Hill | 1310.1 | 3.117295 |
| | 124 12 15.189 | 342.1 | 162 55 47.1 | 342 55 11.4 | Porter | 3984.4 | 3.600361 |
| | | | 207 35 18.7 | 27 36 03.0 | Crawford 2 | 3124.9 | 3.496229 |
| | | | 217 04 12.1 | 37 04 26.3 | White Point 2 | 774.1 | 2.888808 |
| Marsh, 1889 | 43 21 22.544 | 695.7 | 178 09 16.7 | 358 09 14.8 | Marshfield Hill | 1946.7 | 3.289297 |
| | 124 12 48.906 | 1101.5 | 218 27 34.6 | 38 28 12.0 | White Point 2 | 1970.8 | 3.294633 |
| | | | 219 21 44.6 | 39 22 07.8 | Isthmus 2 | 1197.0 | 3.078101 |
| Coos, 1863 | 43 22 28.513 | 880.0 | 60 33 37.2 | 240 32 43.4 | Timmermann | 2027.1 | 3.306877 |
| | 124 10 16.280 | 366.6 | 88 32 18.0 | 268 30 31.3 | Marshfield Hill | 3499.9 | 3.544056 |
| | | | 143 43 04.6 | 323 42 27.3 | Crawford 2 | 2069.2 | 3.315803 |
| Grass, 1889 | 43 21 59.753 | 1843.9 | 104 39 44.6 | 284 38 11.6 | Marshfield Hill | 3152.8 | 3.498701 |
| | 124 10 36.206 | 815.2 | 163 06 32.5 | 343 06 08.9 | Crawford 2 | 2670.7 | 3.426626 |
| | | | 206 48 48.7 | 26 49 02.4 | Coos | 994.5 | 2.997601 |
| Coos River Hill, 1889 | 43 21 59.255 | 1828.7 | 90 34 35.6 | 270 33 48.5 | Grass | 1544.9 | 3.188898 |
| | 124 09 27.596 | 621.4 | 100 02 59.0 | 280 00 38.9 | Marshfield Hill | 4666.4 | 3.668980 |
| | | | 129 29 06.9 | 309 28 33.5 | Coos | 1420.1 | 3.152316 |
| | | | 137 56 15.3 | 317 55 04.6 | Crawford 2 | 3463.3 | 3.539491 |
| Loggie, 1889 | 43 20 54.853 | 1692.8 | 147 58 04.5 | 327 57 26.3 | Grass | 2362.7 | 3.373409 |
| | 124 09 40.549 | 913.4 | 164 26 54.6 | 344 26 30.1 | Coos | 3000.3 | 3.477166 |
| | | | 188 20 53.1 | 8 21 02.0 | Coos River Hill | 2008.8 | 3.302935 |
| Ross, 1889 | 43 21 03.350 | 103.4 | 170 28 54.7 | 350 28 45.8 | Grass | 1765.0 | 3.246733 |
| | 124 10 23.244 | 523.5 | 183 24 50.5 | 3 24 55.3 | Coos | 2632.9 | 3.420430 |
| | | | 215 59 12.0 | 35 59 50.2 | Coos River Hill | 2132.4 | 3.328859 |
| | | | 285 14 57.5 | 205 15 26.8 | Loggie | 996.7 | 2.998559 |
| Violet, 1862 | 43 25 02.089 | 64.5 | 190 45 55.3 | 10 46 05.4 | North Slough | 1769.6 | 3.247885 |
| | 124 14 36.799 | 827.9 | 226 14 15.0 | 46 15 14.0 | Russell | 2675.2 | 3.427357 |
| | | | 256 33 44.3 | 76 34 32.5 | Simpson | 1622.4 | 3.210160 |
| Branch, 1863 | 43 24 42.183 | 1301.8 | 146 44 48.1 | 326 44 35.8 | Violet | 734.6 | 2.866067 |
| | 124 14 18.893 | 425.2 | 178 14 34.4 | 358 14 32.2 | North Slough | 2353.9 | 3.371791 |
| | | | 211 49 15.3 | 31 50 02.0 | Russell | 2900.5 | 3.462477 |
| | | | 229 51 08.8 | 49 51 44.7 | Simpson | 1537.4 | 3.186795 |
| *Supplementary points.* | | | | | | | |
| Haynes,[1] 1862 | 43 27 06.833 | 210.9 | 7 47 51.3 | 187 47 36.8 | Simpson | 3505.3 | 3.544724 |
| | 124 13 05.513 | 124.0 | 37 17 00.1 | 217 16 09.0 | North Slough '89 | 2758.6 | 3.440681 |
| Charleston 2, 1889 | 43 20 49.314 | 1521.9 | 189 09 01.5 | 9 09 16.4 | Surf | 3078.3 | 3.488317 |
| | 124 19 40.337 | 908.1 | 198 52 41.5 | 18 53 02.7 | North Spit | 2153.3 | 3.333106 |
| | | | 228 28 35.5 | 48 29 18.1 | Fossil 2 | 1868.9 | 3.271595 |
| Bluff (U. S. E.), 1907 | 43 20 49.866 | 1538.9 | 89 02 24.5 | 269 01 53.7 | Charleston 2 | 1012.0 | 3.005169 |
| | 124 18 55.412 | 1248.0 | 143 49 39.5 | 323 49 13.6 | Curve (U. S. E.) | 1440.1 | 3.158395 |
| Curve (U. S. E.), 1907 | 43 21 27.534 | 849.7 | 7 48 23.6 | 187 48 18.7 | Charleston 2 | 1190.5 | 3.075739 |
| | 124 19 33.157 | 746.7 | 200 59 45.9 | 21 00 03.9 | Grass Mound (U. S. E.) | 1647.6 | 3.216856 |
| | | | 267 14 59.4 | 87 15 37.1 | Fossil 2 | 1239.0 | 3.093069 |
| Grass Mound (U. S. E.), 1907 | 43 22 17.377 | 536.3 | 32 39 06.5 | 212 38 18.9 | Coos Head 2 | 2647.6 | 3.422849 |
| | 124 19 06.936 | 156.2 | 218 11 11.3 | 38 11 35.5 | Nelson (U. S. E.) | 1285.8 | 3.109182 |
| | | | 313 06 51.4 | 133 07 27.3 | Pigeon 2 | 1612.8 | 3.207582 |
| | | | 336 22 02.4 | 156 22 22.7 | Fossil 2 | 1614.2 | 3.207960 |
| Nelson (U. S. E.), 1907 | 43 22 50.124 | 1546.9 | 217 49 08.8 | 37 49 46.3 | Marsh (U. S. E.) | 2000.7 | 3.301176 |
| | 124 18 31.623 | 711.8 | 284 03 58.9 | 104 04 46.9 | Midway Point (U. S. E.) | 1620.8 | 3.209724 |
| | | | 349 44 53.4 | 169 45 05.1 | Pigeon 2 | 2147.3 | 3.331887 |
| Midway Point (U. S. E.), 1907 | 43 22 37.353 | 1152.8 | 34 42 22.1 | 214 41 45.8 | Pigeon 2 | 2090.8 | 3.320307 |
| | 124 17 21.785 | 490.4 | 170 05 22.2 | 350 05 11.7 | Marsh (U. S. E.) | 2004.3 | 3.301973 |
| | | | 202 41 43.5 | 22 42 10.4 | Empire Dock (U. S. E.) | 2282.6 | 3.358435 |
| Marsh (U. S. E.), 1907 | 43 23 41.331 | 1275.5 | 224 19 04.5 | 44 19 24.8 | Sand Beach (U. S. E.) | 952.4 | 2.978800 |
| | 124 17 37.114 | 835.2 | 263 52 33.7 | 83 53 11.1 | Empire Dock (U. S. E.) | 1232.7 | 3.090860 |
| Empire Dock (U. S. E.), 1907 | 43 23 45.588 | 1406.9 | 134 28 18.7 | 314 28 01.6 | Sand Beach (U. S. E.) | 785.1 | 2.894905 |
| | 124 16 42.651 | 959.8 | 229 20 56.9 | 49 21 16.3 | Lookout Point (U. S. E.) | 838.3 | 2.923424 |
| Sand Beach (U. S. E.), 1907 | 43 24 03.409 | 105.2 | 208 17 05.4 | 28 17 22.0 | Jarvis (U. S. E.) | 1150.9 | 3.061027 |
| | 124 17 07.546 | 169.8 | 270 10 45.7 | 90 11 22.2 | Lookout Point (U. S. E.) | 1196.3 | 3.077830 |

[1] No check on this position.

*Coos Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Mabry (U. S. E.), 1907 | 43 25 39.132 | 1207.7 | 100 11 49 | 280 10 21 | North Slough '89 | 2892.7 | 3.461302 |
| | 124 12 13.228 | 297.5 | 118 35 43 | 298 35 04 | Russell | 1477.2 | 3.169437 |
| | | | 348 54 20 | 168 54 38 | Pierce | 3068.7 | 3.486957 |
| Lookout Point (U. S. E.), 1907 | 43 24 03.284 | 101.3 | 147 23 40.5 | 327 23 20.6 | Jarvis (U. S. E.) | 1207.6 | 3.081939 |
| | 124 16 14.386 | 323.7 | 218 52 54.2 | 38 53 36.0 | Pony Point (U. S. E.) | 2183.2 | 3.339086 |
| Jarvis (U. S. E.), 1907 | 43 24 36.248 | 1118.6 | 204 19 29.6 | 24 19 47.2 | Henderson (U. S. E.) | 1401.5 | 3.146608 |
| | 124 16 43.308 | 974.4 | 251 20 40.8 | 71 21 42.5 | Pony Point (U. S. E.) | 2133.2 | 3.329022 |
| Pony Point (U. S. E.), 1907 | 43 24 58.348 | 1800.7 | 149 48 56.9 | 329 48 35.9 | Ridge | 1366.3 | 3.135547 |
| | 124 15 13.472 | 303.1 | 228 37 58.0 | 48 38 22.5 | Island (U. S. E.) | 1066.9 | 3.028111 |
| Henderson (U. S. E.), 1907 | 43 25 17.630 | 544.1 | 232 14 18.5 | 52 14 41.6 | Ridge | 956.9 | 2.980877 |
| | 124 16 17.644 | 396.9 | 292 23 41.7 | 112 24 25.8 | Pony Point (U. S. E.) | 1561.5 | 3.193537 |
| Island (U. S. E.), 1907 | 43 25 21.194 | 654.1 | 107 44 57.0 | 287 44 11.5 | Ridge | 1561.9 | 3.193658 |
| | 124 14 37.878 | 852.1 | 200 53 12.0 | 20 53 24.4 | North Slough '89 | 1140.0 | 3.056896 |
| | | | 270 41 00.5 | 90 42 01.5 | Hay Barn (U. S. E.) | 1970.0 | 3.294476 |
| Hay Barn (U. S. E.), 1907 | 43 25 20.423 | 630.3 | 124 51 56.1 | 304 51 07.5 | North Slough '89 | 1905.1 | 3.279923 |
| | 124 13 10.310 | 231.9 | 179 24 41.4 | 359 24 41.0 | Russell | 1284.3 | 3.108682 |
| | | | 245 46 56.3 | 65 47 35.6 | Mabry (U. S. E.) | 1407.8 | 3.148555 |
| North Bend (U. S. E.), 1907 | 43 24 12.718 | 392.4 | 156 48 58.8 | 336 48 17.2 | North Slough '89 | 3457.7 | 3.538784 |
| | 124 13 19.287 | 434.0 | 209 07 26.7 | 29 08 12.1 | Mabry (U. S. E.) | 3053.0 | 3.484725 |
| | | | 279 24 38.5 | 99 25 41.9 | Pierce | 2105.4 | 3.323337 |
| | | | 298 02 40.5 | 118 04 08.9 | Crawford Point (U. S. E.) | 3279.2 | 3.515768 |
| | | | 349 21 23.0 | 169 21 42.0 | Marshfield Hill | 3363.9 | 3.526840 |
| Stave Mill (U. S. E.), 1907 | 43 23 11.840 | 365.4 | 232 19 47.5 | 52 20 48.2 | Pierce | 2510.9 | 3.399831 |
| | 124 13 15.306 | 344.5 | 339 34 07.6 | 159 34 23.8 | Marshfield Hill | 1523.1 | 3.182724 |
| Crawford Point (U. S. E.), 1907 | 43 23 22.740 | 701.8 | 24 27 16.0 | 204 26 43.3 | White Point 3 | 2380.0 | 3.376582 |
| | 124 11 10.698 | 240.8 | 52 12 18.8 | 232 11 09.4 | Marshfield Hill | 2877.3 | 3.458981 |
| Marshfield U. S. G. S. bench mark, 1906. | 43 22 08.434 | 260.3 | 156 34 31.0 | 336 34 24.0 | Marshfield Hill | 577.0 | 2.761199 |
| | 124 12 41.501 | 934.4 | 249 42 24.0 | 69 45 44.5 | Noah | 7004.3 | 3.845362 |
| | | | 263 10 49.4 | 83 11 21.7 | White Point 3 | 1060.7 | 3.028033 |
| Marshfield front range, 1906 | 43 22 34.121 | 1053.0 | 143 03 13.2 | 323 02 43.1 | Mill | 1640.6 | 3.214993 |
| | 124 12 31.092 | 700.0 | 162 10 52.1 | 342 10 27.3 | Porter | 2652.6 | 3.423666 |
| | | | 308 55 22.7 | 128 55 47.8 | White Point 3 | 1060.1 | 3.025365 |
| Marshfield rear range, 1906 | 43 22 40.196 | 1240.5 | 137 49 45.0 | 317 49 14.0 | Mill | 1516.1 | 3.180728 |
| | 124 12 29.682 | 668.2 | 160 09 34.2 | 340 09 08.5 | Porter | 2485.5 | 3.395422 |
| | | | 317 06 17.2 | 137 06 41.4 | White Point 3 | 1165.1 | 3.066376 |
| Barker, 1889 | 43 20 49.868 | 1539.0 | 89 02 08.1 | 269 01 37.3 | Charleston 2 | 1011.9 | 3.005128 |
| | 124 18 55.417 | 1248.2 | 170 12 17.2 | 350 12 01.3 | Surf | 3066.8 | 3.486681 |
| | | | 171 08 46.0 | 351 08 36.4 | North Spit | 2044.7 | 3.310631 |
| Quicksand, 1889 | 43 23 09.428 | 291.0 | 273 40 10.9 | 93 40 33.0 | Grove | 727.7 | 2.861974 |
| | 124 18 54.117 | 1218.2 | 341 50 09.7 | 161 50 36.8 | Pigeon 2 | 2850.7 | 3.454958 |
| | | | 23 12 41.1 | 203 12 24.3 | Surf | 1398.0 | 3.145518 |
| Fall, 1889 | 43 24 02.456 | 75.8 | 257 07 10.1 | 77 07 42.9 | Pest | 1103.8 | 3.041902 |
| | 124 18 20.795 | 468.0 | 0 48 37.9 | 180 48 37.2 | Grove | 1679.4 | 3.226149 |
| | | | 24 37 27.1 | 204 37 04.3 | Quicksand | 1800.1 | 3.255304 |
| Stave Mill stack, 1889 | 43 23 10.589 | 326.8 | 262 15 05.8 | 82 16 28.8 | Crawford 2 | 2743.9 | 3.438361 |
| | 124 13 11.479 | 258.4 | 293 34 24.6 | 113 36 58.3 | Coos River Hill | 5499.9 | 3.740355 |
| | | | 315 55 39.4 | 135 56 32.3 | White Point 2 | 2492.9 | 3.396707 |
| | | | 342 12 43.4 | 162 12 57.0 | Marshfield Hill | 1458.4 | 3.163876 |
| Odd Fellows Monument, 1889 | 43 21 38.657 | 1193.0 | 194 13 49.5 | 14 14 00.7 | Marshfield Hill | 1494.3 | 3.174433 |
| | 124 13 08.006 | 180.3 | 219 28 03.5 | 39 29 24.1 | Crawford 2 | 4154.2 | 3.618492 |
| | | | 237 43 03.5 | 57 43 54.0 | White Point 2 | 1958.5 | 3.291927 |
| | | | 250 11 42.1 | 70 12 18.4 | Isthmus 2 | 1264.0 | 3.101755 |
| Merchants tank, 1889 | 43 21 54.744 | 1689.6 | 221 36 09.1 | 41 37 22.5 | Crawford 2 | 3624.7 | 3.559275 |
| | 124 12 57.611 | 1297.2 | 248 52 07.2 | 68 52 50.5 | White Point 2 | 1524.3 | 3.183058 |
| | | | 274 05 08.2 | 94 05 37.3 | Isthmus 2 | 957.7 | 2.981207 |
| Lutheran church spire, 1889 | 43 22 08.213 | 253.5 | 180 05 30.6 | 0 05 30.6 | Marshfield Hill | 536.3 | 2.729407 |
| | 124 12 51.728 | 1164.6 | 224 44 33.9 | 44 45 43.3 | Crawford 2 | 3230.8 | 3.509311 |
| | | | 264 04 26.7 | 84 05 06.0 | White Point 2 | 1296.2 | 3.112678 |
| | | | 300 27 44.9 | 120 28 10.0 | Isthmus 2 | 954.5 | 2.979772 |
| Schoolhouse cupola, 1889 | 43 22 12.252 | 378.1 | 226 30 40.4 | 46 31 50.2 | Crawford 2 | 3153.3 | 3.498761 |
| | 124 12 52.327 | 1178.0 | 269 35 45.4 | 89 36 25.1 | White Point 2 | 1302.8 | 3.114881 |
| | | | 306 02 39.6 | 126 03 05.1 | Isthmus 2 | 1034.2 | 3.014609 |
| Slaughterhouse east gable, 1889 | 43 23 42.107 | 1299.4 | 251 47 13.6 | 71 48 09.3 | Pierce | 1916.5 | 3.283501 |
| | 124 13 08.070 | 181.6 | 282 51 03.9 | 102 52 24.6 | Crawford 2 | 2709.9 | 3.432959 |
| | | | 329 03 05.8 | 149 03 56.4 | White Point 2 | 3222.5 | 3.508194 |
| Marshfield cannery, 1889 | 43 23 03.532 | 109.0 | 339 48 15.5 | 159 48 27.6 | Coos | 1151.5 | 3.061256 |
| | 124 10 33.938 | 763.9 | 33 21 52.8 | 213 21 11.1 | Timmermann | 2487.0 | 3.395679 |
| | | | 69 19 38.5 | 249 18 03.9 | Marshfield Hill | 3314.7 | 3.520439 |

*Coos Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Spring, 1889 | 43 24 55.319 | 1707.2 | 225 15 18.6 | 45 16 39.3 | Coos Bay Tree | 3718.8 | 3.570408 |
| | 124 17 48.761 | 1097.0 | 257 39 26.3 | 77 40 23.3 | Hutchinson 2 | 1909.5 | 3.280929 |
| | | | 345 43 12.7 | 165 43 23.5 | Pest | 1426.9 | 3.155391 |
| | | | 383 50 19.4 | 203 49 57.4 | Fall | 1783.5 | 3.251281 |
| Summer, 1889 | 43 25 59.623 | 1840.0 | 251 06 30.4 | 71 07 27.0 | Coos Bay Tree | 1955.4 | 3.291244 |
| | 124 17 13.580 | 305.4 | 21 44 41.4 | 201 44 17.3 | Spring | 2136.5 | 3.329697 |
| Winter, 1889 | 43 26 50.392 | 1555.1 | 210 43 52.6 | 30 45 04.0 | Unknown | 1820.6 | 3.260220 |
| | 124 16 46.282 | 1040.7 | 307 03 59.3 | 127 04 37.1 | Coos Bay Tree | 1549.3 | 3.190122 |
| | | | 21 23 54.3 | 201 23 35.5 | Summer | 1682.8 | 3.226022 |
| Lookout, 1889 | 43 23 56.697 | 1749.8 | 29 19 24.5 | 209 18 46.2 | Midway | 2567.1 | 3.409439 |
| | 124 16 19.951 | 449.0 | 104 25 33.8 | 284 24 43.6 | Pest | 1699.2 | 3.230257 |
| | | | 176 34 47.2 | 356 34 43.2 | Hutchinson 2 | 2221.0 | 3.346552 |
| | | | 216 20 21.7 | 36 21 44.3 | North Slough '89 | 4560.2 | 3.658980 |

*Port Orford.*

| *Principal points.* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Arch Rock, 1869 | 42 46 44.012 | 1358.1 | 209 57 23.0 | 29 59 28.6 | Sixes | 8401.7 | 3.924368 |
| | 124 35 45.777 | 1040.6 | 299 24 03.8 | 119 27 44.9 | Heads | 8502.1 | 3.929528 |
| | | | 299 37 26.2 | 119 40 49.2 | Port Orford south base | 7826.5 | 3.893566 |
| Blanco, 1869 | 42 50 07.676 | 236.8 | 335 59 49.5 | 156 02 08.6 | Heads | 11451.1 | 4.058848 |
| | 124 33 44.920 | 1020.2 | 23 36 51.6 | 203 35 29.5 | Arch Rock | 6858.4 | 3.836221 |
| Bluff, 1869 | 42 49 55.756 | 1720.5 | 31 56 50.6 | 211 55 00.3 | Arch Rock | 6971.8 | 3.843345 |
| | 124 33 03.492 | 79.3 | 111 21 18.2 | 291 20 50.0 | Blanco | 1010.3 | 3.004429 |
| | | | 200 32 39.9 | 20 32 55.2 | Sixes | 1453.7 | 3.162469 |
| | | | 342 21 39.2 | 162 23 12.0 | Port Orford south base | 10271.0 | 4.011613 |
| Port Orford north base, 1869 | 42 48 19.897 | 614.0 | 62 13 22.2 | 242 10 34.5 | Arch Rock | 6344.0 | 3.802362 |
| | 124 31 38.858 | 882.9 | 139 16 53.8 | 319 15 28.1 | Blanco | 4388.8 | 3.642350 |
| | | | 146 59 05.4 | 326 58 07.9 | Bluff | 3527.9 | 3.547521 |
| | | | 350 08 20.2 | 170 08 55.6 | Port Orford south base | 6933.1 | 3.840929 |
| West, 1869 | 42 50 23.599 | 728.2 | 252 08 08.7 | 72 08 55.4 | Sixes | 1637.2 | 3.214100 |
| | 124 33 49.648 | 1127.5 | 309 20 02.1 | 129 20 33.5 | Bluff | 1355.4 | 3.132053 |
| | | | 347 40 21.5 | 167 40 24.7 | Blanco | 502.9 | 2.701514 |
| Wilson, 1869 | 42 51 20.788 | 641.5 | 24 13 33.1 | 204 13 16.1 | Sixes | 1384.6 | 3.141323 |
| | 124 32 16.007 | 363.5 | 50 19 02.8 | 230 17 59.1 | West | 2763.2 | 3.441416 |
| Rocky Point, 1869 | 42 52 31.024 | 957.3 | 8 40 08.5 | 188 39 58.6 | Wilson | 2192.4 | 3.340917 |
| | 124 32 01.452 | 33.0 | 14 40 53.7 | 194 40 26.8 | Sixes | 3545.7 | 3.549707 |
| | | | 32 00 12.4 | 211 58 58.8 | West | 4636.3 | 3.666170 |
| Best Rock, 1869 | 42 47 28.325 | 874.0 | 253 48 04.3 | 73 50 48.3 | Port Orford north base | 5712.4 | 3.756816 |
| | 124 35 40.277 | 915.4 | 308 05 53.6 | 125 09 13.0 | Port Orford south base | 8486.4 | 3.928721 |
| | | | 5 13 25.9 | 185 13 22.2 | Arch Rock | 1373.1 | 3.137701 |
| Port Orford astronomic, 1869 | 42 44 28.919 | 892.4 | 88 26 13.2 | 268 26 03.1 | Heads | 338.7 | 2.529817 |
| | 124 30 05.243 | 119.4 | 154 29 22.3 | 334 26 53.1 | Blanco | 11584.4 | 4.063874 |
| Round, 1869 | 42 46 52.420 | 1617.5 | 87 36 57.7 | 267 33 53.5 | Arch Rock | 6171.8 | 3.790409 |
| | 124 31 14.510 | 329.8 | 168 25 02.7 | 348 24 46.2 | Port Orford north base | 2755.5 | 3.440193 |
| Pine Hill, 1869 | 42 46 09.287 | 286.6 | 99 25 26.2 | 279 22 12.8 | Arch Rock | 6562.6 | 3.817078 |
| | 124 31 00.977 | 22.2 | 167 56 41.2 | 347 56 15.5 | Port Orford north base | 4121.3 | 3.615029 |
| Arch Rock Summit, 1869 | 42 46 44.274 | 1366.2 | 202 09 01.6 | 22 10 21.1 | Cape | 6971.0 | 3.843292 |
| | 124 35 47.661 | 1083.4 | 242 25 11.8 | 62 28 00.8 | Port Orford north base | 6378.1 | 3.804693 |
| | | | 299 31 14.6 | 119 34 39.0 | Port Orford south base | 7867.7 | 3.895848 |
| | | | 301 39 25.5 | 121 49 03.6 | Bald | 22763.7 | 4.357242 |
| Cape Blanco Lighthouse, 1907 | 42 50 14.934 | 460.8 | 267 02 34.4 | 87 06 26.5 | Madden | 7765.4 | 3.890164 |
| | 124 33 45.969 | 1043.9 | 336 20 14.9 | 156 22 34.7 | Heads | 11665.7 | 4.066009 |
| | | | 71 48 26.6 | 251 48 22.6 | Cape | 142.4 | 2.153636 |
| Port Orford south base, 1869 | 42 44 38.531 | 1189.0 | 157 51 06.9 | 337 49 01.1 | Cape | 11160.9 | 4.047700 |
| | 124 30 46.654 | 1061.1 | 198 51 58.6 | 18 53 48.8 | Madden | 11389.7 | 4.056512 |
| Castle Rock, 1907 | 42 51 25.607 | 790.1 | 323 29 56.5 | 143 37 31.8 | Bald | 25674.9 | 4.409509 |
| | 124 32 47.428 | 1076.7 | 354 07 08.2 | 174 07 12.6 | Sixes | 1418.8 | 3.151923 |
| | | | 33 21 25.9 | 213 20 42.0 | Cape | 2664.0 | 3.425535 |

*San Sebastian to Chetko River.*

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points.* | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Dolan, 1873 | 42 18 06.349 | 195.9 | 196 18 45.0 | 16 20 16.8 | Grizzly | 11099.4 | 4.045300 |
| | 124 24 08.147 | 186.6 | 256 53 23.2 | 76 55 30.9 | Sundown 2 | 4460.9 | 3.649421 |
| Red Rock, 1873 | 42 15 09.482 | 292.5 | 151 34 12.9 | 331 32 46.1 | Dolan | 6206.3 | 3.792833 |
| | 124 21 59.153 | 1356.0 | 180 35 42.7 | 0 35 47.6 | Grizzly | 16110.0 | 4.207095 |
| | | | 192 07 54.7 | 12 08 35.5 | Sundown 2 | 6615.6 | 3.820568 |
| Sundown, 1873 | 42 18 38.318 | 1182.3 | 12 01 56.6 | 192 01 16.3 | Red Rock | 6588.2 | 3.818768 |
| | 124 20 59.240 | 1356.7 | 77 10 30.2 | 257 08 23.0 | Dolan | 4437.8 | 3.647164 |
| | | | 217 03 43.2 | 37 03 43.7 | Sundown 2 | 30.203 | 1.480050 |
| Cape Sebastian pole, 1907 | 42 19 41.410 | 1277.7 | 172 34 21.7 | 352 31 23.9 | Port Orford astronomic | 46289.8 | 4.665485 |
| | 124 25 42.243 | 967.3 | 286 27 13.6 | 106 30 24.7 | Sundown 2 | 6777.2 | 3.831049 |
| | | | 323 41 13.6 | 143 42 17.0 | Dolan | 3639.6 | 3.561051 |
| Crooks Point, 1872 | 42 15 08.310 | 256.4 | 186 45 59.2 | 6 46 18.4 | Dolan | 5531.9 | 3.742876 |
| | 124 24 36.602 | 839.0 | 217 31 33.8 | 37 34 00.1 | Sundown | 8172.6 | 3.912362 |
| | | | 269 24 41.6 | 89 26 27.5 | Red Rock | 3609.5 | 3.557445 |
| San Sebastian, 1873 | 42 19 41.484 | 1280.0 | 286 42 46.6 | 106 45 57.2 | Sundown | 6766.9 | 3.830390 |
| | 124 25 42.225 | 966.8 | 323 42 50.4 | 143 43 53.7 | Dolan | 3641.2 | 3.561243 |
| | | | 349 52 50.2 | 169 53 34.3 | Crooks Point | 8561.8 | 3.932564 |
| Cove, 1873 | 42 19 23.755 | 733.0 | 331 34 10.3 | 151 34 48.3 | Dolan | 2715.8 | 3.433894 |
| | 124 25 04.594 | 105.2 | 122 24 51.2 | 302 24 25.9 | San Sebastian | 1020.6 | 3.008860 |
| Cove Island, 1873 | 42 18 54.232 | 1673.4 | 211 30 03.4 | 31 30 19.8 | Cove | 1068.4 | 3.028742 |
| | 124 25 28.975 | 663.5 | 308 35 06.0 | 128 36 00.4 | Dolan | 2368.5 | 3.374472 |
| Schumacher, 1873 | 42 18 47.043 | 1451.6 | 339 02 08.4 | 159 02 22.4 | Dolan | 1344.6 | 3.128585 |
| | 124 24 29.150 | 667.8 | 99 12 09.2 | 279 11 28.9 | Cove Island | 1387.9 | 3.142363 |
| | | | 135 07 02.4 | 315 06 13.1 | San Sebastian | 2371.0 | 3.374939 |
| | | | 144 22 49.1 | 324 22 25.2 | Cove | 1393.6 | 3.144124 |
| Fairview, 1873 | 42 20 01.972 | 60.8 | 344 35 45.1 | 164 36 13.8 | Dolan | 3700.4 | 3.568249 |
| | 124 24 51.059 | 1168.9 | 347 45 17.8 | 167 45 32.6 | Schumacher | 2365.8 | 3.373970 |
| | | | 14 43 35.1 | 194 43 26.0 | Cove | 1219.2 | 3.086082 |
| Crooks Hill, 1872 | 42 14 41.356 | 1276.1 | 111 05 29.6 | 291 04 26.3 | Crooks Point | 2312.0 | 3.363990 |
| | 124 23 02.502 | 57.4 | 158 27 08.8 | 338 25 21.4 | San Sebastian | 9957.3 | 3.998140 |
| | | | 166 37 39.5 | 346 36 55.3 | Dolan | 6501.5 | 3.813011 |
| | | | 201 06 37.8 | 21 08 00.8 | Sundown | 7838.0 | 3.894207 |
| | | | 239 08 00.2 | 59 08 42.8 | Red Rock | 1691.8 | 3.228350 |
| Bluff, 1873 | 42 17 25.293 | 780.4 | 148 09 50.6 | 328 09 00.5 | Cove Island | 3230.4 | 3.509259 |
| | 124 24 14.567 | 333.7 | 186 37 15.2 | 6 37 19.5 | Dolan | 1275.3 | 3.105621 |
| | | | 341 54 38.0 | 161 55 26.5 | Crooks Hill | 5321.0 | 3.725996 |
| | | | 6 48 55.1 | 186 48 40.3 | Crooks Point | 4256.6 | 3.629063 |
| Loma, 1873 | 42 17 17.010 | 524.8 | 348 43 41.7 | 168 44 09.8 | Crooks Hill | 4897.1 | 3.689938 |
| | 124 23 44.253 | 1013.7 | 16 48 54.5 | 196 48 19.3 | Crooks Point | 4148.3 | 3.617869 |
| | | | 110 12 11.0 | 290 11 50.6 | Bluff | 740.0 | 2.869242 |
| | | | 160 13 32.2 | 340 13 16.2 | Dolan | 1617.8 | 3.208916 |
| Pistol River, 1873 | 42 16 44.912 | 1385.8 | 338 16 44.0 | 158 17 28.6 | Crooks Hill | 4103.5 | 3.613152 |
| | 124 24 08.742 | 200.3 | 12 05 38.0 | 192 05 19.3 | Crooks Point | 3048.2 | 3.484048 |
| | | | 173 53 13.2 | 353 53 09.3 | Bluff | 1253.1 | 3.097974 |
| | | | 209 31 51.8 | 29 32 08.3 | Loma | 1138.3 | 3.056263 |
| Crook, 1873 | 42 16 55.356 | 1708.1 | 347 42 16.3 | 167 42 42.8 | Crooks Hill | 4231.5 | 3.626497 |
| | 124 23 41.807 | 957.9 | 20 49 22.9 | 200 48 46.1 | Crooks Point | 3533.5 | 3.548209 |
| | | | 62 25 58.8 | 242 25 40.7 | Pistol River | 696.2 | 2.842762 |
| | | | 140 54 23.6 | 320 54 01.6 | Bluff | 1190.2 | 3.075623 |
| | | | 175 12 19.7 | 355 12 18.1 | Loma | 670.5 | 2.826411 |
| Dune, 1873 | 42 16 01.023 | 31.6 | 17 28 37.2 | 197 28 22.2 | Crooks Point | 1705.1 | 3.231756 |
| | 124 24 14.263 | 326.9 | 185 20 13.3 | 5 20 17.0 | Pistol River | 1360.1 | 3.133562 |
| | | | 203 55 19.2 | 23 55 41.0 | Crook | 1834.0 | 3.263399 |
| Sandflower, 1873 | 42 15 37.265 | 1149.8 | 321 25 25.2 | 141 26 05.6 | Crooks Hill | 2206.4 | 3.343686 |
| | 124 24 02.512 | 57.6 | 41 10 41.4 | 221 10 18.5 | Crooks Point | 1186.9 | 3.074417 |
| | | | 159 49 38.9 | 339 49 31.0 | Dune | 781.0 | 2.892626 |
| Lookout, 1873 | 42 16 16.051 | 495.3 | 337 48 39.1 | 157 49 14.1 | Crooks Hill | 3155.4 | 3.499049 |
| | 124 23 54.480 | 1248.5 | 8 44 45.0 | 188 44 39.6 | Sandflower | 1210.8 | 3.083074 |
| | | | 44 21 29.4 | 224 21 16.1 | Dune | 648.5 | 2.811913 |
| | | | 159 50 50.5 | 339 50 40.9 | Pistol River | 948.6 | 2.977070 |
| Macks Arch, highest point, 1873 | 42 13 43.819 | 1352.1 | 183 41 53.8 | 3 42 09.2 | Dolan | 8117.2 | 3.909407 |
| | 124 24 31.005 | 711.0 | 208 06 44.3 | 28 09 07.4 | Sundown 2 | 10331.3 | 4.014155 |
| | | | 228 48 42.1 | 48 49 41.6 | Crooks Hill | 2696.2 | 3.430759 |
| Macks Point, 1872 | 42 14 31.439 | 970.0 | 142 02 48.8 | 322 02 22.8 | Crooks Point | 1442.8 | 3.159219 |
| | 124 23 57.892 | 1327.3 | 256 26 53.1 | 76 27 30.3 | Crooks Hill | 1306.3 | 3.116033 |
| Ridge Knob, 1872 | 42 13 38.619 | 1191.6 | 130 07 31.1 | 310 06 34.4 | Macks Point | 2529.2 | 3.402990 |
| | 124 22 33.541 | 769.2 | 161 04 04.3 | 341 03 44.8 | Crooks Hill | 2046.4 | 3.311001 |
| Snodgrass, 1872 | 42 13 44.353 | 1368.5 | 84 25 07.1 | 264 24 14.2 | Ridge Knob | 1816.6 | 3.259258 |
| | 124 21 14.702 | 337.1 | 125 26 38.9 | 305 25 26.4 | Crooks Hill | 3033.6 | 3.481964 |
| Rocky Prairie, 1872 | 42 12 01.773 | 54.7 | 141 28 57.2 | 321 27 47.6 | Ridge Knob | 3819.6 | 3.582018 |
| | 124 20 49.817 | 1142.9 | 169 46 45.1 | 349 46 28.4 | Snodgrass | 3216.1 | 3.507329 |

*San Sebastian to Chetko River*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Burnt Point, 1872 | 42 11 55.868 | 1723.8 | 176 12 17.1 | 356 12 11.0 | Ridge Knob | 3177.3 | 3.502059 |
| | 124 22 24.370 | 559.1 | 265 11 23.3 | 85 12 26.8 | Rocky Prairie | 2176.9 | 3.337847 |
| Smith Hill, 1871 | 42 09 12.795 | 394.8 | 162 04 24.3 | 342 03 36.7 | Burnt Point | 5288.4 | 3.723325 |
| | 124 21 13.422 | 308.2 | 185 55 48.4 | 5 56 04.3 | Rocky Prairie | 5241.8 | 3.719478 |
| Bush Mound, 1872 | 42 09 14.353 | 442.8 | 89 14 52.4 | 269 13 07.4 | Smith Hill | 3591.9 | 3.555321 |
| | 124 18 36.990 | 849.2 | 149 27 56.3 | 329 26 27.1 | Rocky Prairie | 5998.1 | 3.778012 |
| Red Mound, 1872 | 42 07 23.262 | 717.7 | 126 52 24.8 | 306 50 13.0 | Smith Hill | 5634.5 | 3.750855 |
| | 124 17 57.102 | 1311.6 | 165 02 27.8 | 345 02 01.0 | Bush Mound | 3547.9 | 3.549971 |
| Bellevue, 1871 | 42 06 50.594 | 1561.0 | 170 58 17.0 | 350 57 56.6 | Smith Hill | 4442.6 | 3.647634 |
| | 124 20 43.057 | 789.2 | 255,10 29.3 | 75 12 20.6 | Red Mound | 3943.3 | 3.595861 |
| Sister Knob, 1871 | 42 05 33.659 | 1038.5 | 150 24 29.2 | 330 23 49.9 | Bellevue | 2729.9 | 3.436150 |
| | 124 19 44.377 | 1019.9 | 216 04 35.7 | 36 05 47.7 | Red Mound | 4184.6 | 3.621650 |
| Black Mound, 1872 | 42 05 52.868 | 1631.2 | 81 28 41.0 | 261 26 45.8 | Sister Knob | 3991.9 | 3.601184 |
| | 124 16 52.591 | 1208.4 | 152 01 08.6 | 332 00 25.4 | Red Mound | 3158.4 | 3.499462 |
| High Mound, 1870 | 42 04 07.524 | 232.1 | 152 23 23.2 | 332 22 42.7 | Sister Knob | 2999.3 | 3.477018 |
| | 124 18 43.892 | 1009.1 | 218 11 42.6 | 38 12 57.3 | Black Mound | 4136.3 | 3.616608 |
| Miller, 1870 | 42 04 03.799 | 117.2 | 92 05 43.0 | 272 04 10.9 | High Mound | 3162.3 | 3.499997 |
| | 124 16 26.434 | 607.7 | 169 52 22.9 | 349 52 05.4 | Black Mound | 8418.5 | 3.533830 |
| New, 1872 | 42 09 50.166 | 1547.8 | 288 56 13.6 | 108 57 47.7 | Bush Mound | 3402.6 | 3.531812 |
| | 124 20 57.171 | 1312.4 | 17 55 50.4 | 197 55 39.5 | Smith Hill | 1211.9 | 3.083466 |
| Sheep, 1871 | 42 09 23.634 | 729.2 | 229 55 55.6 | 49 56 24.1 | New | 1271.9 | 3.104446 |
| | 124 21 39.573 | 908.5 | 299 06 53.9 | 119 07 11.5 | Smith Hill | 687.2 | 2.837107 |
| Head Island, 1871 | 42 08 21.570 | 665.5 | 181 07 58.0 | 1 07 59.1 | Sheep | 1915.3 | 3.282232 |
| | 124 21 41.222 | 946.7 | 201 59 25.7 | 21 59 44.4 | Smith Hill | 1704.5 | 3.231606 |
| Trail, 1871 | 42 07 31.614 | 975.4 | 353 00 43.8 | 173 00 48.3 | Bellevue | 1275.1 | 3.105548 |
| | 124 20 49.809 | 1144.1 | 142 33 00.6 | 322 32 26.0 | Head Island | 1941.7 | 3.288175 |
| | | | 170 08 54.7 | 350 08 38.8 | Smith Hill | 3168.6 | 3.500867 |
| Sand Hill, 1871 | 42 07 06.473 | 199.7 | 161 30 49.0 | 341 30 26.2 | Head Island | 2443.2 | 3.387951 |
| | 124 21 07.488 | 172.0 | 207 37 55.5 | 27 38 07.4 | Trail | 875.6 | 2.942283 |
| | | | 311 07 04.1 | 131 07 20.5 | Bellevue | 745.0 | 2.872175 |
| Cresswell, 1871 | 42 06 08.617 | 265.9 | 175 33 20.3 | 355 33 16.2 | Sand Hill | 1790.5 | 3.252966 |
| | 124 21 01.448 | 33.3 | 198 04 06.1 | 18 04 18.4 | Bellevue | 1362.3 | 3.134275 |
| Barnacle Rock, 1871 | 42 06 40.041 | 1235.4 | 185 44 57.5 | 5 45 06.6 | Head Island | 3148.4 | 3.498091 |
| | 124 21 54.956 | 1262.6 | 223 14 17.9 | 43 15 01.6 | Trail | 2184.4 | 3.339331 |
| | | | 258 50 37.5 | 78 51 25.7 | Bellevue | 1683.6 | 3.226239 |
| | | | 308 15 20.4 | 128 15 56.3 | Cresswell | 1565.7 | 3.194714 |
| Elk, 1872 | 42 10 08.276 | 255.3 | 301 47 32.6 | 121 47 59.0 | New | 1060.5 | 3.025517 |
| | 124 21 36.438 | 836.4 | 342 50 39.3 | 162 50 54.8 | Smith Hill | 1791.5 | 3.253222 |
| Thomas Hill, 1872 | 42 10 20.755 | 640.4 | 334 54 56.2 | 154 55 09.1 | New | 1042.1 | 3.017897 |
| | 124 21 16.416 | 376.8 | 50 02 45.0 | 230 02 31.5 | Elk | 599.5 | 2.777810 |
| Deep Gulch, 1872 | 42 11 01.116 | 34.4 | 154 18 52.8 | 334 18 29.0 | Burnt Point | 1874.6 | 3.272905 |
| | 124 21 48.956 | 1123.4 | 215 56 20.6 | 35 57 00.3 | Rocky Prairie | 2311.7 | 3.363933 |
| | | | 329 02 47.2 | 149 03 09.1 | Thomas Hill | 1452.1 | 3.161987 |
| | | | 350 00 17.4 | 170 00 25.8 | Elk | 1655.4 | 3.218916 |
| Green Hill, 1871 | 42 08 23.013 | 710.0 | 88 34 13.7 | 268 33 21.8 | Head Island | 1775.8 | 3.249406 |
| | 124 20 23.916 | 549.2 | 143 29 59.4 | 323 29 26.2 | Smith Hill | 1910.9 | 3.281231 |
| Seal Point,[1] 1872 | 42 11 25.28 | 780.0 | 147 52 41.9 | 327 52 24.6 | Burnt Point | 1114.6 | 3.047105 |
| | 124 21 58.54 | 1343.2 | 234 27 33.2 | 54 28 19.4 | Rocky Prairie | 1937.6 | 3.287272 |
| Thomas Point, 1872 | 42 10 07.336 | 226.4 | 165 25 15.3 | 345 24 49.8 | Burnt Point | 3460.1 | 3.539094 |
| | 124 21 46.408 | 1065.3 | 200 11 17.1 | 20 11 55.1 | Rocky Prairie | 3762.1 | 3.575434 |
| Red Bush, 1871 | 42 06 24.519 | 756.5 | 60 14 40.8 | 240 14 15.8 | Creswell | 988.5 | 2.994074 |
| | 124 20 24.101 | 553.8 | 151 34 21.2 | 331 34 08.5 | Bellevue | 914.8 | 2.961324 |
| Lone Knob, 1871 | 42 06 11.689 | 360.6 | 85 47 31.4 | 265 46 53.9 | Creswell | 1290.2 | 3.110658 |
| | 124 20 05.450 | 125.2 | 132 43 50.4 | 312 43 37.9 | Red Bush | 583.4 | 2.765962 |
| | | | 144 15 26.5 | 324 14 55.3 | Bellevue | 1479.0 | 3.169959 |
| Sandy Point, 1871 | 42 05 34.854 | 1075.4 | 135 09 07.1 | 315 08 36.9 | Creswell | 1469.4 | 3.167142 |
| | 124 20 16.350 | 375.7 | 173 22 14.5 | 353 22 09.3 | Red Bush | 1542.7 | 3.188270 |
| | | | 192 25 40.1 | 12 25 47.4 | Lone Knob | 1163.8 | 3.065866 |
| | | | 272 52 17.5 | 92 52 28.2 | Sister Knob | 735.7 | 2.866699 |
| Acorn, 1871 | 42 05 57.899 | 1786.4 | 57 57 16.9 | 237 56 43.8 | Sandy Point | 1339.9 | 3.127068 |
| | 124 19 26.930 | 618.8 | 115 40 36.8 | 295 40 11.0 | Lone Knob | 982.1 | 2.992142 |
| Black Point, 1871 | 42 05 18.814 | 580.5 | 147 25 11.7 | 327 25 02.5 | Sandy Point | 587.3 | 2.768871 |
| | 124 20 02.588 | 59.5 | 214 11 39.0 | 34 12 02.9 | Acorn | 1458.0 | 3.163754 |
| | | | 222 25 13.4 | 42 25 15.0 | Sister Knob | 620.4 | 2.792688 |

[1] No check on this position.

*San Sebastian to Chetko River*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Bench, 1871 | 42 05 11.288 | 348.3 | 98 17 07.5 | 278 16 21.0 | Black Point | 1612.7 | 3.207549 |
| | 124 18 53.151 | 1221.4 | 120 23 11.6 | 300 22 26.6 | Sister Knob | 1364.7 | 3.135036 |
| | | | 151 38 38.1 | 331 38 15.5 | Acorn | 1634.3 | 3.213320 |
| Flat Knoll, 1871 | 42 04 49.316 | 1521.6 | 125 15 48.8 | 305 15 11.3 | Black Point | 1576.6 | 3.197733 |
| | 124 19 06.575 | 151.1 | 147 35 11.0 | 327 34 35.0 | Sister Knob | 1620.7 | 3.209699 |
| | | | 204 28 11.3 | 24 28 20.3 | Bench | 744.8 | 2.872060 |
| | | | 337 59 09.8 | 157 59 25.0 | High Mound | 1390.9 | 3.143308 |
| Low Point, 1871 | 42 04 27.183 | 838.7 | 141 50 48.6 | 321 50 12.1 | Black Point | 2025.9 | 3.306628 |
| | 124 19 08.131 | 186.9 | 182 59 57.3 | 2 59 58.3 | Flat Knoll | 683.8 | 2.834938 |
| | | | 194 11 54.0 | 14 12 04.0 | Bench | 1403.7 | 3.147272 |
| | | | 317 26 07.0 | 137 26 23.2 | High Mound | 823.7 | 2.915757 |
| Taylor, 1871 | 42 05 09.932 | 306.4 | 109 29 31.6 | 289 29 09.0 | Black Point | 821.5 | 2.914588 |
| | 124 19 28.894 | 664.0 | 154 04 41.3 | 334 04 20.2 | Sister Knob | 814.0 | 2.910600 |
| | | | 267 04 50.5 | 87 05 14.4 | Bench | 822.6 | 2.915169 |
| | | | 321 06 43.0 | 141 06 57.9 | Flat Knoll | 817.2 | 2.912309 |
| Hidden, 1871 | 42 04 22.672 | 699.6 | 61 11 44.1 | 241 11 19.3 | High Mound | 970.2 | 2.986870 |
| | 124 18 06.914 | 159.0 | 120 56 41.2 | 300 56 01.2 | Flat Knoll | 1598.9 | 3.203814 |
| | | | 127 44 25.5 | 307 43 30.6 | Taylor | 2382.6 | 3.377052 |
| Loma, 1870 | 42 03 52.762 | 1628.0 | 102 51 31.8 | 282 50 33.6 | High Mound | 2047.4 | 3.311204 |
| | 124 17 17.070 | 392.5 | 124 44 20.1 | 304 43 06.7 | Flat Knoll | 3062.9 | 3.486135 |
| | | | 128 51 08.8 | 308 50 35.4 | Hidden | 1471.3 | 3.167707 |

*Chetko River to Trinidad Head.*

| *Principal points.* | | | | | | | |
|---|---|---|---|---|---|---|---|
| North Chetko, 1870 | 42 02 38.992 | 1203.1 | 145 49 14.8 | 325 48 20.7 | High Mound | 3302.1 | 3.518787 |
| | 124 17 23.202 | 533.6 | 206 30 29.5 | 26 31 07.5 | Miller | 2924.1 | 3.465997 |
| Red Point, 1870 | 42 01 44.857 | 1384.1 | 118 48 38.8 | 298 47 10.3 | North Chetko | 3467.2 | 3.539976 |
| | 124 15 11.109 | 255.6 | 158 00 13.5 | 337 59 23.0 | Miller | 4623.6 | 3.664982 |
| Fence, 1870 | 42 03 20.194 | 623.1 | 43 00 30.5 | 229 59 56.0 | North Chetko | 1738.3 | 3.240125 |
| | 124 16 31.647 | 727.7 | 185 05 26.0 | 5 05 29.5 | Miller | 1350.7 | 3.130557 |
| Cooley, 1870 | 42 02 21.244 | 655.4 | 103 13 39.7 | 283 12 31.8 | North Chetko | 2394.8 | 3.379269 |
| | 124 15 41.838 | 962.3 | 147 48 07.1 | 327 47 33.7 | Fence | 2149.5 | 3.332336 |
| | | | 327 48 05.8 | 147 48 26.4 | Red Point | 1326.6 | 3.122752 |
| Pine Hill, 1870 | 42 02 41.192 | 1270.9 | 26 12 43.9 | 206 12 19.0 | Red Point | 1937.3 | 3.287193 |
| | 124 14 33.912 | 779.9 | 68 30 15.1 | 248 29 29.6 | Cooley | 1679.1 | 3.225086 |
| | | | 113 58 26.2 | 293 57 07.3 | Fence | 2962.9 | 3.471716 |
| | | | 134 34 45.5 | 314 33 30.1 | Miller | 3631.9 | 3.560133 |
| Bare Ridge, 1870 | 42 02 00.318 | 9.8 | 76 18 55.5 | 256 17 58.5 | Red Point | 2015.1 | 3.304305 |
| | 124 13 45.997 | 1058.0 | 138 51 16.3 | 318 50 44.2 | Pine Hill | 1674.8 | 3.2239.3 |
| North Winchuck, 1870 | 42 00 50.449 | 1556.5 | 124 03 54.7 | 304 01 30.4 | North Chetko | 5981.9 | 3.776836 |
| | 124 13 47.740 | 1098.5 | 131 12 00.0 | 311 11 04.2 | Red Point | 2548.9 | 3.406355 |
| | | | 181 03 56.0 | 1 03 57.2 | Bare Ridge | 2156.1 | 3.333660 |
| Rocky Butte, 1870 | 42 01 19.155 | 591.0 | 118 09 16.6 | 298 08 33.5 | Red Point | 1681.0 | 3.225565 |
| | 124 14 06.682 | 153.7 | 200 32 16.6 | 20 32 30.5 | Bare Ridge | 1356.2 | 3.132339 |
| | | | 333 47 49.1 | 153 48 01.8 | North Winchuck | 987.1 | 2.994351 |
| Otto, 1870 | 42 01 33.428 | 1031.4 | 9 54 36.0 | 189 54 29.3 | North Winchuck | 1346.1 | 3.129087 |
| | 124 13 37.672 | 866.6 | 56 35 00.8 | 236 34 41.4 | Rocky Butte | 799.6 | 2.902883 |
| | | | 167 00 07.0 | 347 00 01.5 | Bare Ridge | 851.4 | 2.930157 |
| Henderson, 1870 | 42 00 56.036 | 1728.9 | 83 30 09.5 | 263 29 25.5 | North Winchuck | 1521.9 | 3.182388 |
| | 124 12 42.023 | 906.9 | 110 07 12.4 | 290 06 15.7 | Rocky Butte | 2074.3 | 3.316876 |
| | | | 132 01 35.4 | 312 00 58.1 | Otto | 1723.4 | 3.236393 |
| Oregon-California Boundary Monument, 1869. | 41 59 55.736 | 1719.6 | 15 39 34.6 | 195 39 11.7 | Cone Rock | 2911.5 | 3.464116 |
| | 124 12 29.498 | 678.9 | 133 09 39.9 | 313 08 47.5 | North Winchuck | 2468.1 | 3.392363 |
| | | | 171 11 42.3 | 351 11 33.9 | Henderson | 1882.7 | 3.274770 |
| Northwest Seal Rock, 1870 | 41 50 14.746 | 454.9 | 196 57 25.7 | 17 00 49.2 | North Chetko | 24009.5 | 4.380[illegible]83 |
| | 124 22 27.675 | 638.6 | 205 14 41.0 | 25 19 32.7 | Red Point | 23548.0 | 4.371954 |
| | | | 211 22 08.3 | 31 27 55.8 | North Winchuck | 22982.6 | 4.361400 |
| Pyramid, 1870 | 41 57 05.256 | 162.2 | 48 05 02.5 | 227 58 14.7 | Northwest Seal Rock | 18938.1 | 4.277336 |
| | 124 12 16.910 | 389.5 | 155 05 11.3 | 335 03 14.8 | Red Point | 9512.9 | 3.978[illegible]15 |
| | | | 163 15 32.4 | 343 14 31.7 | North Winchuck | 7255.7 | 3.860681 |
| Peak, 1870 | 41 59 15.294 | 471.9 | 131 15 56.0 | 311 14 18.7 | North Winchuck | 4452.5 | 3.648604 |
| | 124 11 22.289 | 513.2 | 149 27 04.4 | 329 26 11.1 | Henderson | 3609.5 | 3.557445 |
| Cone Rock, 1870 | 41 58 24.872 | 767.4 | 167 16 01.5 | 347 15 32.0 | North Winchuck | 4604.8 | 3.663217 |
| | 124 13 03.631 | 83.6 | 236 17 41.6 | 56 18 49.4 | Peak | 2804.2 | 3.447802 |
| | | | 336 20 30.4 | 156 21 01.6 | Pyramid | 2681.6 | 3.428401 |
| Boulder, 1870 | 41 59 35.258 | 1087.8 | 38 12 49.9 | 218 12 00.2 | Cone Rock | 2763.7 | 3.441[illegible]84 |
| | 124 11 49.379 | 1136.6 | 314 38 45.3 | 134 39 03.4 | Peak | 876.5 | 2.9427[illegible]2 |

*Chetko River to Trinidad Head*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Bush, 1870 | 41 59 27.060 | 834.9 | 27 22 27.8 | 207 21 58.9 | Cone Rock | 2160.6 | 3.334566 |
| | 124 12 20.484 | 471.5 | 250 32 21.8 | 70 32 42.6 | Boulder | 759.3 | 2.880426 |
| Hillside, 1870 | 41 58 34.853 | 1075.3 | 80 29 47.6 | 260 28 54.2 | Cone Rock | 1863.7 | 3.270370 |
| | 124 11 43.798 | 1008.4 | 152 20 05.4 | 332 19 40.9 | Bush | 1818.7 | 3.259766 |
| | | | 176 03 24.4 | 356 03 20.7 | Boulder | 1868.1 | 3.271403 |
| Low Dune, 1870 | 41 57 34.487 | 1064.0 | 356 38 23.9 | 176 38 25.5 | Pyramid | 903.4 | 2.955890 |
| | 124 12 19.209 | 442.4 | 321 54 05.6 | 141 54 18.9 | Head | 742.3 | 2.870593 |
| Island, 1870 | 41 57 05.600 | 172.8 | 220 04 37.8 | 40 04 59.6 | Low Dune | 1164.8 | 3.066258 |
| | 124 12 51.773 | 1192.5 | 270 45 14.9 | 90 45 38.3 | Pyramid | 803.0 | 2.904741 |
| | | | 355 40 59.0 | 175 41 16.5 | Cone | 8001.3 | 3.903159 |
| Cone, 1870 | 41 52 46.998 | 1449.9 | 71 21 58.1 | 251 15 16.4 | Northwest Seal Rock | 14659.0 | 4.166104 |
| | 124 12 25.653 | 591.5 | 181 26 51.8 | 1 26 57.6 | Pyramid | 7970.5 | 3.901487 |
| Head, 1870 | 41 57 15.553 | 479.9 | 51 53 48.8 | 231 53 37.1 | Pyramid | 514.8 | 2.711635 |
| | 124 11 59.322 | 1366.3 | 75 44 35.5 | 255 44 00.4 | Island | 1246.5 | 3.095678 |
| | | | 141 54 18.9 | 321 54 05.6 | Low Dune | 742.3 | 2.870593 |
| Last, 1870 | 41 58 21.462 | 662.2 | 4 00 00.8 | 183 59 57.9 | Low Dune | 1452.8 | 3.162222 |
| | 124 12 14.808 | 341.0 | 19 59 22.0 | 199 58 57.3 | Island | 2490.6 | 3.396296 |
| Patch, 1870 | 41 57 48.531 | 1497.3 | 24 04 28.4 | 204 04 15.2 | Head | 1114.4 | 3.047042 |
| | 124 11 39.584 | 911.6 | 64 36 12.8 | 244 35 46.3 | Low Dune | 1010.2 | 3.004390 |
| | | | 141 24 11.3 | 321 23 47.7 | Last | 1300.1 | 3.113962 |
| East, 1870 | 41 56 52.294 | 1613.4 | 13 35 40.5 | 193 34 47.5 | Cone | 7786.0 | 3.891312 |
| | 124 11 06.284 | 144.7 | 99 36 01.2 | 279 34 50.7 | Island | 2464.2 | 3.391668 |
| | | | 103 49 07.6 | 283 48 20.4 | Pyramid | 1675.2 | 3.224055 |
| Low Rock, 1870 | 41 55 58.566 | 1806.9 | 198 27 48.7 | 18 28 08.6 | Island | 2180.5 | 3.338550 |
| | 124 13 21.755 | 501.2 | 215 58 21.5 | 35 59 04.8 | Pyramid | 2542.6 | 3.405283 |
| | | | 242 00 41.1 | 62 02 11.6 | East | 3533.7 | 3.548227 |
| | | | 347 39 14.7 | 167 39 52.2 | Cone | 6050.2 | 3.781770 |
| Spur, 1870 | 41 55 25.730 | 793.8 | 119 45 01.7 | 299 44 10.3 | Low Rock | 2042.0 | 3.310065 |
| | 124 12 04.803 | 110.7 | 174 48 40.9 | 354 48 32.8 | Pyramid | 3083.3 | 3.489018 |
| | | | 182 08 01.8 | 2 08 05.4 | Head | 3390.7 | 3.530291 |
| | | | 206 46 42.8 | 26 47 21.9 | East | 2991.7 | 3.475922 |
| Great Sand Dune, 1870 | 41 53 44.970 | 1387.5 | 13 42 59.2 | 193 42 46.6 | Cone | 1841.1 | 3.265073 |
| | 124 12 06.720 | 154.9 | 157 14 50.6 | 337 14 00.5 | Low Rock | 4469.9 | 3.650294 |
| | | | 193 32 31.6 | 13 33 12.0 | East | 5944.9 | 3.774144 |
| Indian, 1870 | 41 49 06.758 | 208.5 | 99 53 54.3 | 279 48 05.2 | Northwest Seal Rock | 12261.5 | 4.088549 |
| | 124 13 44.162 | 1019.3 | 194 55 01.6 | 14 55 54.0 | Cone | 7032.1 | 3.847088 |
| Eureka, 1870 | 41 51 41.421 | 1277.9 | 30 58 30.2 | 210 57 07.4 | Indian | 5564.7 | 3.745442 |
| | 124 11 40.072 | 924.2 | 152 33 01.1 | 332 32 30.7 | Cone | 2280.0 | 3.357933 |
| Lake End, 1870 | 41 51 54.047 | 1607.4 | 188 44 47.3 | 8 44 54.6 | Cone | 1652.9 | 3.218250 |
| | 124 12 36.554 | 843.0 | 286 38 33.5 | 106 39 11.2 | Eureka | 1359.7 | 3.133436 |
| Lake Earl north base, 1870 | 41 52 02.954 | 91.1 | 316 41 06.1 | 136 41 24.2 | Eureka | 913.0 | 2.960478 |
| | 124 12 07.228 | 166.7 | 67 53 25.7 | 247 53 06.1 | Lake End | 730.0 | 2.863340 |
| Lake Earl south base, 1870 | 41 51 34.345 | 1059.6 | 140 48 52.3 | 320 48 38.0 | Lake End | 784.2 | 2.894454 |
| | 124 12 15.069 | 347.6 | 191 34 39.5 | 11 34 44.7 | Lake Earl north base | 901.0 | 2.954720 |
| Gravel, 1870 | 41 50 36.935 | 1139.5 | 196 20 10.5 | 16 20 30.6 | Lake End | 2479.2 | 3.394308 |
| | 124 13 06.790 | 156.7 | 225 08 51.8 | 45 09 49.7 | Eureka | 2821.3 | 3.450449 |
| | | | 17 13 28.3 | 197 13 03.4 | Indian | 2912.7 | 3.464302 |
| Burnt Ranch,[1] 1870 | 41 54 26.56 | 819.5 | 141 40 06 | 321 39 01 | Low Rock | 3619.0 | 3.558586 |
| | 124 11 44.33 | 1021.7 | 191 01 46 | 11 02 11 | East | 4580.8 | 3.660943 |
| Ridge, 1870 | 41 50 48.698 | 1502.4 | 80 37 01.6 | 260 35 58.1 | Gravel | 2224.0 | 3.347130 |
| | 124 11 31.683 | 731.0 | 173 12 56.7 | 353 12 51.1 | Eureka | 1638.1 | 3.214337 |
| Lake Mound, 1870 | 41 50 05.368 | 165.6 | 41 30 23.0 | 221 29 36.8 | Indian | 2414.4 | 3.382801 |
| | 124 12 34.837 | 803.9 | 142 52 38.6 | 322 52 17.3 | Gravel | 1221.5 | 3.086892 |
| | | | 179 19 22.3 | 359 19 21.1 | Lake End | 3353.2 | 3.525460 |
| Squaw, 1870 | 41 49 27.188 | 838.8 | 72 26 57.6 | 252 26 00.0 | Indian | 2089.4 | 3.320016 |
| | 124 12 17.849 | 411.9 | 152 18 51.0 | 332 18 18.3 | Gravel | 2430.2 | 3.385037 |
| | | | 202 57 10.8 | 22 57 41.6 | Ridge | 2731.1 | 3.436334 |
| Red Point, 1870 | 41 49 07.973 | 246.0 | 104 05 15.8 | 284 04 07.5 | Squaw | 2437.2 | 3.386887 |
| | 124 10 35.419 | 817.5 | 157 19 52.9 | 337 19 15.4 | Ridge | 3367.9 | 3.527358 |
| | | | 162 31 01.0 | 342 30 18.0 | Eureka | 4958.7 | 3.695366 |
| Swamp, 1870 | 41 48 15.844 | 488.8 | 163 57 02.5 | 343 56 44.2 | Squaw | 2290.4 | 3.359914 |
| | 124 11 50.411 | 1163.7 | 227 05 51.7 | 47 06 41.7 | Red Point | 2362.8 | 3.373430 |
| Lake, 1870 | 41 49 49.435 | 1525.2 | 194 51 58.0 | 14 52 09.2 | Gravel | 1516.2 | 3.180766 |
| | 124 13 23.652 | 545.8 | 246 25 09.8 | 66 25 42.3 | Lake Mound | 1229.0 | 3.089546 |
| | | | 19 46 26.0 | 199 46 12.3 | Indian | 1399.2 | 3.145873 |
| Yank, 1870 | 41 49 14.948 | 461.2 | 77 48 46.9 | 255 48 18.0 | Indian | 1030.7 | 3.013155 |
| | 124 13 00.864 | 19.9 | 153 42 00.6 | 333 41 45.4 | Lake | 1186.9 | 3.074404 |

[1] No check on this position.

*Chetko River to Trinidad Head*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Pine Bush, 1870 | 41 48 43.429 | 1339.8 | 174 50 45.9 | 354 50 44.0 | Indian | 722.7 | 2.858942 |
| | 124 13 41.350 | 954.4 | 223 51 14.9 | 43 51 41.9 | Yank | 1348.6 | 3.129893 |
| Pond, 1870 | 41 48 31.908 | 987.2 | 80 46 59.6 | 260 46 48.2 | Hut | 398.4 | 2.600287 |
| | 124 13 42.083 | 971.4 | 133 53 38.1 | 313 53 29.2 | Stick | 425.3 | 2.628737 |
| | | | 182 44 38.6 | 2 44 39.9 | Pine Bush | 353.1 | 2.547898 |
| | | | 1 35 58.5 | 181 35 57.9 | Forest Mound | 682.1 | 2.833848 |
| Stick, 1870 | 41 48 41.555 | 1282.0 | 198 23 12.6 | 18 23 20.1 | Indian | 819.4 | 2.913490 |
| | 124 13 55.361 | 1277.8 | 259 51 56.4 | 79 52 05.8 | Pine Bush | 328.5 | 2.516587 |
| Hut, 1870 | 41 48 29.929 | 923.3 | 193 35 14.8 | 13 35 17.3 | Stick | 369.0 | 2.567074 |
| | 124 13 59.117 | 1364.6 | 224 33 19.4 | 44 33 31.3 | Pine Bush | 584.5 | 2.766812 |
| Round, 1870 | 41 48 24.588 | 758.6 | 134 00 09.4 | 314 00 04.5 | Hut | 237.2 | 2.375169 |
| | 124 13 51.725 | 1194.0 | 170 53 28.7 | 350 53 26.3 | Stick | 530.2 | 2.724437 |
| Skull, 1870 | 41 48 08.752 | 270.0 | 204 26 26.6 | 24 26 35.2 | Hut | 717.7 | 2.855936 |
| | 124 14 11.982 | 276.6 | 223 44 33.0 | 43 44 46.5 | Round | 676.3 | 2.830130 |
| Forest Mound, 1870 | 41 48 09.898 | 305.3 | 86 59 14.9 | 266 58 55.5 | Skull | 672.1 | 2.827449 |
| | 124 13 42.908 | 990.5 | 148 48 24.8 | 328 48 14.0 | Hut | 722.5 | 2.858824 |
| Pine, 1870 | 41 47 56.611 | 1746.5 | 160 52 57.8 | 340 52 54.0 | Skull | 396.4 | 2.598185 |
| | 124 14 06.358 | 146.8 | 232 51 50.8 | 52 52 06.4 | Forest Mound | 679.1 | 2.831912 |
| Flag, 1870 | 41 47 55.943 | 1725.9 | 201 06 30.3 | 21 06 34.7 | Skull | 423.6 | 2.626956 |
| | 124 14 18.590 | 429.2 | 265 49 41.2 | 85 49 49.4 | Pine | 283.2 | 2.452024 |
| Firknoll, 1870 | 41 47 45.687 | 1409.5 | 161 31 30.9 | 341 31 27.8 | Flag | 333.6 | 2.523275 |
| | 124 14 14.011 | 323.5 | 207 39 50.5 | 27 39 55.6 | Pine | 380.5 | 2.580400 |
| Drift, 1870 | 41 47 47.303 | 1459.3 | 206 46 11.9 | 26 46 15.8 | Flag | 298.6 | 2.475042 |
| | 124 14 24.415 | 563.7 | 281 43 44.1 | 101 43 51.1 | Firknoll | 245.2 | 2.389762 |
| Knob, 1870 | 41 47 37.635 | 1161.1 | 170 21 32.6 | 350 21 31.1 | Drift | 302.6 | 2.480809 |
| | 124 14 22.220 | 513.0 | 217 20 39.7 | 37 20 45.2 | Firknoll | 312.5 | 2.494802 |
| Sand, 1869 | 41 47 35.525 | 1096.0 | 197 16 28.2 | 17 16 31.9 | Drift | 380.6 | 2.580417 |
| | 124 14 29.310 | 676.8 | 248 18 35.0 | 68 18 40.3 | Knob | 176.2 | 2.245898 |
| | | | 32 56 57.2 | 212 56 28.1 | St. George | 1857.4 | 3.268899 |
| | | | 114 01 44.0 | 293 56 25.1 | Northwest Seal Rock | 12084.7 | 4.082235 |
| St. George, 1869 | 41 46 45.004 | 1388.4 | 122 51 43.1 | 302 46 53.4 | Northwest Seal Rock | 11938.5 | 4.076950 |
| | 124 15 13.054 | 301.5 | 205 07 49.2 | 25 08 48.5 | Indian | 4831.0 | 3.684037 |
| St. George north base, 1869 | 41 47 00.057 | 1.8 | 52 10 20.5 | 232 10 03.3 | St. George | 757.2 | 2.879235 |
| | 124 14 47.154 | 1088.9 | 200 37 56.1 | 20 38 08.0 | Sand | 1169.3 | 3.067913 |
| Woodedge, 1870 | 41 47 23.680 | 730.5 | 42 28 23.1 | 222 28 03.8 | St. George north base | 988.1 | 2.994779 |
| | 124 14 18.263 | 421.7 | 145 05 16.0 | 325 05 08.6 | Sand | 445.7 | 2.649001 |
| | | | 168 01 06.7 | 348 01 03.7 | Knob | 440.1 | 2.643591 |
| Mound, 1869 | 41 46 46.728 | 1441.7 | 87 25 58.3 | 267 25 24.2 | St. George | 1185.5 | 3.073914 |
| | 124 14 21.771 | 502.8 | 125 03 09.2 | 305 02 52.3 | St. George north base | 716.1 | 2.854955 |
| | | | 173 24 13.7 | 353 24 08.7 | Sand | 1515.4 | 3.180564 |
| | | | 184 03 45.6 | 4 03 48.0 | Woodedge | 1142.9 | 3.058015 |
| Shell, 1869 | 41 47 06.900 | 212.9 | 245 03 22.9 | 65 03 55.0 | Woodedge | 1227.8 | 3.089121 |
| | 124 15 06.477 | 149.6 | 295 19 08.9 | 115 19 21.8 | St. George north base | 493.6 | 2.693384 |
| | | | 12 40 19.0 | 192 40 14.6 | St. George | 692.4 | 2.840362 |
| St. George south base, 1869 | 41 46 39.129 | 1207.2 | 112 10 39.1 | 292 10 26.3 | St. George | 480.2 | 2.681453 |
| | 124 14 53.798 | 1242.5 | 193 21 50.9 | 13 21 55.3 | St. George north base | 663.7 | 2.821952 |
| | | | 252 24 32.0 | 72 24 53.3 | Mound | 775.9 | 2.889816 |
| Castle Rock, 1869 | 41 45 41.887 | 1202.2 | 170 33 23.9 | 350 33 14.6 | St. George | 1974.0 | 3.295356 |
| | 124 14 59.029 | 1363.6 | 191 04 25.4 | 11 04 45.2 | Sand | 3572.5 | 3.552975 |
| Connection Rock, 1869 | 41 44 51.355 | 1584.3 | 132 07 46.1 | 312 06 56.4 | Castle Rock | 2324.4 | 3.366308 |
| | 124 13 44.406 | 1026.0 | 149 43 20.2 | 329 42 21.2 | St. George | 4060.5 | 3.608575 |
| | | | 278 35 14.0 | 98 36 18.4 | Crescent City Lighthouse | 2255.4 | 3.353229 |
| Preston 2, 1869 | 41 45 05.210 | 160.7 | 69 57 25.9 | 249 56 52.1 | Connection Rock | 1246.9 | 3.095834 |
| | 124 12 53.708 | 1240.9 | 111 21 33.6 | 291 20 10.1 | Castle Rock | 3108.5 | 3.492547 |
| | | | 305 49 57.8 | 125 50 28.4 | Crescent City Lighthouse | 1305.9 | 3.115897 |
| Wynell, 1869 | 41 46 13.652 | 421.2 | 47 23 07.4 | 227 22 36.7 | Castle Rock | 1447.3 | 3.160568 |
| | 124 14 12.921 | 298.4 | 124 51 41.5 | 304 51 01.5 | St. George | 1692.5 | 3.228518 |
| | | | 168 40 28.4 | 348 40 22.5 | Mound | 1040.7 | 3.017340 |
| | | | 319 04 51.8 | 139 05 44.6 | Preston 2 | 2794.1 | 3.446247 |
| | | | 345 27 10.6 | 165 27 29.6 | Connection Rock | 2623.1 | 3.418812 |
| White, 1869 | 41 46 24.913 | 768.6 | 138 38 10.0 | 318 37 54.3 | St. George | 825.9 | 2.916929 |
| | 124 14 49.421 | 1141.4 | 223 29 32.8 | 43 29 51.2 | Mound | 927.8 | 2.967443 |
| | | | 292 23 38.2 | 112 24 02.5 | Wynell | 911.8 | 2.959907 |
| Point, 1869 | 41 46 20.949 | 646.3 | 158 40 50.7 | 338 40 42.4 | St. George | 796.7 | 2.901269 |
| | 124 15 00.513 | 11.8 | 244 28 52.3 | 64 28 59.7 | White | 283.9 | 2.453120 |
| | | | 281 34 13.9 | 101 34 45.6 | Wynell | 1122.0 | 3.050009 |

*Chetko River to Trinidad Head*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Crescent City Lighthouse, 1913 | 41 44 40.428 | 1247.3 | 257 22 43.1 | 77 36 04.8 | Gordon | 28468.3 | 4.454362 |
| | 124 12 07.890 | 182.3 | 287 24 35.4 | 107 31 34.1 | Child | 15245.1 | 4.183130 |
| Crescent City azimuth, 1871 | 41 44 49.567 | 1529.2 | 91 19 36.7 | 271 18 27.5 | Connection Rock | 2400.2 | 3.380249 |
| | 124 12 00.553 | 12.8 | 352 25 01.9 | 172 25 05.2 | Steamboat Rock | 869.6 | 2.939334 |
| Battery Point 2, 1869 | 41 44 47.308 | 1459.5 | 43 15 46.7 | 223 15 41.1 | Crescent City Lighthouse | 291.4 | 2.464563 |
| | 124 11 59.246 | 1368.9 | 92 57 06.3 | 272 55 56.3 | Connection Rock | 2433.0 | 3.386142 |
| | | | 113 42 09.1 | 293 41 32.9 | Preston 2 | 1374.2 | 3.138059 |
| Steamboat Rock, 1859 | 41 44 21.626 | 667.2 | 110 03 01.9 | 290 01 49.4 | Connection Rock | 2676.5 | 3.427572 |
| | 124 11 55.587 | 1284.6 | 135 02 28.3 | 315 01 49.5 | Preston 2 | 1900.4 | 3.278850 |
| Whalers Island, 1859 | 41 44 25.975 | 801.4 | 83 58 47.4 | 263 58 10.8 | Steamboat Rock | 1278.3 | 3.106636 |
| | 124 11 00.574 | 13.3 | 117 42 46.0 | 297 42 06.1 | Crescent City azimuth | 1565.4 | 3.194630 |
| Smyth 2, 1871 | 41 44 47.190 | 1455.9 | 40 50 03.4 | 220 49 47.1 | Whalers Island | 865.0 | 2.937033 |
| | 124 10 36.097 | 834.1 | 92 09 36.2 | 272 08 40.0 | Crescent City azimuth | 1952.8 | 3.290658 |
| Ehroser 2, 1871 | 41 44 19.732 | 608.8 | 95 58 57.8 | 275 58 04.8 | Whalers Island | 1850.3 | 3.267245 |
| | 124 09 40.938 | 946.0 | 123 36 52.7 | 303 36 16.0 | Smyth 2 | 1530.4 | 3.184808 |
| Round Rock, 1859 | 41 43 56.772 | 1751.5 | 216 26 14.8 | 36 26 47.9 | Smyth 2 | 1933.6 | 3.286361 |
| | 124 11 25.800 | 596.3 | 253 41 47.1 | 73 42 56.9 | Ehroser 2 | 2524.7 | 3.402218 |
| Alexander, 1871 | 41 43 14.978 | 462.1 | 109 54 47.4 | 289 53 04.8 | Round Rock | 3788.4 | 3.578455 |
| | 124 08 51.679 | 1194.5 | 150 19 37.7 | 330 19 04.9 | Ehroser 2 | 2299.4 | 3.361614 |
| Crescent City northeast base, 1859 | 41 45 09.589 | 295.8 | 27 55 52.8 | 207 55 30.2 | Steamboat Rock | 1674.8 | 3.223960 |
| | 124 11 21.639 | 499.9 | 340 06 43.5 | 160 06 57.5 | Whalers Island | 1430.9 | 3.155602 |
| Smyth, 1859 | 41 44 47.195 | 1456.1 | 40 49 27.6 | 220 49 11.3 | Whalers Island | 865.1 | 2.937069 |
| | 124 10 36.100 | 834.1 | 66 45 52.7 | 246 44 59.8 | Steamboat Rock | 1999.0 | 3.300803 |
| | | | 123 17 40.8 | 303 17 10.5 | Crescent City northeast base | 1258.7 | 3.099930 |
| Crescent City southwest base, 1859 | 41 44 52.893 | 1631.8 | 239 42 27.4 | 59 42 52.8 | Crescent City northeast base | 1021.3 | 3.009136 |
| | 124 11 59.807 | 1381.9 | 275 11 11.1 | 95 12 06.8 | Smyth | 1942.1 | 3.288265 |
| | | | 301 14 34.9 | 121 15 14.3 | Whalers Island | 1600.9 | 3.204369 |
| Crescent City astronomical,[1] 1853 | 41 44 49.40 | 1524.1 | 235 08 44 | 55 09 10 | Crescent City northeast base | 1090.1 | 3.037456 |
| | 124 12 00.36 | 8.3 | 297 36 35 | 117 37 15 | Whalers Island | 1559.0 | 3.192840 |
| Battery, 1859 | 41 44 47.313 | 1459.7 | 231 41 23.7 | 51 41 48.8 | Crescent City northeast base | 1108.7 | 3.044819 |
| | 124 11 59.294 | 1370.0 | 295 52 28.7 | 115 53 07.5 | Whalers Island | 1508.1 | 3.178427 |
| | | | 353 49 51.7 | 173 49 54.2 | Steamboat Rock | 797.1 | 2.901510 |
| Preston,[1] 1859 | 41 45 05.16 | 159.2 | 294 47 58 | 114 49 14 | Whalers Island | 2880.7 | 3.459505 |
| | 124 12 53.74 | 1241.6 | 314 58 40 | 134 59 19 | Steamboat Rock | 1899.8 | 3.278708 |
| Sister Rock, 1871 | 41 39 31.646 | 976.3 | 154 52 35.2 | 334 50 44.8 | Round Rock | 9035.4 | 3.955947 |
| | 124 08 39.810 | 921.1 | 177 43 11.6 | 357 43 03.7 | Alexander | 6895.6 | 3.838573 |
| Long Point, 1871 | 41 40 26.297 | 811.3 | 25 04 13.3 | 205 03 50.6 | Sister Rock | 1861.4 | 3.269835 |
| | 124 08 05.721 | 132.3 | 144 33 06.2 | 324 30 53.1 | Round Rock | 7972.8 | 3.901613 |
| White Knob, 1871 | 41 42 27.488 | 848.0 | 124 47 56.4 | 304 46 02.3 | Round Rock | 4828.6 | 3.683823 |
| | 124 08 34.233 | 791.4 | 164 36 42.5 | 344 36 31.0 | Alexander | 1519.7 | 3.181747 |
| Woody Point, 1871 | 41 41 21.703 | 669.6 | 356 18 11.7 | 176 18 14.9 | Long Point | 1712.9 | 3.233731 |
| | 124 08 10.496 | 242.7 | 11 17 48.3 | 191 17 28.7 | Sister Rock | 3462.4 | 3.539382 |
| | | | 136 40 30.2 | 316 38 20.3 | Round Rock | 6578.4 | 3.818118 |
| | | | 164 52 09.5 | 344 51 53.7 | White Knob | 2102.5 | 3.322733 |
| Green, 1871 | 41 40 09.370 | 289.1 | 38 17 00.0 | 218 16 33.6 | Sister Rock | 1482.6 | 3.171031 |
| | 124 08 00.109 | 2.5 | 166 02 26.7 | 346 02 23.0 | Long Point | 538.1 | 2.730861 |
| Bush, 1871 | 41 39 37.617 | 1160.5 | 80 46 35.8 | 260 46 03.2 | Sister Rock | 1148.8 | 3.060239 |
| | 124 07 50.801 | 1175.4 | 167 36 10.3 | 347 36 04.1 | Green | 1003.0 | 3.001312 |
| Point, 1871 | 41 36 59.217 | 1826.9 | 151 51 39.0 | 331 50 26.8 | Sister Rock | 5333.4 | 3.727007 |
| | 124 06 51.096 | 1183.0 | 164 12 59.2 | 344 12 19.5 | Bush | 5078.4 | 3.705731 |
| Grant, 1871 | 41 37 41.874 | 1291.8 | 11 44 52.5 | 191 44 44.6 | Point | 1344.2 | 3.128457 |
| | 124 06 39.275 | 909.1 | 140 31 59.7 | 320 30 39.6 | Sister Rock | 4387.5 | 3.642218 |
| Low, 1871 | 41 37 59.857 | 1846.6 | 313 33 12.3 | 133 33 29.1 | Grant | 805.2 | 2.905887 |
| | 124 07 04.484 | 103.8 | 350 35 34.0 | 170 35 42.9 | Point | 1896.3 | 3.277914 |
| | | | 142 05 22.0 | 322 04 18.7 | Sister Rock | 3589.6 | 3.555049 |
| Near, 1871 | 41 39 32.346 | 997.9 | 340 26 43.0 | 160 26 40.2 | Low | 3028.3 | 3.481198 |
| | 124 07 48.294 | 1117.4 | 88 57 59.2 | 268 57 25.0 | Sister Rock | 1192.1 | 3.076326 |
| | | | 160 22 04.6 | 340 22 03.0 | Bush | 172.7 | 2.237182 |
| Wilson, 1871 | 41 36 46.493 | 1434.4 | 110 51 46.3 | 290 51 16.8 | Point | 1102.4 | 3.042346 |
| | 124 06 06.602 | 152.9 | 156 07 23.9 | 336 07 02.2 | Grant | 1868.5 | 3.271495 |
| Last, 1871 | 41 35 57.795 | 1783.0 | 146 32 58.6 | 326 32 22.7 | Point | 2271.2 | 3.356263 |
| | 124 05 57.022 | 1320.5 | 171 36 05.4 | 351 35 59.0 | Wilson | 1518.7 | 3.181468 |
| Rock, 1872 | 41 34 46.378 | 1430.8 | 189 20 01.8 | 9 20 21.1 | Point | 4153.2 | 3.618386 |
| | 124 07 20.190 | 407.7 | 221 09 20.3 | 41 10 15.5 | Last | 2926.6 | 3.466370 |
| | | | 326 23 29.4 | 146 25 23.7 | Flint Ridge | 7217.9 | 3.858409 |
| | | | 334 15 37.5 | 154 17 20.8 | High Bluff | 8319.0 | 3.920071 |

[1] No check on this position.

*Chetko River to Trinidad Head*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Principal points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Halfway, 1872 | 41 34 41.206 | 1271.2 | 94 10 30.7 | 274 09 28.0 | Rock | 2196.2 | 3.341669 |
| | 124 05 45.638 | 1057.3 | 173 38 00.4 | 353 37 52.9 | Last | 2377.5 | 3.376124 |
| Pine Ridge, 1873 | 41 34 09.251 | 285.4 | 119 26 43.5 | 299 25 45.4 | Rock | 2330.6 | 3.367461 |
| | 124 05 52.582 | 1218.3 | 189 16 00.0 | 9 16 04.6 | Halfway | 998.9 | 2.999513 |
| | | | 346 00 54.9 | 166 01 40.0 | High Bluff | 6542.8 | 3.815765 |
| | | | 14 46 24.8 | 194 43 14.3 | Redding Rock | 26239.8 | 4.418960 |
| Council Mound, 1872 | 41 33 34.785 | 1073.2 | 346 18 53.1 | 166 19 19.5 | Flint Ridge | 3914.8 | 3.592711 |
| | 124 05 07.820 | 181.2 | 354 07 58.8 | 174 08 14.2 | High Bluff | 5313.6 | 3.725387 |
| | | | 125 46 21.2 | 305 44 53.4 | Rock | 3779.5 | 3.577430 |
| | | | 135 43 00.3 | 315 42 30.6 | Pine Ridge | 1485.4 | 3.171835 |
| Flint Rock, 1872 | 41 31 29.993 | 925.3 | 151 46 44.1 | 331 45 11.1 | Rock | 6876.9 | 3.837391 |
| | 124 04 59.815 | 1386.9 | 177 14 28.8 | 357 14 23.6 | Council Mound | 3854.4 | 3.585962 |
| | | | 266 25 24.9 | 86 25 46.1 | Flint Ridge | 742.0 | 2.870424 |
| | | | 346 01 03.9 | 166 01 14.1 | High Bluff | 1479.6 | 3.170150 |
| Council Point, 1872 | 41 33 33.554 | 1035.2 | 131 14 58.9 | 311 13 45.5 | Rock | 3408.2 | 3.532526 |
| | 124 05 29.577 | 685.4 | 265 41 08.5 | 85 41 23.0 | Council Mound | 505.6 | 2.703799 |
| | | | 349 44 21.8 | 169 44 41.5 | Flint Rock | 3873.9 | 3.588146 |
| Klamath South, 1872 | 41 31 56.408 | 1740.2 | 37 28 51.0 | 217 28 33.1 | Flint Rock | 1026.8 | 3.011493 |
| | 124 04 32.865 | 761.9 | 143 32 02.1 | 323 30 11.2 | Rock | 6521.8 | 3.814365 |
| | | | 156 19 28.3 | 336 18 50.8 | Council Point | 3272.7 | 3.514900 |
| | | | 165 03 26.5 | 345 03 03.4 | Council Mound | 3141.4 | 3.497124 |
| Redding Rock, 1874 | 41 20 26.686 | 823.3 | 194 43 14.3 | 14 46 24.8 | Pine Ridge | 26239.8 | 4.418960 |
| | 124 10 40.353 | 938.2 | 203 26 49.7 | 23 30 45.2 | High Bluff | 20745.0 | 4.316913 |
| Split Rock, 1874 | 41 29 43.051 | 1328.1 | 27 14 13.0 | 207 10 01.7 | Redding Rock | 19298.3 | 4.285519 |
| | 124 04 20.482 | 475.1 | 163 25 33.3 | 343 25 17.4 | High Bluff | 1944.2 | 3.288745 |
| Alder Butte, 1874 | 41 28 29.251 | 902.4 | 32 58 31.8 | 212 53 57.1 | Redding Rock | 17738.3 | 4.248912 |
| | 124 03 45.114 | 1046.8 | 160 11 03.0 | 340 10 39.5 | Split Rock | 2420.1 | 3.383829 |
| | | | 354 23 23.5 | 174 23 31.0 | Johnson | 2681.7 | 3.428410 |
| Johnson, 1874 | 41 27 02.741 | 84.6 | 39 04 50.5 | 219 00 08.5 | Redding Rock | 15731.2 | 4.196763 |
| | 124 03 33.821 | 785.0 | 166 29 04.7 | 346 28 18.0 | High Bluff | 7003.2 | 3.845294 |
| | | | 174 23 31.0 | 354 23 23.5 | Alder Butte | 2681.7 | 3.428410 |
| Upper Bluff, 1874 | 41 24 19.193 | 592.1 | 53 16 36.0 | 233 12 02.9 | Redding Rock | 11985.0 | 4.078639 |
| | 124 03 47.188 | 1096.1 | 183 31 09.4 | 3 31 18.2 | Johnson | 5055.0 | 3.703723 |
| Mussel Point, 1874 | 41 19 21.411 | 660.5 | 104 31 35.1 | 284 27 53.9 | Redding Rock | 8045.0 | 3.905524 |
| | 124 05 05.405 | 125.7 | 191 11 11.9 | 11 12 03.6 | Upper Bluff | 9364.7 | 3.971493 |
| Sharp Point, 1874 | 41 14 12.724 | 392.5 | 153 01 44.1 | 332 58 57.4 | Redding Rock | 12947.1 | 4.112171 |
| | 124 06 27.801 | 647.4 | 191 22 38.9 | 11 23 33.3 | Mussel Point | 9713.9 | 3.987395 |
| Big Lagoon, 1870 | 41 09 26.477 | 816.8 | 170 16 37.4 | 350 14 58.4 | Redding Rock | 20664.6 | 4.315226 |
| | 124 08 10.254 | 239.1 | 195 07 08.7 | 15 08 16.2 | Sharp Point | 9147.4 | 3.961299 |
| Patricks Pinnacle, 1870 | 41 08 21.482 | 662.7 | 201 57 14.8 | 21 59 18.3 | Sharp Point | 11684.0 | 4.067592 |
| | 124 09 35.378 | 825.1 | 224 42 17.7 | 44 43 13.7 | Big Lagoon | 2821.4 | 3.450468 |
| Inner Turtle Rock, 1870 | 41 07 54.448 | 1679.7 | 233 52 11.9 | 53 54 01.7 | Big Lagoon | 4816.7 | 3.682749 |
| | 124 10 57.108 | 1332.0 | 246 21 49.3 | 66 22 43.1 | Patricks Pinnacle | 2080.7 | 3.318206 |
| Patricks Point South, 1870 | 41 07 48.600 | 1499.3 | 96 32 10.6 | 276 31 26.2 | Inner Turtle Rock | 1586.3 | 3.200388 |
| | 124 09 49.541 | 1155.5 | 198 02 12.9 | 18 02 22.2 | Patricks Pinnacle | 1066.8 | 3.028081 |
| Castle, 1870 | 41 08 19.764 | 609.7 | 36 26 25.9 | 216 26 05.9 | Patricks Point south | 1195.0 | 3.077364 |
| | 124 09 19.110 | 445.6 | 71 08 40.8 | 251 07 36.4 | Inner Turtle Rock | 2415.4 | 3.382990 |
| | | | 97 57 09.0 | 277 56 58.3 | Patricks Pinnacle | 383.1 | 2.583293 |
| | | | 217 57 18.9 | 37 58 04.2 | Big Lagoon | 2610.3 | 3.416688 |
| Outer Turtle Rock, 1870 | 41 08 00.281 | 8.7 | 236 22 22.7 | 56 24 15.6 | Big Lagoon | 4803.6 | 3.681562 |
| | 124 11 01.799 | 42.0 | 252 00 55.1 | 72 01 52.0 | Patricks Pinnacle | 2119.1 | 3.326148 |
| | | | 255 54 12.4 | 75 55 20.0 | Castle | 2469.3 | 3.392576 |
| Bight Tree, 1870 | 41 08 34.170 | 1054.1 | 65 22 03.5 | 245 21 36.2 | Castle | 1066.1 | 3.027781 |
| | 124 08 37.560 | 876.0 | 73 49 07.9 | 253 48 29.9 | Patricks Pinnacle | 1404.1 | 3.147388 |
| | | | 201 31 54.6 | 21 32 12.6 | Big Lagoon | 1734.7 | 3.239227 |
| Sugar Loaf, 1870 | 41 08 19.019 | 586.7 | 37 50 17.8 | 217 49 57.3 | Patricks Point south | 1188.1 | 3.074870 |
| | 124 09 18.294 | 426.6 | 100 47 58.2 | 280 47 47.0 | Patricks Pinnacle | 405.6 | 2.608123 |
| | | | 140 22 57.5 | 320 22 57.0 | Castle | 29.9 | 1.475084 |
| | | | 217 19 00.8 | 37 19 45.6 | Big Lagoon | 2616.9 | 3.417783 |
| *Supplementary points.* | | | | | | | |
| Long Rock, 1869 | 41 48 09.192 | 283.6 | 282 45 47.1 | 102 47 59.3 | Sand | 4695.0 | 3.671632 |
| | 124 17 47.627 | 1099.5 | 308 00 10.9 | 128 02 19.6 | White | 5223.3 | 3.717948 |
| | | | 319 23 50.7 | 139 25 43.1 | Castle Rock | 5984.4 | 3.777019 |
| Southwest Seal Rock, point B, 1869 | 41 48 52.104 | 1607.5 | 284 30 54.5 | 104 35 17.3 | Sand | 9403.3 | 3.973280 |
| | 124 21 03.572 | 82.4 | 295 49 11.6 | 115 53 05.3 | St. George | 8992.7 | 3.953890 |
| | | | 304 50 58.2 | 124 55 01.1 | Castle Rock | 10261.4 | 4.011208 |
| Whale Rock, 1869 | 41 47 40.854 | 1260.4 | 271 27 55.6 | 91 30 57.9 | Sand | 6319.2 | 3.800664 |
| | 124 19 02.909 | 67.2 | 287 57 51.5 | 108 00 24.7 | St. George | 5580.4 | 3.746662 |
| | | | 303 04 06.0 | 123 06 48.5 | Castle Rock | 6722.7 | 3.827542 |

*Chetko River to Trinidad Head*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Azimuth. | Back azimuth. | To station. | Distance. | Logarithm. |
|---|---|---|---|---|---|---|---|
| *Supplementary points*—Continued. | ° ′ ″ | | ° ′ ″ | ° ′ ″ | | *Meters.* | |
| Star Rock, 1869 | 41 46 32.311 | 996.8 | 244 39 47.0 | 64 41 45.9 | Sand | 4560.2 | 3.658980 |
| | 124 17 27.814 | 642.4 | 262 48 57.6 | 82 50 27.4 | St. George | 3136.8 | 3.496489 |
| | | | 294 20 29.0 | 114 22 08.1 | Castle Rock | 3772.3 | 3.576611 |
| Mussel Rock, 1869 | 41 48 14.706 | 453.7 | 282 37 26.7 | 102 40 02.2 | Sand | 5521.7 | 3.742076 |
| | 124 18 22.678 | 523.5 | 302 16 44.4 | 122 18 50.8 | St. George | 5179.7 | 3.714304 |
| | | | 315 03 14.3 | 135 05 30.0 | Castle Rock | 6659.3 | 3.823427 |
| Southwest Seal Rock, point A, 1869 | 41 48 50.583 | 1560.6 | 284 15 13.8 | 104 19 36.3 | Sand | 9381.5 | 3.972273 |
| | 124 21 03.119 | 72.0 | 295 34 45.0 | 115 38 38.8 | St. George | 8962.9 | 3.952448 |
| | | | 297 28 44.6 | 117 32 53.7 | White | 9728.6 | 3.988050 |
| Little Black Rock, 1869 | 41 50 14.271 | 440.3 | 293 43 08.4 | 113 48 29.7 | Sand | 12154.0 | 4.084720 |
| | 124 22 31.241 | 720.8 | 302 30 33.1 | 122 35 25.3 | St. George | 11999.9 | 4.079177 |
| | | | 308 47 23.2 | 128 52 24.6 | Castle Rock | 13402.2 | 4.127175 |
| Flat Rock, 1869 | 41 47 56.630 | 1747.1 | 276 57 57.4 | 97 00 30.7 | Sand | 5352.5 | 3.728557 |
| | 124 18 19.419 | 448.3 | 297 09 51.0 | 117 11 55.2 | St. George | 4837.5 | 3.684620 |
| | | | 311 54 53.3 | 131 57 06.8 | Castle Rock | 6220.7 | 3.793841 |
| Hump Rock, 1869 | 41 46 58.534 | 1805.9 | 257 02 06.3 | 77 04 29.5 | Sand | 5094.7 | 3.707115 |
| | 124 18 04.338 | 100.2 | 276 00 28.6 | 96 02 22.7 | St. George | 3977.5 | 3.599610 |
| | | | 298 54 12.1 | 118 56 15.5 | Castle Rock | 4889.8 | 3.689291 |
| Small Rock, 1869 | 41 48 37.162 | 1146.5 | 292 17 36.8 | 112 19 50.6 | Sand | 5008.9 | 3.699738 |
| | 124 17 50.030 | 1154.8 | 313 39 32.2 | 133 41 16.9 | St. George | 5011.0 | 3.699922 |
| | | | 317 01 07.2 | 137 03 00.2 | Point | 5742.9 | 3.759129 |

For the convenience of the draftsmen of this office there are given the following unadjusted positions of stations, which are lost or for some other reason have no value except for the coordination of the old work:

TABLE OF POSITIONS OF LOST POINTS.

*Coos Bay.*

| Station. | Latitude and longitude. | Seconds in meters. | Station. | Latitude and longitude. | Seconds in meters. |
|---|---|---|---|---|---|
| | ° ′ ″ | | | ° ′ ″ | |
| Woodland, 1861 | 43 23 58.71 | 1811.8 | Isthmus, 1863 | 43 21 52.47 | 1619.3 |
| | 124 17 41.38 | 931.2 | | 124 12 15.20 | 342.3 |
| Trail, 1861 | 43 25 16.47 | 508.3 | Kitchen, 1863 | 43 22 17.05 | 526.2 |
| | 124 17 36.47 | 820.4 | | 124 10 55.11 | 1240.8 |
| Wreck, 1861 | 43 23 55.09 | 1700.1 | Marked tree No. 1, 1863 | 43 24 08.58 | 264.8 |
| | 124 18 24.94 | 561.3 | | 124 17 09.10 | 204.8 |
| Yokam, 1861 | 43 20 38.95 | 1202.0 | Marked tree No. 2, 1862 | 43 24 18.93 | 584.2 |
| | 124 21 35.37 | 796.7 | | 124 15 52.74 | 1186.7 |
| Beach, 1861 | 43 23 20.65 | 637.3 | Marked tree No. 3, 1862 | 43 25 29.83 | 920.9 |
| | 124 13 11.03 | 248.3 | | 124 15 56.59 | 1273.0 |
| Beaver, 1862 | 43 24 26.69 | 823.7 | Marked tree No. 4, 1862 | 43 24 58.72 | 1812.1 |
| | 124 14 06.03 | 135.7 | | 124 15 12.52 | 281.7 |
| North Bend, 1862 | 43 25 14.55 | 449.2 | Marked tree No. 5, 1862 | 43 25 39.63 | 1223.0 |
| | 124 13 03.45 | 77.6 | | 124 15 18.64 | 419.3 |
| Bight, 1862 | 43 25 47.72 | 1472.7 | Marked tree No. 6, 1862 | 43 24 04.51 | 139.2 |
| | 124 15 04.70 | 105.7 | | 124 13 56.21 | 1264.9 |
| Bluff, 1862 | 43 24 40.58 | 1252.3 | Marked tree No. 7, 1862 | 43 27 02.63 | 81.1 |
| | 124 11 45.49 | 1023.5 | | 124 13 27.89 | 627.1 |
| Coal Bank, 1863 | 43 21 34.75 | 1072.8 | North Sands, 1861 | 43 21 45.18 | 1394.3 |
| | 124 12 25.04 | 563.9 | | 124 19 17.71 | 398.8 |
| Cooper, 1862 | 43 23 56.67 | 1748.9 | Alder, 1861 | 43 22 40.70 | 1256.0 |
| | 124 13 06.34 | 142.7 | | 124 17 19.87 | 447.3 |
| Crawford, 1863 | 43 23 22.55 | 695.9 | Charleston, 1861 | 43 20 49.34 | 1522. |
| | 124 11 10.60 | 238.6 | | 124 19 40.28 | 907.2 |
| Hulet, 1863 | 43 22 51.58 | 1591.8 | Coos Head, 1861 | 43 21 04.55 | 140.4 |
| | 124 13 13.07 | 294.2 | | 124 20 12.47 | 280.8 |
| Island, 1863 | 43 22 48.58 | 1499.2 | Dennis, 1861 | 43 23 00.79 | 24.4 |
| | 124 10 25.09 | 564.8 | | 124 18 58.55 | 1317.9 |

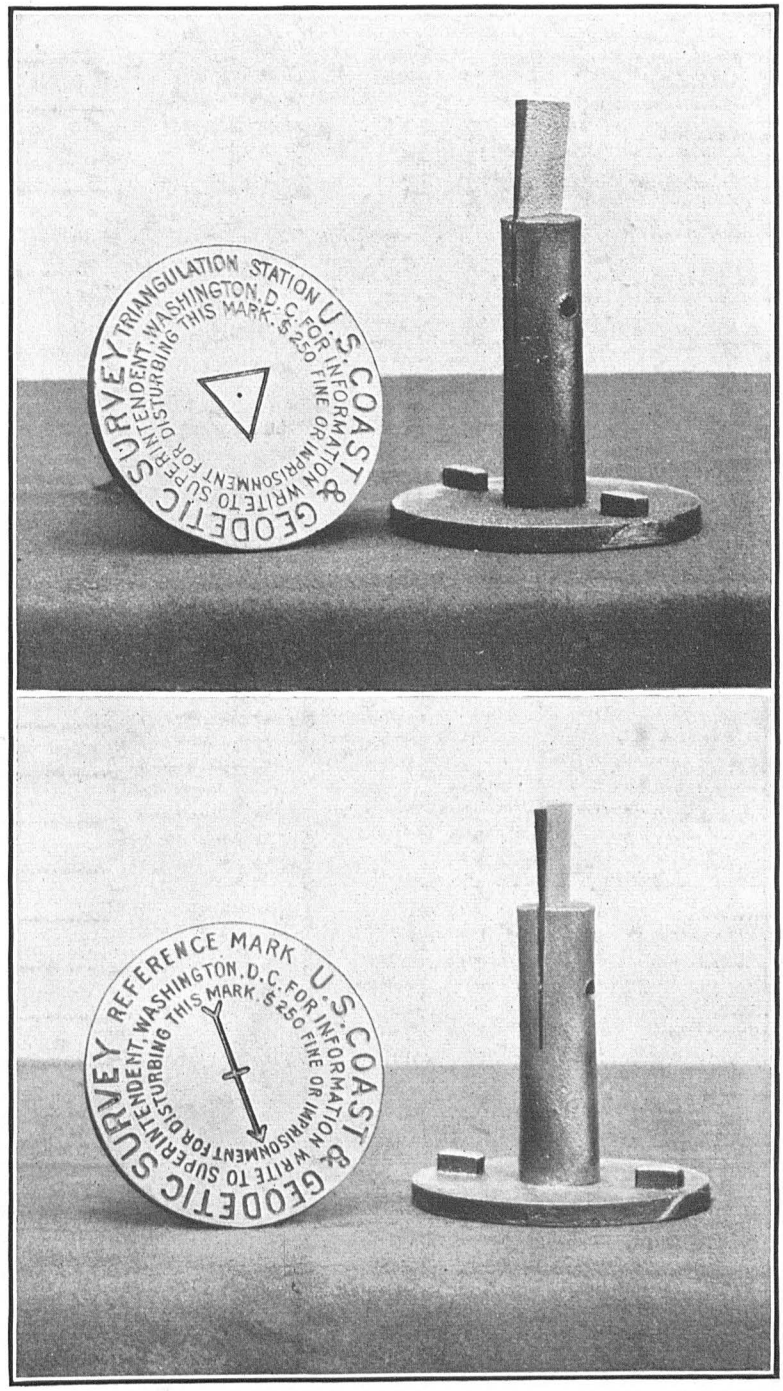


FIG. 3.—STANDARD TRIANGULATION STATION AND REFERENCE MARKS.

*Coos Bay*—Continued.

| Station. | Latitude and longitude. | Seconds in meters. | Station. | Latitude and longitude. | Seconds in meters. |
|---|---|---|---|---|---|
| | ° ′ ″ | | | ° ′ ″ | |
| Duke, 1861 | 43 22 15.31<br>124 17 39.70 | 472.5<br>893.8 | Marked tree No. 13, 1862 | 43 24 27.02<br>124 11 53.03 | 833.9<br>1193.2 |
| Empire, 1861 | 43 23 44.60<br>124 16 32.21 | 1376.9<br>724.9 | Marked tree No. 14, 1862 | 43 24 53.45<br>124 13 08.62 | 1649.5<br>193.9 |
| Fossil, 1861 | 43 21 29.54<br>124 18 38.14 | 911.6<br>858.9 | Marked tree No. 15, 1863 | 43 23 48.26<br>124 11 14.26 | 1489.3<br>320.9 |
| Garden, 1861 | 43 24 07.59<br>124 17 33.71 | 234.2<br>758.6 | Marked tree No. 16, 1862 | 43 24 35.99<br>124 13 21.69 | 1110.7<br>488.0 |
| Gregory, 1861 | 43 20 38.79<br>124 22 32.97 | 1197.1<br>742.6 | Marked tree No. 17, 1863 | 43 22 52.54<br>124 10 16.66 | 1621.4<br>375.0 |
| Dash, 1861 | 43 24 27.46<br>124 18 05.59 | 847.4<br>125.8 | Marked tree No. 22, 1863 | 43 22 16.90<br>124 12 40.37 | 521.5<br>908.9 |
| Johnson, 1861 | 43 20 32.63<br>124 10 20.34 | 1007.0<br>458.2 | Marked tree No. 24, 1863 | 43 21 59.89<br>124 10 41.96 | 1848.2<br>944.8 |
| Kenny, 1861 | 43 23 39.26<br>124 18 06.39 | 1211.6<br>143.8 | Mound, 1862 | 43 24 27.02<br>124 13 44.28 | 833.9<br>996.3 |
| Lodge, 1861 | 43 23 01.95<br>124 17 00.30 | 60.2<br>6.8 | Pine, 1862 | 43 26 46.53<br>124 13 58.50 | 1435.0<br>1315.5 |
| Marked tree A, 1861 | 43 23 02.45<br>124 18 19.42 | 75.6<br>437.1 | Reed, 1863 | 43 21 57.24<br>124 12 42.59 | 1766.5<br>959.0 |
| Marked tree B, 1861 | 43 20 59.22<br>124 19 45.65 | 1827.6<br>1028.1 | Relief, 1862 | 43 24 46.91<br>124 13 41.50 | 1447.7<br>933.7 |
| Marked tree Anderson, 1861 | 43 21 24.03<br>124 18 43.26 | 741.6<br>974.2 | Slab, 1863 | 43 23 03.32<br>124 10 33.77 | 102.5<br>760.1 |
| Marked tree Mosman, 1861 | 43 21 11.83<br>124 18 49.15 | 365.1<br>1106.9 | Woodland 2, 1862 | 43 23 59.03<br>124 17 41.35 | 1821.7<br>930.5 |
| Martin, 1861 | 43 22 55.49<br>124 18 42.21 | 1712.5<br>950.2 | Mill, 1889 | 43 21 11.91<br>124 11 38.22 | 367.6<br>860.7 |
| Pigeon astronomic, 1861 | 43 21 41.64<br>124 18 14.64 | 1285.0<br>329.7 | Hardy's wharf | 43 25 13.86<br>124 12 00.24 | 427.7<br>5.4 |
| Sallal, 1861 | 43 20 50.07<br>124 18 55.31 | 1545.2<br>1245.7 | Fridlund | 43 24 57.78<br>124 11 34.84 | 1783.1<br>783.8 |
| Siwash, 1861 | 43 20 22.02<br>124 19 07.45 | 679.6<br>167.8 | Hagglund | 43 23 57.43<br>124 11 28.77 | 1772.3<br>647.4 |
| Skiff, 1861 | 43 22 19.48<br>124 19 18.05 | 601.2<br>406.4 | Hay Barn | 43 25 20.98<br>124 13 09.82 | 647.5<br>220.9 |
| Whitewashed cliff, 1861 | 43 19 45.63<br>124 19 25.69 | 1408.2<br>578.8 | Ross | 43 21 10.35<br>124 10 16.47 | 319.4<br>370.9 |
| Whitewashed sapling, 1861 | 43 19 51.19<br>124 19 09.17 | 1579.8<br>206.6 | Isthmus tree | 43 21 56.22<br>124 11 37.54 | 1735.0<br>845.3 |
| Marshfield, 1863 | 43 22 30.26<br>124 12 44.31 | 933.8<br>997.5 | Yokam 2 | 43 20 37.72<br>124 21 33.35 | 1164.1<br>751.2 |
| White, 1863 | 43 22 12.37<br>124 11 53.65 | 381.7<br>1207.9 | Empire Mill | 43 23 49.35<br>124 16 33.91 | 1523.0<br>763.1 |
| Merchant, 1862 | 43 25 06.86<br>124 13 05.09 | 211.7<br>114.5 | Bay | 43 23 52.39<br>124 17 21.64 | 1616.8<br>487.0 |
| Marked tree No. 8, 1862 | 43 24 39.34<br>124 13 41.85 | 1214.1<br>941.6 | Timber Knob | 43 24 05.48<br>124 17 49.88 | 169.1<br>1122.5 |
| Marked tree No. 10, 1862 | 43 24 54.05<br>124 13 33.51 | 1668.0<br>753.9 | Coalbank tree | 43 19 21.60<br>124 17 17.86 | 666.6<br>402.4 |
| Marked tree No. 11, 1862 | 43 25 55.26<br>124 12 26.27 | 1705.4<br>590.9 | Snag | 43 24 12.89<br>124 12 38.04 | 397.8<br>856.0 |
| Marked tree No. 12, 1864 | 43 25 18.73<br>124 13 06.73 | 578.0<br>151.4 | | | |

*Tillamook Bay.*

| Station. | Latitude and longitude. | Seconds in meters. | Station. | Latitude and longitude. | Seconds in meters. |
|---|---|---|---|---|---|
| | ° ′ ″ | | | ° ′ ″ | |
| Marked tree No. 1, 1866 | 45 31 02.04<br>123 53 11.38 | 63.0<br>247.0 | Pole No. 4, 1866 | 45 32 28.66<br>123 56 16.83 | 884.8<br>365.1 |
| Marked tree No. 2, 1866 | 45 33 31.18<br>123 55 38.78 | 962.6<br>841.1 | Beach, 1875 | 45 37 13.94<br>123 56 39.84 | 430.4<br>863.1 |
| Marked tree No. 3, 1866 | 45 33 39.81<br>123 55 57.65 | 1229.0<br>1250.3 | Rock off Cape Mears | 45 29 46.51<br>123 59 01.74 | 1435.9<br>37.8 |
| Marked tree No. 4, 1866 | 45 34 08.33<br>123 56 35.83 | 257.2<br>777.0 | Morgan's dwelling | 45 30 11.21<br>123 52 23.59 | 346.1<br>512.1 |
| Pine, 1866 | 45 34 22.04<br>123 56 52.65 | 680.4<br>1141.6 | House No. 1, south gable | 45 29 09.59<br>123 51 33.89 | 296.1<br>736.1 |
| Pole No. 1, 1866 | 45 30 14.07<br>123 53 51.55 | 434.4<br>1119.1 | House No. 4, east gable | 45 28 09.21<br>123 53 11.73 | 284.3<br>254.8 |
| Pole No. 2, 1866 | 45 30 45.06<br>123 54 12.41 | 1391.1<br>269.4 | House No. 5, north gable | 45 28 22.87<br>123 53 37.38 | 706.1<br>812.0 |
| Pole No. 3, 1866 | 45 31 30.29<br>123 54 29.53 | 935.1<br>640.8 | | | |

*Columbia River.*

| | | | | | |
|---|---|---|---|---|---|
| Marked tree, Government Island, 1899 | 45 34 49.68<br>122 29 38.53 | 1533.9<br>835.3 | Deer Island, 1878 | 45 57 40.78<br>122 49 14.49 | 1259.1<br>312.0 |
| Sandhill tree, 1889 | 45 33 01.98<br>122 20 50.12 | 61.1<br>1087.2 | Eversole, 1878 | 45 46 20.30<br>122 46 18.39 | 626.8<br>397.4 |
| W. house, west gable, 1889 | 45 32 37.24<br>122 24 27.01 | 1149.8<br>585.9 | Thicket, 1878 | 45 46 17.34<br>122 45 40.35 | 535.4<br>871.9 |
| Bakers Bay, 1851 | 46 16 29.69<br>123 56 40.06 | 916.7<br>857.9 | Willow Bar, 1878 | 45 45 49.17<br>122 45 57.03 | 1518.1<br>1232.3 |
| Channel, 1851 | 46 13 13.49<br>123 37 12.66 | 416.5<br>271.3 | Sauvies Island, 1878 | 45 49 55.56<br>122 47 45.59 | 1715.4<br>982.2 |
| Cliff Point, 1851 | 46 15 47.00<br>123 50 19.46 | 1451.1<br>416.7 | Henrici, 1878 | 45 48 43.49<br>122 47 50.91 | 1342.7<br>1099.1 |
| Cross, priest's house, 1851 | 46 14 45.66<br>123 54 17.67 | 1409.7<br>378.5 | Lancaster, 1878 | 45 51 15.36<br>122 45 59.89 | 474.2<br>1292.2 |
| Lewis and Clark River, 1851 | 46 09 31.97<br>123 51 42.60 | 987.1<br>902.3 | Sandy Beach, 1878 | 45 47 24.63<br>122 46 30.44 | 760.4<br>657.6 |
| Marsh Point 1, 1851 | 46 09 54.00<br>123 52 36.91 | 1667.2<br>791.8 | Wikman, 1878 | 45 47 12.26<br>122 47 11.58 | 378.5<br>250.1 |
| Marsh Point 2, 1851 | 46 13 43.88<br>123 34 23.09 | 1354.8<br>494.8 | Willows, 1878 | 45 58 49.46<br>122 50 44.68 | 1527.1<br>959.6 |
| Pillar Hill tree, 1851 | 46 16 05.73<br>123 34 17.52 | 176.9<br>375.1 | Round Point, 1878 | 45 48 47.50<br>122 47 04.51 | 1466.5<br>97.4 |
| Rock Knoll, 1851 | 46 16 03.89<br>123 40 06.10 | 120.1<br>130.6 | Martins Island, 1878 | 45 56 10.00<br>122 47 58.41 | 308.7<br>1258.4 |
| Skeppernawin Creek, 1851 | 46 10 26.22<br>123 54 30.68 | 809.5<br>658.2 | Barn, north gable, 1881 | 45 41 15.36<br>122 41 51.40 | 474.2<br>1112.3 |
| Upper Astoria, 1851 | 46 11 34.87<br>123 48 08.06 | 1076.6<br>172.8 | Beacon, 1881 | 45 38 32.01<br>122 46 31.80 | 988.3<br>688.6 |
| Youngs River, 1851 | 46 09 50.59<br>123 50 00.17 | 1562.0<br>3.7 | Cupola, Vancouver, 1881 | 45 37 47.38<br>122 40 02.06 | 1462.8<br>44.6 |
| Westerly of two trees, 1872 | 46 16 33.11<br>123 21 15.68 | 1022.3<br>335.7 | Dann, 1881 | 45 49 16.32<br>122 50 53.57 | 503.9<br>1156.5 |
| Dead tree, 1872 | 46 09 45.76<br>123 25 57.94 | 1412.8<br>1243.0 | Dann's house, north gable, 1881 | 45 49 13.21<br>122 50 51.14 | 407.9<br>1104.0 |
| Kalama astronomic, 1872 | 46 00 25.78<br>122 50 26.44 | 795.9<br>569.0 | Dillion's house, north gable, 1881 | 45 40 11.54<br>122 45 35.10 | 356.3<br>759.8 |
| Kalama azimuth, 1872 | 46 00 24.61<br>122 50 36.97 | 759.8<br>795.5 | Shobert chimney, 1881 | 45 49 16.32<br>122 44 33.82 | 503.9<br>730.2 |
| Ahles, 1878 | 45 59 49.03<br>122 50 30.91 | 1513.8<br>665.1 | Stewart's house, south gable, 1881 | 45 47 50.09<br>122 51 51.59 | 1546.5<br>1114.1 |
| Bachelors Island, 1878 | 45 49 42.57<br>122 47 08.96 | 1314.3<br>193.4 | Tree on Rocky Butte, 1881 | 45 32 47.28<br>122 33 53.93 | 1459.6<br>1169.8 |

## DESCRIPTION OF STATIONS.

This list may be conveniently consulted by reference to the illustrations at the end of this publication or to the index. All azimuths given in the descriptions are reckoned continuously from true south around by west to 360°, south being 0°, west 90°, north 180°, and east 270°. Where magnetic azimuths are given they are indicated as such.

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

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

### MARKING OF STATIONS.

The standard disk station and reference marks referred to in the following descriptions and notes consist of a disk and shank of brass cast in one piece, as shown in illustration No. 3. The disk of the station mark is 90 mm. in diameter, with a hole at the center surrounded by a 20 mm. equilateral triangle, and has the following inscribed legend: "U. S. Coast and Geodetic Survey Triangulation Station. For information write to the Superintendent, Washington, D. C. $250 fine or imprisonment for disturbing this mark." The shank is 25 mm. in diameter and 80 mm. long, with a slit at the lower end into which a wedge is inserted so that when it is driven into a drill hole in the rock it will bulge at the bottom and hold the mark firmly in place.

The standard disk reference mark, shown in illustration No. 3, 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 type of station mark approved by the Chief of Engineers, United States Army, for re-marking stations originally established by that service is the same as the standard disk station mark, with the addition of a fourth and inner circle of lettering to the legend. This addition is "Estab'd by Corps of Engineers, U. S. A."

### GENERAL NOTES REGARDING THE MARKING OF STATIONS.

*Note 1.*—This station is marked by an iron pipe 3 feet long set in a pier of concrete which is about 1 foot square at the surface of the ground and approximately 8 inches deep. The pipe projects from 4 to 8 inches above the cement. The top of the pier bears the inscription "U. S. E." and the name or an abbreviation of the name of the station. There is no underground mark.

*Note 2.*—This station is marked by a standard disk station mark set in an irregular pier of concrete, the top of which is spherical in shape and projects from 6 to 8 inches above the surface of the ground. The underground mark is a glass bottle set neck down in concrete from 2½ to 3 feet below the surface.

*Note 3.*—The geographic positions of the permanent reference marks at this station have been computed and may be found in the list of geographic positions immediately following the position of the station, consequently the distances and azimuths have not been repeated in the descriptions.

*Note 4.*—The same as note 1 with the addition that the iron pipe is filled with sand to the bottom of the concrete, and then with concrete to the top of the pipe, and a standard disk station mark of the type approved by the Chief of Engineers, United States Army, is set in the cement on the inside of the pipe.

*Note 5.*—The same as note 2 except that the standard disk station mark is replaced by a standard disk reference mark, and there is no underground mark.

*Note 6.*—The station is marked by a standard disk station mark set in an irregular pier of concrete, projecting from 6 to 8 inches above the surface of the ground. An iron pipe extends downward from under the station mark to a point just over the underground mark. The underground mark is a bottle set neck down in concrete 2½ or 3 feet below the surface.

*Note 7.*—The same as note 6 except that a standard disk reference mark replaces the station mark.

*Note 8.*—The station is marked by a bottle buried mouth up 3 feet below the surface and at the surface there is a rock with a drill hole filled with lead. Around the station, buried 1 foot, are three bottles distant about 6 feet, at equal angles, and lying on their sides with the necks pointing to the station.

*Note 9.*—The station is marked about 2½ feet underground by a bottle and at the surface by a drill hole, filled with lead, in a stone block. Three stakes around the station bear north, south, and east magnetic and are distant 0.91 meter.

*Note 10.*—The station is marked by a drill hole in a stone set firmly in the ground. Two stakes were set in line one on either side of the station, and a third stake was set at right angles to this line, each distant 1.22 meters.

*Note 11.*—The station is marked from 12 to 15 inches below the ground by a drill hole in a rock and at the surface by a standard disk station mark set in a rock. The reference marks are three-eighths-inch brass bolts set in a stone level with its surface.

*Note 12.*—The station is marked by a standard disk station mark cemented into a drill hole in an irregular shaped rock firmly set in place. The top of the stone is about 3 inches above the surface of the ground.

*Note 13.*—The station is marked by a bottle set 3 feet below the surface, and at the surface by a standard disk station mark set in a cylindrical bed of concrete 8 inches in diameter by 2 feet deep. There is a standard disk reference mark set in concrete.

*Note 14.*—The station is marked by a concrete block 10 inches square and 1½ feet deep with a 1½-inch iron pipe run through the center.

*Note 15.*—The station is marked by a bottle buried 3 feet below the surface, and at the surface there are three stubs with a copper tack in the top of each, distant 3 feet and bearing north, south, and east (magnetic).

*Note 16.*—Stations with a reference to this note were established by the United States Engineers and are marked in a temporary manner, usually by tacks or nails driven in wharves. There is no description for them available.

*Note 17.*—The station is marked by a pipe set in the center of a square block of concrete. The top of the concrete is smoothed off and bears the letters U. S. E., one letter in each of three corners. In the fourth corner is the number, letter, or name by which the station is known.

## MOUTH OF THE COLUMBIA RIVER TO PORTLAND.

### PRINCIPAL POINTS.

*Scarboro Hill 2* (Pacific County, Wash., J. J. G., 1873; 1913). On the highest part of the hill entirely clear of timber and about 15 meters from the highest point on a line to Fort Stevens. The station is marked by a one-half-inch drill hole 2 inches deep in a stone buried 1 foot below the surface. South of the station 45 meters is a spruce tree 2 feet in diameter, marked with a blaze and three nails in the form of a triangle, north 29 meters is a spruce tree 20 inches in diameter with a similar marking, and west 53 meters is an alder tree 20 inches in diameter with the same marking.

*East Battery* (Pacific County, Wash., E. H. P., 1911; 1913). On the embankment of the old east battery at Forth Canby, on the brow of a steep slope which rises from the water at the easternmost point, abreast of Sand Island, 50 meters up the hill from the building on the slope, and 4 miles by road or 2 miles by water from Ilwaco, marked with a standard disk station mark set in the top of a square granite post, flush with the top of the ground. Reference mark No. 1 is a 3-inch iron bolt embedded in masonry about 1 foot above the level of the road, distant 9.42 meters in azimuth 45° 23′, reference mark No. 2 is the same as above and is distant 4.71 meters in azimuth 63° 09′, reference mark No. 3 is the same and is distant 6.54 meters in azimuth 120° 25′, reference mark No. 4 is the easternmost corner of cement manhole about 3 meters outside the embankment, distant 4.89 meters in azimuth 223° 09′.

*Battery* (Pacific County, Wash., J. J. G., 1873; 1909). The station is marked 1 foot below the surface by a one-half inch drill hole 2 inches deep in the top of a large stone. The station could not be recovered in 1911.

*Fort Stevens Longitude* (Clatsop County, C. V. H., 1911; 1913). On the embankment at the edge of the old moat, just in front of Battery Freeman at Fort Stevens. The station is marked by a standard disk station mark bearing the usual inscription and the words "Astronomical Station," set in the middle of the notch in the top of the pier. The foundation of the pier was placed 4 feet in the ground, the lower 2 feet being old concrete blocks tamped in with sand, the remainder is concrete. *Gun* is distant 27.90 meters in azimuth 45° 18′ 20″. Reference mark No. 1 is a cross one-half inch deep in the concrete embankment in front of the easternmost and smallest cannon in Battery Freeman and about 8 inches from the inner edge of the concrete, distant 37.25 meters S. 27° 30′ E. (magnetic). Reference mark No. 2 is a small triangle with a three-fourths inch hole in the center, cut in the concrete directly in front of the easternmost of the two 6-inch guns about 8 inches from the inner edge of the concrete, distant 42.20 meters S. 40° 00′ W. (magnetic.)

*Island (U. S. E.)* (Pacific County, Wash., E. B. L., 1913). On the southeast end of Sand Island, marked according to note 1.[1] The reference mark is a standard disk reference mark set in an irregular pier of concrete projecting 6 inches above the ground, distant 51.22 meters in azimuth 44° 03′ 12″.

*Tansy Point 2* (Clatsop County, J. J. G., 1873). The station is marked 1 foot below the surface by a block of wood 1 foot square by 8 inches deep, with a one-half inch drill hole 2 inches deep in the top. On the surface there are three stubs, two parallel with the shore and one at right angles, each distant 1.83 meters.

*Smith Point* (Clatsop County, R. D. C., 1851; 1873). On Youngs Point, about 4.5 meters from the high-water mark and 5 feet above the tide. The station is marked by cross lines on a flat stone. There are three stakes around the station, each distant 1.83 meters.

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[1] See p. 81.

*Scarboro Hill* (Pacific County, Wash., R. D. C., 1851; 1873). On the south side of Scarboro Hill, about one-half mile south of Chinook Point, and about 2 meters north of a remarkable ledge of rock cropping out of the side hill. The station is marked according to note 8,[1] except there is no surface mark.

*Tansy Point* (Clatsop County, R. D. C., 1851).—Lost.

*Point Adams* (Clatsop County, R. D. C., 1851). About one-half mile east of the extremity of Point Adams, on the edge of the bank 12 feet above the high-water mark. The station is marked according to note 8,[1] except there is no surface mark.

*Cape Disappointment* (Pacific County, Wash., R. D. C., 1851). On the side hill on the most eastern spur of Cape Disappointment. The station is marked by a stake driven 3 feet in the broken rock; around this are three other stakes, each distant 1.83 meters.

*Baker east base* (Pacific County, Wash., R. D. C., 1851). On Bakers Bay about 365 meters west of the mouth of the Chinook River, on a small sand hill about 10 feet above the ordinary high-water mark. The station is marked 3 feet below the surface by a copper bolt set in a sandstone block 10 inches square by 18 inches long; over this is a wood block 2 feet in diameter and 2½ feet long. Three stakes set around the station are distant 1.83 meters.

*Baker west base* (Pacific County, Wash., R. D. C., 1851). On Bakers Bay, 365 meters east of the mouth of the Wallicut River, about midway between the alder bushes and the high-water mark. The station is marked by a copper bolt in a sandstone block 10 inches square and 18 inches long set 3 feet below the surface; over this is a block of wood 2 feet in diameter and 2½ feet long. Three stakes were set, each distant 1.83 meters.

*Point Ellice* (Pacific County, Wash., R. D. C., 1851). On Point Ellice 25 feet above the tide. The bank was cut away and leveled to make room to occupy the station. The station is marked by a cross cut on a large flat rock. There are three stakes around the station, two distant 1.83 meters, and the other is north 1.22 meters.

*Astor Point* (Clatsop County, R. D. C., 1851). On Astor Point about 2 meters from the edge of the river and 7 feet above the high-water mark. The station is marked by a cross on a flat stone 3 feet below the surface. There are three stakes around the station, each 1.83 meters distant.

*Grays Point* (Pacific County, Wash., R. D. C., 1851). On the river bank about midway of Grays Point and 10 feet above the highest tide. The station is marked by a bottle buried 3 feet below the surface. There are 3 stubs with a copper tack in the top, each distant 1.83 meters.

*Tongue Point* (Clatsop County, R. D. C., 1851).—Lost.

*Rocky Point* (Wahkiakum County, Wash., R. D. C., 1851).—Lost.

*Indian Point* (Clatsop County, R. D. C., 1852). On Indian Point on a side hill about 20 feet above the tide, in front of an almost perpendicular cliff. The station is marked according to note 8,[1] except there is no surface mark.

*Cathlamet Point* (Clatsop County, R. D. C., 1851; 1871). On a side hill on the west side of Cathlamet Point, about 190 feet above tidewater. The station is marked by a bottle buried 3 feet below the surface. There are 3 stubs with copper tacks in the top of each, distant 1.83 meters from the station.

*Jim Crow Point* (Wahkiakum County, Wash., R. D. C., 1851; 1913). On the north side of the Columbia River, on Jim Crow Point, and about 1,800 meters to the east of Pillar Rock, and about 35 feet above the tide. The station is marked according to note 2,[1] with the exception that the underground mark is a stone, with a cross cut in its surface, buried 3 feet below the surface. See also the description of *Jim Crow Point* (*U. S. E.*).

*Three Tree Point* (Wahkiakum County, Wash., R. D. C., 1851; 1913). On the north side of the Columbia River, on Three Tree Point, about 35 feet above tidewater. The station is marked according to note 2,[1] except that the underground mark is a cross cut on a flat stone instead of a bottle. See description of *Three Tree Point* (*U. S. E.*).

*Aldrich* (Clatsop County, C. R., 1871). On the eastern end of a small sharp ridge on the northeast side of Cathlamet Point, 233 feet above tidewater. The station is marked according to note 8.[1] Three stakes were set as follows, north 1.46 meters, east 1.89 meters, and south 1.83 meters. There is a copper tack in a stump, distant 3.20 meters.

*Skumaquea* (Wahkiakum County, Wash., C. R., 1871.). On a high ridge nearly destitute of trees and covered with ferns, 342 feet above the tide. The station is marked according to note 8.[1]

*Quinn* (Clatsop County, C. R., 1871). On the side of the first point above Aldrich's fishery, opposite the lower part of Tenasillihee Island, near the shore, west of a deep ravine, and 153 feet above the river. The station is marked according to note 8.[1] Three stakes were set in the ground, north, south, and east, respectively, each distant 1.83 meters.

*Lokamin* (Wahkiakum County, Wash., C. R., 1871). On the end of the most prominent projecting ridge between Skumaquea and Cathlamet. The station is marked according to note 8.[1] Three stakes around the station are distant 1.83 meters, bearing magnetic, respectively, north, south, and east.

*Hunts Mill Point* (Clatsop County, C. R., 1871). On the apex of a ridge of basaltic rock which is nearly perpendicular on the river side. The station is marked according to note 8.[1] There are three stakes around the station, distant 1.83 meters and bearing magnetic east, west, and south.

*Birnie* (Wahkiakum County, Wash., C. R., 1871). On the cleared land near the edge of the timber, about 275 meters southeast of the Birnie house, just south of a road and 156 feet above the river. The station is marked according to note 8.[1] Three stakes bearing north, south, and east are distant 1.83 meters.

*Westport* (Clatsop County, C. R., 1871). On a sharp ridge projecting into the bottom lands, 600 meters from the wharf and 292 feet above the level of the river. The station is marked according to note 8,[1] except the surface mark was omitted. Three stakes around the station are distant 1.83 meters, bearing, respectively, north, south, and east.

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[1] See pp. 81 and 82.

*Anderson* (Wahkiakum County, Wash., C. R., 1872). About 3½ miles above Cathlamet, on a rocky side hill covered with heavy timber and brush, nearly opposite the head of Puget Island, and about 150 feet above the level of the river and about 3 meters east of an old burnt stump. The station is marked according to note 9,[1] except the surface mark is omitted and the three stakes are each 1.83 meters distant.

*Woods* (Columbia County, C. R., 1873). About 4½ miles above Westport, up the Westport Slough, on the apex of a sharp ridge on land owned by Mr. Woods. The station is marked according to note 8,[1] except the surface mark is a piece of the original signal pole.

*Cape Horn* (Wahkiakum County, Wash., C. R., 1873).—Just back of a large rock on a point locally known as Cape Horn. The station is marked according to note 8,[1] except there is no surface mark. There are 2 stubs and a stump of a tree with copper tacks in them, distant 1.83 meters from the station.

*Clatskanie* (Columbia County, C. R., 1873).—On a sharp ridge opposite the head of Westport Slough where it branches off from Beaver Slough, 227 feet above the river level. The locality can be located by the lines of stumps left by the cutting which was done to open lines of sight. The station is marked according to note 8,[1] except the surface mark is a part of the center pole of the original signal.

*Cooper* (Wahkiakum County, Wash., C. R., 1873). On the north side of the Columbia River on a sharp ridge above a rocky point, 91 feet above the river. The station is marked according to note 8,[1] except the surface mark is a section of the original center pole of the signal. Three stakes were set bearing north, south, and east magnetic distant 1.83 meters.

*Bradbury* (Columbia County, C. R., 1873). On land owned by Mr. Bradbury about 150 meters from the prairie, 80 meters from the edge of a clearing, 71 feet above the level of the river. The station is marked according to note 8,[1] except the surface mark is a section of the old center pole of the signal. Three stakes bear north, south, and east magnetic distant 1.83 meters.

*Abernathy* (Cowlitz County, Wash., C. R., 1873). On the summit of the high perpendicular basaltic cliffs, about 15 meters from the edge, and 291 feet above the river level, and just east of the first break in the cliff below Oak Point Creek. The station is marked according to note 8,[1] except there is no surface mark. Three stakes around the station bear north, south, and east magnetic distant 1.83 meters.

*Nequally* (Cowlitz County, Wash., C. R., 1873). About one-half mile below the mouth of the Nequally Creek, on the brink of a precipice of basaltic rock, 268 feet above the level of the river. The station is marked according to note 8,[1] except the surface mark is a section of the center pole of the old signal. Three stakes bear north, south, and east magnetic distant 1.83 meters.

*Stoughton* (Columbia County, C. R., 1873). About 1½ miles above Oak Point on what is called Bradburys Slough, in a small garden 3 or 4 feet above high water, and 30 meters from the shore and 80 meters east of the house. The station is marked according to note 8,[1] except the surface mark is a section of the center pole of the old signal. Three stakes bear north, south, and east magnetic distant 1.83 meters.

*Greens Point* (Columbia County, C. R., 1873; 1885). On a bold, rocky point about 4 miles above Oak Point and about 75 feet above tidewater. The station is marked according to note 8,[1] except the surface mark is a piece of pine 4 inches square. There is a pine stub east and one south of the station 1.83 meters.

*Coal Creek Ridge* (Cowlitz County, Wash., A. W. C., 1873). On the edge of a prominent ridge about one-half mile west of Coal Creek; the numerous stumps left from the heavy cutting will serve to identify the locality. The station is marked according to note 8.[1]

*Mount Solo* (Cowlitz County, Wash., C. R., 1873). On a narrow ridge of land on the western side of Mount Solo. The locality can probably be found by the heavy cutting which was done to open lines of sight. The station is marked according to note 8,[1] except the surface mark is a section of the center pole of the signal. Three stakes around the station have the following magnetic bearings and distances: North 1.83 meters, south 1.83 meters, and west 1.87 meters.

*Rincarson* (Columbia County, C. R., 1873; 1913). On the summit of a very sharp pointed hill, over the east one of two tunnels, west of camp No. 1, Peninsula Lumber Co. The station is marked according to note 2,[1] except that a small hole in the concrete replaces the bottle in the underground mark.

*Huntington* (Cowlitz County, Wash., C. R., 1873; 1913). About 2 miles west of Kelso, on the western side of a large, isolated bowlder. The station is marked by a standard disk station mark set in lime mortar. The underground mark is a flat stone with a cross cut on it buried 2 feet below the surface. Three bottles were placed on their sides with the necks pointing to the station and buried 1 foot. There is a triangular blaze on the side of an oak tree facing the station distant 3.82 meters and a similar mark on a spruce tree distant 15.70 meters.

*Rainier* (Columbia County, C. R., 1873). Near the village of Rainier, on a side hill about 200 meters from the shore and down the hill about 45 meters from an old logging road. The station is marked according to note 8,[1] except that the surface mark is a post 2½ feet long with a copper tack in the top. There is a blazed fir tree stump bearing 206° magnetic distant 3.64 meters and a blazed fir tree bearing 37° magnetic distant 2.59 meters.

*Coweman* (Cowlitz County, Wash., C. R., 1873).—Nearly opposite the mouth of the Coweman Creek, on top of a small ridge, back of which the ground falls before rising to the hills, about 60 meters from the lowlands, and 167 feet above the river. The station is marked according to note 8,[1] except the surface mark is a section of the old center pole of the signal. Two stakes were set, one east and one west of the station.

*Mount Coffin* (Cowlitz County, Wash., C. R., 1873; 1913). On the summit of a rock called Mount Coffin, about 4.5 meters from the northern edge of the rock, which is nearly vertical on that side, and 227 feet above tidewater. The

[1] See pp. 81 and 82.

station is marked by a drill hole filled with lead in a rock level with the surface of the ground. The reference mark is described in note 5.[1] There is a triangular blaze on an oak tree distant 23.3 meters in azimuth 90° 25′, and a similar blaze on a large spruce tree distant 9.83 meters in azimuth 110° 46′. See note 3.[1]

*Warren* (Columbia County, C. R., 1873). About 1 mile above Rainier, on top of a steep bluff about 100 meters from the river and 142 feet above tidewater. The station is marked according to note 8,[1] except there is no surface mark. Three stakes were set with the following magnetic bearings and distances: North 1.83 meters, east 1.80 meters, and south 1.83 meters.

*Carolls Point* (Cowlitz County, Wash., C. R., 1873). On top of an isolated ridge exactly opposite the head of Cottonwood Island. The station is marked according to note 8,[1] except there is no surface mark.

*Galloway* (Columbia County, C. R., 1873). Opposite the upper part of Cottonwood Island, 6 or 7 meters from the edge of the precipice, almost immediately over the water. The station is marked according to note 8,[1] except the center mark is a section of the center pole of the old signal. Three stakes were set bearing magnetic north, south, and east distant 1.83 meters.

*Carr* (Columbia County, C. R., 1873; 1913). About one-half mile up the river from Prescott, on a rocky point approximately 50 feet above low water. The station is marked by a stone sunk in the ground, the top being flush with the surface. There is a hole drilled in the stone, filled with lead and marked with cross lines. The reference mark is according to note 5.[1] There is a blaze with copper tacks on a fir tree distant 35 meters in azimuth 34° 07′ 36″. See note 3.[1]

*Drays Mound* (Cowlitz County, Wash., C. R., 1873; 1913). About 2¼ miles northwesterly from Kalama, near the tracks of the Northern Pacific Railway and on the southern end and highest part of Drays Mound. The station is marked according to note 2,[1] with the exception that the underground mark is an iron nail set in cement in a hole drilled in the rock; also 1 foot below the ground there are two bottles on their side and with the necks pointing to the station. The reference mark is a galvanized-iron pipe filled with earth and cement, and set in concrete, with a copper tack in its top surface. There is a triangle on a fir tree distant 6.43 meters in azimuth 120° magnetic. See note 3.[1]

*Gobles Point* (Columbia County, C. R., 1873). About 1 mile below Kalama on broken rocky ground, about 100 meters from the shore. The station is marked according to note 8,[1] except the surface mark is a post 2½ feet long, with a copper tack to mark the station.

*Rocky Ridge* (Cowlitz County, Wash., C. R., 1878). On a rocky ridge about 180 meters from the shore back of a small log cabin. On the north side of the ridge is a heavily wooded swamp. The station is marked according to note 8.[1] There is a triangular blaze on a small fir stump bearing N. 85° E. magnetic, distant 10.13 meters, and a fir tree with a similar mark bears S. 80° E. magnetic, distant 15.12 meters.

*Hunter* (Columbia County, C. R., 1873). Nearly opposite Kalama, on firm bottom land 25 meters from the shore, 75 meters from an orchard back of the station, 120 meters north of a house, and 225 meters north of a creek. The station is marked according to note 8,[1] except the surface mark is a section of the center pole of the original signal. Three stakes bear magnetic north, south, and east distant 1.83 meters.

*Hoffman* (Cowlitz County, Wash., C. R., 1878). About 3 miles above Kalama, 1 mile below Martins Bluff, 180 meters above Mr. Hoffman's house, and 75 feet above the level of the river, and 12 or 14 meters from the edge of the bank. The station is marked underground by a drill hole in a rock filled with lead. There are three wild cherry stakes set as follows: North 1.83 meters, south 1.87 meters, and east 1.81 meters.

*Martins Bluff* (Cowlitz County, Wash., C. R., 1878; 1913). The station is 4 meters from the edge of the summit of Martins Bluff, approximately 75 feet above low water. The station is marked by a copper bolt in rock. The reference mark is the same as is described in note 7,[1] except no underground mark. There is a triangle blazed on the only large fir tree in the vicinity distant 22.98 meters in azimuth 291° 59′. See note 3.[1]

*Merrill* (Columbia County, C. R., 1878). On the nose of a high ridge on the farm belonging to Mr. Norton Merrill and southwest of the bridge across Tide Creek. The station is marked by a drill hole filled with lead in a large conical rock. Three cedar stakes were set as follows: North 1.79 meters, south 1.83 meters, and east 1.86 meters. Three copper tacks in a triangular blaze on a white fir tree bear S. 73° W., magnetic, distant 9.769 meters.

*Burnt Hill* (Cowlitz County, Wash., C. R., 1878). On the crest of a burnt ridge covered with scrub oak and hazel, with a few trees in the vicinity. The station is marked according to note 8,[1] except the three bottles pointing to the station are omitted. There are three cedar stakes around the station, as follows: North 1.74 meters, south and east each 1.79 meters.

*Maple Hill* (Columbia County, C. R., 1878). About 1½ miles below Columbia City, nearly opposite the head of Deer Island, on the summit of a wooded hill about 460 feet above the river level. The station is marked 2½ feet underground by a drill hole filled with lead in a flat-topped stone, and at the surface by a similar mark in a stone projecting 6 inches above the surface. Three cedar stakes were set as follows: North 1.79 meters, south and east each 1.83 meters. There are three copper tacks in a triangular blaze on a fir tree bearing S. 15° W. magnetic, distant 2.35 meters.

*Lewis River Hills* (Clarke County, Wash., C. R., 1878). On a narrow bench on one of the most prominent ridges on the southwest face of the hills lying between the two forks of the Lewis River. The station is marked according to note 8.[1] Three cedar stubbs are set as follows: North 1.81 meters, east 1.83 meters, and south 1.86 meters. Three copper tacks in a blaze on a burnt stump bear S. 6° E. magnetic, distant 3.472 meters.

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[1] See pp. 81 and 82.

*Reed* (Clarke County, Wash., C. R., 1878). About 135 meters northwest of the top of the hill on the land owned by Mr. S. G. Reed. The station is marked according to note 8.[1] Three stakes are set around the station as follows: North 1.83 meters, east 1.84 meters, and south 1.85 meters.

*Table Cliff* (Columbia County, C. R., 1878). On a bare flat table cliff of rock about midway between Columbia City and St. Helens, about one-half mile from the river shore, and 275 meters from the county road from St. Helens to Portland, and about 200 feet above the river level, northeast of a small gulch, and about 27 meters southeast of a small pond in the rainy season. The station is marked by a drill hole filled with lead in solid rock.

*Scappoose* (Columbia County, C. R., 1878; 1881). On the end of the high ridge between the north and south forks of the Scappoose Creek, and west of the county road between St. Helens and Portland, about 460 feet above the river. The station is marked according to note 8.[1] There are three cedar stubs around the station, as follows: East 1.92 meters, north 1.84 meters, and south 1.84 meters. Three copper tacks in a triangular blaze on a large fir stump bears S. 80° E. magnetic, distant 6.91 meters, and a similar mark on a large fir tree bears S. 12° E. magnetic, distant 5.34 meters.

*Fales* (Clarke County, Wash., C. R., 1878; 1881). In a cleared field on high ground on the east side of Lake River. The station is marked according to note 8.[1] Three cedar stakes are set as follows: North 1.79 meters, south 1.86 meters, and east 1.80 meters.

*Secrist* (Clarke County, Wash., C. R., 1881). On the north side of Vancouver Lake just back of Secrist Landing, on a bare hillside about 100 feet above the lake, 50 meters east of an old log house, and close to a fence which is parallel with the shore. The station is marked according to note 8,[1] except the underground mark is the intersection of cross lines on a flat stone. Three cedar stakes were set as follows: North 1.73 meters, south 1.84 meters, and east 1.81 meters.

*Bouser* (Multnomah County, C. R., 1878; 1881). On the west side of Willamette Slough, about 1 mile below Rocky Point, on the northeast end of a partly bare spur southwest of the Bouser farmhouse, and 515 feet above the water level. The station is marked according to note 8.[1] Three cedar stakes were set as follows: North 1.86 meters, east and south each 1.83 meters. Two fir trees have copper tacks in a triangular blaze; one bears S. 18° W. magnetic distant 8.50 meters and the other bears S. 55° W. magnetic distant 3.615 meters.

*Willamet* (Multnomah County, C. R., 1881). On the nose of a high hill on the west bank of the Willamette River, about 1 mile south of the head of Willamette Slough, on a level spot which can probably be easily found from the heavy cutting done to open lines of sight. The station is marked according to note 8.[1] There are three cedar stubs around the station, as follows: North 1.80 meters, east 1.79 meters, and south 1.78 meters. A triangular blaze on a fir stump bears N. 61° E. magnetic distant 5.03 meters, and a second similar mark bears N. 26° W. magnetic distant 5.67 meters.

*Warren* (Columbia County, O. B. F., 1903). About a mile southwest of Warren, a station on the Northern Pacific Railway, on a slight elevation or ridge near the west side of a pasture owned by Mr. E. Harnes, and about 250 meters north of an east-and-west road. The station is marked by a three-eighths inch copper bolt 3 inches long, cemented into a drill hole in a stone 6 by 12 by 18 inches, buried 18 inches below the ground. The surface mark is the old-style station mark, which is a disk and shank cast in one piece. The disk is about 85 millimeters in diameter and has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. This mark is set at the surface of the ground in a bowlder 8 by 24 by 24 inches, with the letters "U. S." cut on the north side. There are three reference marks, which are drill holes in the top of three-eighths inch copper bolts, which are leaded or cemented into drill holes in rock with the top of the bolt flush with the surface. The three reference marks are in the north-and-south fence line to the west of the station. The middle mark of the three is 246.7 meters north of the north road fence and the other two are each about 30 meters distant from the middle mark, one north and the other south. They are at the following distances and azimuths from the station: 23.67 meters, 93° 15′; 37.46 meters, 41° 26′; and 37.95 meters, 142° 46′.

*Rocky Butte* (Multnomah County, C. R., 1889; 1903). On the north side of the highest part of the bush-covered summit of the butte, about 2 miles northeast of Montavilla. The station is marked by a drill hole in a large-topped bowlder.

*Harney* (Clarke County, Wash., C. R., 1881; 1903). On the north bank of the Columbia River, about 1½ miles above the United States wharf at Vancouver, on a sloping bare bluff immediately above the road leading from Vancouver up the river. It is almost in front of the Harney House, on land formerly owned by Gen. Harney, and about 80 meters east of the fence inclosing the race track. The underground mark consists of a glass bottle placed 3 feet below the surface, with the neck up, the center of the neck marking the station, and three other bottles placed on their sides at a depth of about 1 foot and at a distance of about 6 feet from the center, with the necks of the bottles pointing toward the center. The surface mark is a small drill hole 2 inches deep in a basaltic bowlder, weighing about 350 pounds, placed with its top flush with the surface of the ground. The following bearings to the right of the magnetic north were read at the station: East chimney of Harney House, 27° 05′; triangle on tree, 74° 28′; white house on south side of river, 172° 55′; ventilator on barn, 220° 06′; and corner of race-track fence, 276° 47′.

*Barnes* (Multnomah County, O. B. F., 1903). On a cleared hill about 4 miles west of Portland, between the Barnes and Cornell roads, and just east of the highest hill in this range, which hill is still densely wooded. It is on the south edge of the hill, about 100 feet southeast of a fir tree and some small maples, and close to the north side of a large stump.

[1] See pp. 81 and 82.

The station is marked by a three-eighths inch copper bolt 3 inches long, cemented into a drill hole in a stone 6 by 12 by 18 inches, 1¼ feet below the surface. The surface mark is an old-style station mark, which is a disk and shank cast in one piece. The disk is about 85 millimeters in diameter and has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. This is set in a stone 8 by 14 by 18 inches, with its top flush with the surface of the ground. The two reference marks are drill holes in the top of three-eighths inch copper bolts, which are leaded or cemented into drill holes in rock with the top of the bolt flush with the surface. These are set at the roots of stumps on the side facing the station and are located as follows: One in a bowlder 15 inches in diameter, distant 15.80 meters from the station in azimuth 156° 11′; and the other in a bowlder 12 inches in diameter, 7.02 meters from the station in azimuth 233° 23.′ A third reference mark consists of a cross in the top of a bowlder 10 inches in diameter buried 15 inches beneath the surface, and of a copper bolt directly above the cross in a bowlder 14 by 14 by 18 inches, set with its top flush with the surface of the ground. It is about 3 feet north of the main east-and-west fence line, about 30 feet east of where this fence crosses the highest part of the ridge, and about 3 feet east of a fence extending northward from this fence, and 44.95 meters from the station in azimuth 184° 35′.

*Monument, General Land Survey* (Multnomah County, O. B. F., 1903). The initial intersection of the first standard parallel and the Willamette meridian, a short distance southeast of Barnes. (See above.) The station is in a fence corner, and is marked by a stone post projecting 1½ feet above the ground.

*River* (Multnomah County, O. B. F., 1903). Near the junction of the two suburbs of Portland known as Arbor Lodge and Peninsula, on the east bank of the Willamette River about a mile east of Columbia University. It is on a slight elevation, the highest in the vicinity, and in the fence line on the north side of the boulevard along the river bank. It was placed as far east as possible and still keep the Oregonian Building in view. The station is marked by crosses cut in the tops of two bowlders, one placed near the surface of the ground and the other directly beneath at a depth of 1.7 feet, each stone bearing the letters "U. S. C. S." cut in the top.

*Oregonian* (Multnomah County, O. B. F., 1903). The tall iron pole at the southeast corner of the tower of the Oregonian Building, at the northwest corner of Sixth and Adler Streets, Portland.

*Portland longitude station* (Multnomah County, C. H. S., 1887; 1905). This station has been destroyed.

*Portland latitude station* (Multnomah County, C. H. S., 1887; 1905). This station has been destroyed.

*Balch* (Multnomah County, C. R., 1881; 1906). This station was occupied for azimuth in 1886. It is immediately northwest of the city limits of Portland, about a mile south of the Willamette River, on the first small level bench of the spur making out from the ridge west of the Cornell road, and about 255 feet above the road. The station is marked underground by a broken-necked bottle placed neck up 2 feet below the surface, and by a cross in the top of a copper bolt set in concrete 6 inches above the bottle, and at the surface by a cross on an old-type station mark set in concrete, which is inscribed with the letters "C. & G. S." The old-type station mark consists of a disk and shank made of brass and cast in one piece. The disk is about 85 mm. in diameter and has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. The reference marks are the remains of two brick piers built in line to the west of the station, with their foundation about 20 inches below the surface, the nearest edge of the first pier being 1 meter west of the station.

*Sands* (Clatsop County, E. B. L., 1913). On the highest part of the sand spit near the middle of the river and 2½ miles northwest from Smith Point. The station is marked according to note 2. A pile marked with nails is distant 103.9 meters in azimuth 172° 18′ 40″.

*Point Ellice* (*U. S. E.*) (Pacific County, Wash., U. S. E., 1913). On Point Ellice between the river bank and the tracks of the Oregon-Washington Railroad & Navigation Co., and 25 feet above the low-water mark. There is a large bowlder within 1 meter of the station. The station is marked according to note 1.[1] Reference mark No. 1 is a cross cut in rock, the longer arm pointing toward the station. Reference mark No. 2 is a standard disk reference mark set in a block of concrete. See note 3.[1]

*Harrington* (*U. S. E.*) (Wahkiakum County, U. S. E., 1913). Located one-half mile west of Altoona Cannery, 12 meters from the edge of the bluff, and approximately 20 feet above the mean stage of the river. There is a sharp break in the bluff line 7 meters from the station on a line to Altoona Cannery. The station is marked according to note 1.[1] The reference mark is a hole bored in a bowlder on the shore.

*Taylor* (Clatsop County, E. B. L., 1913). On a fishing wharf on Taylor Sands. Marked with a triangle of copper tacks with one tack in the center.

*Grays* (*U. S. E.*) (Pacific County, Wash., U. S. E., 1913). One mile east of Knapton, one-half mile west of Gray's Point, 6 meters from the edge of the bluff, and 20 feet above the river at mean stage. The station is marked according to note 1.[1] There is a triangle blazed on a leaning spruce tree near the edge of the bluff, distant 11.6 meters in azimuth 51° 48′, a second spruce tree distant 13.9 meters in azimuth 87° 01′ is marked in a similar manner. There is a pile of stone 4 feet high distant 30 meters in azimuth 92° 01′.

*Tongue* (*U. S. E.*) (Clatsop County, U. S. E., 1913). On Tongue Point, on the bluff above the rock crusher and east of the trail from the rock crusher to the convict camp. The station is marked according to note 1.[1] The reference mark is described in note 7.[1] See note 3.[1]

*Water* (Clatsop County, E. B. L., 1913). There is no permanent mark for this station, owing to the high water. A pole was nailed to the roots of a stranded tree.

*Rocky Point 2* (Wahkiakum County, Wash., E. B. L., 1913). On Elliott Point, one-fourth mile east of Elliott Landing, on a rocky point 6 meters from the edge of the bank, and 20 feet above the mean stage of the river. The station

[1] See pp. 81 and 82.

is marked according to note 2.[1] The reference mark is a galvanized-iron pipe filled with and set in concrete, with a copper tack in its top surface. There is a triangular blaze on a maple tree distant 30.82 meters in azimuth 112° 19′ 30″. See note 3.[1]

*Wharf* (Clatsop County, E. B. L., 1913). This station was on a wharf which was lost in July, 1913.

*Jim Crow* (*U. S. E.*) (Wahkiakum County, Wash., U. S. E., 1913). On Jim Crow Point, near the middle of a sharp ridge one-fourth mile southeast of Brookfield. The station is marked according to note 1.[1] There is a triangle blazed on a fir tree distant 5.13 meters. The relation of Jim Crow Point (U. S. E.) to Jim Crow Point is given in the list of positions.

*Raspberry* (*U. S. E.*) (Clatsop County, U. S. E., 1913). On a sidehill, one-fourth mile west of Cathlamet Point. The station is marked according to note 1.[1] There are no reference marks.

*Three Tree Point* (*U. S. E.*) (Wahkiakum County, Wash., U. S. E. 1913). On Three Tree Point, about 20 feet above the mean stage of the river. The station is marked according to note 1.[1] See the description of Three Tree Point.

*Ten* (Clatsop County, E. B. L., 1913). At the northeast end of Tenasillihee Island, on the northwest bank of Multnomot Slough. The station was a flag in a tree. The reference mark is the same as is described in note 5.[1] See note 3.[1]

*Dike* (Wahkiakum County, Wash., E. B. L., 1913). On Hunting Island, about 1½ miles northwest of Cathlamet, on a small dike, and about 4 feet above the high-water mark. The station is marked according to note 2.[1] The reference mark is the same as described in note 6.[1] There is a triangle blazed on a willow tree distant 23.8 meters in azimuth 315° 12′, also one on a large spruce tree near the river bank distant 65.15 meters in azimuth 330° 53′.

*Mud* (Clatsop County, E. B. L., 1913). On Tenasillihee Island, opposite Hunting Island light, about 1¼ miles northwest of Cathlamet, and below the high-water level of the river. The station is marked by a 1½-inch galvanized iron pipe, 5 feet long, and projecting 3 feet above the ground. The pipe is filled with cement, with a standard disk station mark set in the top.

*Barlow* (Cowlitz County, Wash., E. B. L., 1913). On Barlow Point, below the high-water stage of the river. The station is marked according to note 2,[1] except that the station mark is placed 1 foot below the surface of the ground. Reference mark No. 1 is the same as is described in note 7[1] and is 2 feet from the southeast corner of Barlow's dwelling. Reference mark No. 2 is described in note 5,[1] and is near the fence line at a large gate.

*Quarry* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1913). On the southeast end of the wharf of the Star Sand Co., northwest of the ramp. The station is marked by a triangle of nails with one nail in the center. The following distances are given: Dolphin, 5.33 meters; edge of ramp, 0.82 meter; edge of wharf toward the river, 1.28 meters; and mooring pile, 0.54 meter.

*Slaughter 2* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912; 1913). On the wharf at Slaughter Landing, 1.28 meters from the edge of the wharf, 1.82 meters from the side of barn, and 4.26 meters up the river from an old mooring pile. The station is marked by a sixtypenny nail at the center of a cross of twentypenny nails, surrounded by a triangle cut in the plank. Reference mark No. 1 is described in note 7,[1] except there is no underground mark, and reference mark No. 2 is a 3-foot length of 1½-inch galvanized-iron pipe with a standard disk reference mark set in its top with cement. See note 3.[1]

*Curve* (*U. S. E.*) (Columbia County, U. S. E., 1912). On the south side of the tracks of the Spokane, Portland & Seattle Railway, near the middle of a curve, distant 1.52 meters from the south rail and 88.42 meters southeast from a road crossing the railroad. The station is marked according to note 1.[1]

*Tangent* (*U. S. E.*) (Columbia County, U. S. E., 1912). South of the tracks of the Spokane, Portland & Seattle Railway, 228.6 meters in a northwesterly direction from a telephone pole. The station is marked according to note 1.[1]

*Beach 2* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1913). The station is 7 meters outside the high-water line and is marked according to note 1.[1]

*Bourne* (*U. S. E.*) (Columbia County, U. S. E., 1912). South of the tracks of the Spokane, Portland & Seattle Railway, about midway between the track and the line of telephone poles, and 38.09 meters northwesterly of the road to the dock. The station is marked according to note 1.[1]

*A 2* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Three meters from the river bank, near a sorting gap in a log boom. The following distances are given: To a triangle blazed on a cottonwood tree with a nail in the center, northerly 4.87 meters; to a triangle with a nail in the center, easterly 5.49 meters; and to a pump upstream, approximately east-southeast 42.54 meters. The station is marked according to note 1.[1]

*Hut* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). The station is on a small knoll. The following distances are given: To a cottonwood tree, northwesterly 4.47 meters; to apple tree, easterly 4.66 meters; to northwest corner of old house, easterly 8.37 meters; and to a telephone pole, southwesterly 15.97 meters. The station is marked according to note 1.[1]

*Mill* (*U. S. E.*) (Columbia County, U. S. E., 1912). In the town of Rainier, near the Columbia Door Co.'s mill, on a side hill southwest of the tracks of the Spokane, Portland & Seattle Railway. The following distances are given: To the corner of wall, 6.03 meters southeasterly; to face of wall, 4.62 meters southerly; to corner of wall, southwesterly 5.41 meters; and to a flagpole, 14.69 meters. The station is marked according to note 1.[1]

*Wood 2* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Upriver or southeasterly from a slough approximately 60 meters. The station is marked by a pipe set in a concrete monument buried 2 feet in the ground. The following distances are given: To a blazed cottonwood tree, northwesterly 8.93 meters; to a blazed cottonwood tree, north 9.60 meters; to a blazed cottonwood tree, southwesterly 18.44 meters.

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[1] See pp. 81 and 82.

*Dock* (*U. S. E.*) (Columbia County, U. S. E., 1912). In the city of Rainier on the wharf of the Pacific National Lumber Co. The station is marked by a twentypenny nail surrounded by eightpenny nails driven at irregular intervals and a triangle cut in the plank. The following distances are given: To a mooring pile, westerly 0.76 meter; to the river edge of the wharf, northerly 0.45 meter; and to the west edge of log chute, easterly 8.44 meters.

*Net 2* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Opposite Rainier and 0.6 meter west of the center line of the street on which the Rainier post office is located, 7.62 meters from the river bank. The station is marked according to note 1.[1]

*Rainier 2* (*U. S. E.*) (Columbia County, U. S. E., 1912). In the city of Rainier, near the northwest corner of Water and Virginia Streets. The following distances are given: Eastern curb line of Virginia Street, easterly 7.62 meters; southwest corner of sheet iron building on the northeast corner of Virginia and Water Streets, easterly 14.53 meters; northwest corner of concrete block building on the northeast street corner, southeasterly 35.05 meters; cross on Water Street curb, southeasterly 5.03 meters; and cross on Water Street curb, southwesterly 4.61 meters. The station is marked according to note 1.[1]

*Bluff* (*U. S. E.*) (Columbia County, U. S. E., 1912). On a sharp rocky ridge south of the tracks of the Spokane, Portland & Seattle Railway. The station is marked according to note 1.[1]

*Cowlitz 2* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). At the junction of the Columbia and Cowlitz Rivers, outside the high-water line and south of the line of the jetty. The station is marked according to note 1.[1]

*D 10* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Approximately 244 meters southeast of the northwestern end of Cottonwood Island and 9 meters inside the high-water line. The station is marked according to note 1.[1] The following distances are given: To a nail in a notched blaze in a cottonwood stump northerly 18.04 meters; to a nail in a triangle blazed on a forked ash northeasterly 20.7 meters; to the center of a small knoll southeast approximately 60 meters.

*D 9* (*U. S. E.*) (Columbia County, U. S. E., 1912). On a sharp ridge between the tracks of the Spokane, Portland & Seattle Railway and the Columbia River. The station is marked according to note 1.[1]

*D 8* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). About midway of the western shore of Cottonwood Island and 30 meters inshore from the high-water line. The station is marked according to note 1.[1] The following distances are given: To Cottonwood Island upper range rear light westerly 38.31 meters; to a nail in a blaze in a large cottonwood north-northwesterly 12.34 meters; to a nail in a blaze in a crooked cottonwood northerly 20.79 meters; to a nail in a blaze in a cottonwood easterly 17.07 meters.

*D 7* (*U. S. E.*) (Columbia County, U. S. E., 1912). On a rocky ledge about one-fourth mile above Thayer's dock and about 8 feet above low water. The station is marked by a concrete monument with the station name and the letters "U. S. E." on its top surface.

*D 6* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Approximately 90 meters north of the southerly end of Cottonwood Island and 18 meters inside of the high-water line. The station is marked according to note 1.[1] The following distances are given: To a forked cottonwood tree with a nail in an irregular blaze north-northeasterly 10.05 meters; to a high cottonwood stump with one limb easterly 13.87 meters.

*D 5* (*U. S. E.*) (Columbia County, U. S. E., 1912). Between the tracks of the Spokane, Portland & Seattle Railway and the top of the bank of the Columbia River, 6.1 meters from the east rail, 1.52 meters from the top of the riprapped bank of the river, and 38 meters north of the north end of the railroad trestle. The station is marked according to note 1,[1] and is the same as station Twenty of the previous triangulation by the Corps of Engineers, United States Army.

*D 4* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Up river from logging dock and old fish trap and 4.3 meters outside the high-water line. The station is marked according to note 1.[1] The following distances are given: To a blazed willow northeasterly 25.15 meters; to a blazed willow easterly 26.82 meters.

*D 3* (*U. S. E.*) (Columbia County, U. S. E., 1912). At the edge of a bluff above Beaver Lumber Co. The station is marked according to note 1.[1] The distance to the smaller of two rocks off shore east-northeasterly in the direction of *D 4* (*U. S. E.*) is 33.5 meters.

*D 1* (*U. S. E.*) (Columbia County, U. S. E., 1912). Near cable landing sign, on a bench of rocks 15 feet above low water. The station is marked according to note 1.[1]

*D 2* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). Down river 25 meters from Le Roy's float and stranded scows. The station is marked according to note 1.[1] North-northeasterly 28.49 meters is a willow tree 16 inches in diameter with a blaze and notch on it, and south-southeasterly 29.20 meters is a cottonwood tree 24 inches in diameter with a nail in a blaze.

*Kalama* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). The station is outside the high-water mark and is marked according to note 1.[1]

*Coffin Rock* (*U. S. E.*) (Columbia County, Wash., U. S. E., 1913). On the southern end of Coffin Rock. The station is marked according to note 1.[1]

*H 27* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). On the river bank about 6 feet above low water and 60 meters inside of the high-water line. The station is marked according to note 1.[1]

*H $30_2$* (*U. S. E.*) (Columbia County, U. S. E., 1912). About one-fourth mile northwest of the Spokane, Portland & Seattle Railway station at Goble, on the fourth crib of the abandoned Northern Pacific Railway ferry slip counting

[1] See pp. 81 and 82.

from the northwest end. Midway, north and south, and 1.8 meters from the western end of the crib. The station is marked according to note 1.[1]

*Mill* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912; 1913). About 1 mile down the river from Kalama, on the outer edge of the wharf of the Mountain Timber Co., west-northwest from the western end of the sawmill, and at a break in the wharves connected by a truss bridge. The station is marked by a twentypenny nail surrounded by a triangle of sixpenny nails. The following distances are given: To the river edge of the wharf 0.55 meter, to the shoulder in the wharf 0.61 meter, and to the electric pole southeasterly 1.83 meters.

*H 28* (*U. S. E.*) (Columbia County, U. S. E., 1912). On a rocky knoll at Reuben, west of the tracks of the Spokane, Portland & Seattle Railway, and north of the north line of the old wharf. The station is marked according to note 1.[1]

*Bank* (Cowlitz County, Wash., E. B. L., 1913). About one-half mile south of Kalama Slough, 2 meters from the bank of the river, and approximately 6 feet above low water. The station is marked according to note 2.[1] The reference mark is according to note 5.[1] See note 3.[1]

*Dock* (Columbia County, E. B. L., 1913). On the northeast corner of the Beaver Lumber Co. wharf, Prescott. The station is marked by a nail with the head filed off, surrounded by a triangle of copper tacks.

*Rail* (Cowlitz County, Wash., E. B. L., 1913). About one-fourth mile southeast of Carrolls Bluff on the right of way of the Northern Pacific Railway, and between the tracks and the river. The station is marked according to note 2.[1]

*Cotton* (Cowlitz County, Wash., E. B. L., 1913). On the western side and southern end of Cottonwood Island, one-half mile west of Carrolls Bluff. The station is marked according to note 2.[1] Reference mark No. 1 is a galvanized iron pipe filled with earth and cement and set in concrete with a copper tack in its top surface, and reference mark No. 2 is according to note 7. See note 3.[1] There is a triangle on a cottonwood tree distant 45.62 meters in azimuth 234° 43′ 45″ and a similar mark on another cottonwood tree distant 50.79 meters in azimuth 290° 19′ 25″.

*Cut* (Columbia County, E. B. L., 1913). About 1 mile northwest of Prescott, on a rounded point between the tracks of the Spokane, Portland & Seattle Railway and the Columbia River. At the fourth rail northwest of the beginning of the curve in the track. The station is marked by a standard disk station mark set in a concrete pier in loose rock about 1 foot deep. The reference mark is a cross cut in stone with the longer arm pointing to the station. See note 3.[1]

*Twenty-six 2* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Twenty-four 2* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Nineteen 2* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Seventeen 2* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Thirteen 2* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Cottonwood Island 1913* (Cowlitz County, Wash., E. B. L., 1913). On the western shore of Cottonwood Island, midway its length. The station is marked according to note 2.[1] Reference mark No. 1 is a section of iron pipe filled with earth and cement and set in concrete, with a copper tack in its top surface. Reference mark No. 2 is according to note 7,[1] except there is no underground mark. See note 3.[1]

*Old* (Columbia County, E. B. L., 1913). About 1 mile southeast of Rainier, opposite the lower end of Cottonwood Island, one-fourth mile west of the Western Lumber Co.'s shingle mill, 3 meters from the bluff, and 12 feet above low water. The station is marked according to note 2.[1] The reference mark is according to note 5.[1] The post of the abandoned Doblebower front range is distant 6.5 meters in azimuth 318° 08′. See note 3.[1]

*Knight* (Columbia County, E. B. L., 1913). About one-fourth mile north of Goble station, on a high rocky knoll at the lower end of a ferry slip, between the road and the Spokane, Portland & Seattle Railway. The station is marked by a standard disk station mark set in a pier of concrete built on rock. The top of the pier is about 10 inches above the surface of the surrounding stone. Reference mark No. 1 is according to note 5,[1] and No. 2 is a cross cut in stone, the longer arm being in the direction of the station. See note 3.[1]

*Kalama* (Cowlitz County, Wash., E. B. L., 1913). About one-fourth mile south of the town of Kalama, between the Pacific highway and the Northern Pacific Railway track, 7 meters from the top of the rock cut of the railroad. The station is marked according to note 2.[1] The reference mark is the same as is described in note 5.[1] See note 3.[1]

*Slue* (Columbia County, E. B. L., 1913). On a sand flat, 50 meters from the river shore, and 200 meters north of the mouth of Deer Island Slough. See description of *H 26*$_2$ (*U. S. E.*). Reference mark No. 1 is described in note 7,[1] except there is no underground mark, and reference mark No. 2 [1] is a section of galvanized-iron pipe filled with earth and cement and set in concrete, with a copper tack in its top surface. See note 3.[1]

*H 26*$_2$ (*U. S. E.*) (Columbia County, U. S. E., 1912). The station is marked according to note 1, but in July, 1913, the station was covered with 6 inches of sand. See the description of *Slue*.

*Rock* (Cowlitz County, Wash., E. B. L., 1913). About 1½ miles south of Kalama, in the Pacific highway, about 60 meters east of the Northern Pacific Railway tracks. There is no station mark. Both reference marks are the same as described in note 7,[1] except there is no underground mark.

*Flat* (Columbia County, E. B. L., 1913). On Deer Island, approximately midway between Deer Island Point and Deer Island Slough, on a sand flat 10 meters from the river shore. The station is marked according to note 2.[1] Reference mark No. 1 is a section of galvanized-iron pipe filled with earth and cement and set in concrete with a copper tack in its upper surface, and No. 2 is the same as is described in note 7,[1] except there is no underground mark.

*H 21* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912, 1913). On a rocky knoll 15 meters south-southeast from the southeast corner of a small house. The station is marked according to note 1.[1] The reference mark is a standard

[1] See pp. 81 and 82.

disk reference mark set in a hole drilled in rock and cemented. There is a triangle on a maple tree distant 28 meters in azimuth 272° 15′.

*H 23₂ (U. S. E.)* (Cowlitz County, Wash., U. S. E., 1912; 1913). On Ahles Point, east of the railroad tracks, easterly from the shingle mill, and 6 meters from the top of the railroad cut. The station is marked according to note 4.[1] The nearest telephone pole is northerly 9.17 meters. The reference mark is described in note 5.[1] See note 3.[1]

*H 22 (U. S. E.)* (Columbia County, U. S. E., 1912, 1913). In a cleared space behind dense willows, 23.8 meters inside the high-water line. The station is marked according to note 4.[1] The reference mark is the same as is described in note 7,[1] except there is no underground mark. See note 3.[1]

*H 19 (U. S. E.)* (Cowlitz County, Wash., U. S. E., 1912, 1913). The station is 12 meters northwest from the top of the bluff river bank and 111 meters southerly from the north gable of a yellow house. The station is marked according to note 1.[1] The reference mark is the same as is described in note 5.[1] There is a blazed triangle on a pine tree distant 10.90 meters in azimuth 299° 26′.

*Hill (U. S. E.)* (Cowlitz County, Wash., 1912, 1913). On a hill back of Bybee Light, northeast of the railroad tracks. The station is marked according to note 1.[1] The reference mark is the same as is described in note 5.[1] See note 3.[1]

*H 20 (U. S. E.)* (Columbia County, U. S. E., 1912, 1913). On a small knoll on Deer Island between two ponds, one-half mile west from the river bank, and 10.6 meters from the shore of the lake toward the river. The station is marked according to note 4.[1] The reference mark is the same as is described in note 5.[1] See note 3.[1]

*Connell 2 (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). On the south side of a lane and 15 meters inside the high-water line, south-southeast from Mr. Connell's house, and 10 feet above low water. The station is marked according to note 4.[1] The reference mark is the same as is described in note 5.[1] There is a cottonwood stump westerly 9.75 meters. See note 3.[1]

*Martin 3 (U. S. E.)* (Cowlitz County, Wash., U. S. E., 1912; 1913). On the western shore of Martin's Island, 10 meters from the bank inside the high-water line. The station is marked according to note 1,[1] with the exception that the mark is 1½ feet below the surface. The reference mark is the same as is described in note 5.[1] There are triangles blazed on three cottonwood trees, one north-northeast 6.43 meters, one east 3.84 meters, and one south-southeast 10.88 meters. See note 3.[1]

*H 16₂ (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). Between the piles on Deer Island dike, about 30 meters outside the high-water mark. The station is marked according to note 1.[1]

*H 13₃ (U. S. E.)* (Cowlitz County, Wash., U. S. E., 1912; 1913). About 150 meters north from Burkes Slough and 10 meters inside the high-water line. The station is marked according to note 4.[1] The reference mark is according to note 7,[1] except there is no surface mark. There is a triangular blaze on a cottonwood tree distant 4.83 meters in azimuth 236° 31′, a similar marked cottonwood tree is distant 3.95 meters in azimuth 63° 13′, and a third tree marked in the same manner is southeast 9.81 meters. The Engineer's station *Keg*, cross boards on a tree, is south 25.1 meters. See note 3.[1]

*H 11 (U. S. E.)* (Cowlitz County, Wash., U. S. E., 1912; 1913).—The station is outside the high-water line and is marked according to note 1.[1] The reference mark is the same as is described in note 5.[1] See note 3.[1]

*H 14₂ (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). On a bank 12 meters inshore from the high-water line, 0.76 meter northeast of a wire fence, and 8 feet above low water. The station is marked according to note 4.[1] The reference mark is the same as is described in note 5[1] and is near the barbed-wire fence. See note 3.[1]

*H 9₂ (U. S. E.)* (Cowlitz County, Wash., U. S. E., 1912; 1913). About 25 meters inshore from the high-water mark, 50.20 meters north of the northwest corner of Caple's barn, 27.9 meters south of the southeast corner of a small house. The station is marked according to note 1,[1] with the exception that the top of the monument is 18 inches below the surface. The reference mark is the same as is described in note 7, except there is no underground mark,[1] and is near an old oak tree back of the unpainted house. See note 3.[1]

*Dock (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). Near the southeastern corner of the Peninsula Lumber Co.'s wharf. The station is marked by a sixtypenny nail at the intersection of two lines of eightpenny nails and is 0.84 meter from the offshore edge and 0.82 meter from the south edge of the wharf.

*H 7₂ (U. S. E.)* (Cowlitz County, Wash., 1912; 1913). About one-half mile up the river from Caples Landing and 23 meters inside the high-water line. The station is marked according to note 4,[1] except that the monument is 18 inches below the surface of the ground. The reference mark is the same as is described in note 5.[1] There is a blazed willow tree with a nail driven in it northerly 24.38 meters and a similarly marked willow tree easterly 24.26 meters. See note 3.[1]

*H 8₂ (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). On a stone-filled wharf at Columbia City, 27.28 meters from the eastern end of the storehouse, 10.67 meters west from the outside face of the wharf, and 5.49 meters north of the southern face of the crib work of the wharf. The station is marked by a 1½-inch iron pipe driven into the loose stones with cement around it. The cement is marked with the name of the station. The reference mark is the same as is described in note 5.[1] See note 3.[1]

*H 5₂ (U. S. E.)* (Cowlitz County, Wash., U. S. E., 1912; 1913). The station is 18 meters from the river bank, 43.6 meters south of a lane, and is marked according to note 4.[1] The reference mark is described in note 7, except there is no underground mark.[1] There is a blazed cottonwood tree southeast 16.52 meters. See note 3.[1]

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[1] See pp. 81 and 82.

*H 6₂ (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). On a rocky point about 1 mile below St. Helens, 200 meters below a rock crusher, and about 25 feet above low water. The station is marked according to note 4.[1] The reference mark is the same as is described in note 7,[1] except no underground mark. See note 3.[1]

*H 3 (U. S. E.)* (Cowlitz County, Wash., U. S. E., 1912; 1913). In the riprap on the offshore end of St. Helens Jetty. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. See note 3.[1]

*H 4 (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). The station is on the northern end of Sauvies Island, on recently made ground, and is marked according to note 1.[1] The reference mark is described in note 5.[1] See note 3.[1]

*H 1₂ (U. S. E.)* (Cowlitz County, Wash., U. S. E., 1912; 1913). The station is 45 meters inshore from the high-water line and is marked according to note 4.[1] The reference mark is the same as is described in note 7,[1] except no underground mark. There is a triangular blaze on a box-elder tree distant 81.69 meters in azimuth 207° 13′.

*Warrior (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). On Warrior Point, 1.1 meters east of the easternmost part of the house. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] The following distances are given: To the northeast corner of the house 4.81 meters, to the first angle of the bay window 2.00 meters, to the second angle of the bay window and the nearest corner of the house 1.34 meters, to a locust tree northeast 3.60 meters. See note 3.[1]

*Lake (U. S. E.)* (Clarke County, Wash., U. S. E., 1912; 1913). At the junction of the Lewis and Columbia Rivers 10.5 meters inside the Columbia River high-water line. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. There is a triangular blaze on a willow tree with a nail in the center distant 8.66 meters in azimuth 308° 33′, and a similar blaze on another willow tree southerly 24.00 meters. See note 3.[1]

*Eleven (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). The station is marked according to note 4,[1] and is 9 meters from the shore line. The reference mark is described in note 7,[1] except no underground mark. The following distances and directions are given: To blaze on cottonwood tree distant 22.65 meters in azimuth 12° 18′, to a triangular blaze on a cottonwood tree distant 17.70 meters in azimuth 139° 39′, and to an engineer's blaze northeast by north 13.29 meters. See note 3.[1]

*Ten (U. S. E.)* (Clarke County, Wash., U. S. E., 1912; 1913). The station is 9 meters from the bank of the river and is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. The following distances to blazes on willow trees are given: Northwest, 4.33 meters; northeast, 8.78 meters; nail in blaze east-northeast, 15.00 meters; nail in blaze southeast, 8.80 meters; nail in blaze south-southwest, 8.72 meters. See note 3.[1]

*Nine (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). Southeasterly from the southeast corner of the H. and R. Duck Club and 6 meters from the river bank. The station is marked according to note 1,[1] except that the top of the pipe is about 2 feet below the surface of the ground. The reference mark is described in note 7,[1] except no underground mark. There is a large stump east by south 4.27 meters and a nail in a fence post westerly 17.46 meters. See note 3.[1]

*Eight (U. S. E.)* (Clarke County, Wash., U. S. E., 1912). The station is 60 meters south of a barbed-wire fence and is marked according to note 1.[1] There is an engineer's blaze north-northeasterly 20.1 meters, one easterly 13.81 meters, and a blaze on a cottonwood tree southwesterly 7.92 meters.

*Seven 2 (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). On the river bank about 150 meters south of the Lionite Powder Works wharf and 20 feet above low water. The station is marked according to note 4,[1] except the mark is 18 inches below the surface. The reference mark is described in note 7,[1] except there is no underground mark. There is a triangle blazed on a tree distant 18.55 meters in azimuth 63° 45′, and a similar mark on another tree distant 22.10 meters in azimuth 116° 38′. See note 3.[1]

*Six (U. S. E.)* (Clarke County, Wash., U. S. E., 1912; 1913). On the river bank 8 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. The following distances and azimuths are given: Triangular blaze on cottonwood tree distant 16.50 meters in azimuth 274° 09′; triangular blaze on cottonwood tree distant 7.65 meters in azimuth 20° 15′. The following distances and directions are given: Blaze on tree north-northeast 18.1 meters; triangular blaze on cottonwood tree east by north 17.37 meters; tree blazed on both sides west by north 8.47 meters. See note 3.[1]

*Five 2 (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). About 300 meters south from Henrici's old house, and northeast from the yellow house on the mound. The station is marked according to note 4.[1] Reference marks No. 1 and No. 2 are described in note 7,[1] except no underground mark. There is a hickory tree distant 41.05 meters in azimuth 258° 17′. The northeast corner of the picket fence is south-southwesterly 41.7 meters and the northwest corner is southwest by south 55.41 meters. See note 3.[1]

*Two (U. S. E.)* (Clarke County, Wash., U. S. E., 1912).—Lost.

*One 2 (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). In an open field 16 meters from the top of the river bank, and 10 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. The northwest corner of a large barn is distant 22.55 meters. See note 3.[1]

*D (U. S. E.)* (Columbia County, U. S. E., 1912; 1913). Seven meters from the top of the bank and 10 feet above the low water. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a nail in an old post southerly 14.2 meters and a nail in a blaze on a crooked willow tree northwesterly 24.1 meters. See note 3.[1]

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[1] See pp. 81 and 82.

*A* (*U. S. E.*) (Clarke County, Wash., U. S E., 1912; 1913). Ten feet above low water and 10.6 meters from the top of the river bank. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except no underground mark. There is a triangular blaze with a nail in the center on a willow tree distant 30.7 meters in azimuth 214°54′, and a similar mark on another willow tree distant 28.1 meters in azimuth 300° 32′. See note 3.[1]

*E* (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). The station is an open space 15 meters from the high-water line and marked as in note 4.[1] The reference mark is described in note 7,[1] except no underground mark. There is a nail in a blazed willow tree distant 31.2 meters and a notched willow tree with a nail in a blaze west-southwest 28.8 meters. See note 3.[1]

*B* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). About 10 feet above low water, 12 meters from the top of the river bank, and 107 meters south-southeast from the southeast corner of an old building. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a blaze on a bushy tree northerly 25.08 meters, a blazed stump distant 6.72 meters in azimuth 247° 35′, and a blazed stump distant 19.80 meters in azimuth 304° 14′. See note 3.[1]

*Dead Willow* (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). Abreast of new landing, 18 meters from the inshore end of the wharf, north of a rose thicket. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a large cottonwood tree distant 12.9 meters. See note 3.[1]

*C* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). About 50 meters from the river bank among large cottonwood and willow trees. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. There is a large cottonwood tree distant 19.12 meters in azimuth 83° 17′, a small blazed cottonwood tree distant 1.10 meters in azimuth 172° 09′, and a blazed cottonwood distant 6.42 meters in azimuth 305° 04′. See note 3.[1]

*Grassy* (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). In an open grass-covered space 10 meters from the high-water line and 137 meters southerly from the fence of a cultivated field. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. There is a nail in a blaze in a cottonwood tree southwesterly 18.1 meters and a similar mark on a cottonwood tree westerly 16.9 meters. See note 3.[1]

*Fales* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). Nine meters from the top of the river bank and 0.9 meter north of a wire fence. The station is marked according to note 4,[1] with the exception that the mark is covered with 6 inches of sediment. The reference mark is on the same side of the fence as the station mark and is described in note 7,[1] except there is no underground mark. See note 3.[1]

*Ridge* (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). The station is in an open space about 70 meters from the river bank and is marked according to note 4.[1] The reference mark is on the inshore edge of a tongue of brushy woods and is described as in note 7,[1] except there is no underground mark. There is a blaze on a cottonwood tree southwesterly 13.9 meters and a similar mark on a cottonwood tree, distant 5.24 meters in azimuth 66° 53′. See note 3.[1]

*W 11* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912). The station is 12 meters from the top of the river bank, 27 meters south of a slough, and is marked according to note 4.[1] There are three blazed trees in the vicinity, northeast, east, and east by south from the station.

*W 16* (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). About 100 meters south of Willow Bar Point, about 30 meters north of a wire fence and at the top of the partially undermined river bank. The station is marked according to note 4.[1] Reference marks No. 1 and No. 2 are described in note 7,[1] except there is no underground mark. There is a triangle blazed on a cottonwood tree, distant 20.82 meters in azimuth 113° 15′ 21.″ See note 3.[1]

*W 14* (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). On the west edge of a road about 10 meters from the river bank, 90 meters south of the north face of Bonser's house and about 90 meters from Petes Island. The station is marked according to note 4.[1] The reference mark is on the east side of a fence and is described in note 7[1], except there is no underground mark. See note 3.[1]

*W 9* (*U. S. E.*) (Clarke County, Wash., 1912; 1913). In the woods 10 meters from the top of the river bank marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. There is a blazed tree northerly 2.35 meters, one easterly 4.27 meters, and one southwesterly 2.38 meters. See note 3.[1]

*W $12_2$* (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). In an open field about 305 meters west of the river bank and 150 meters north of a wire fence. The station is marked according to note 1.[1] There is a barn northeastly about 244 meters, and the north chimney of a brick house is southeasterly about 245 meters.

*W $7_2$* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). At the top of the river bank, entirely undermined, and will probably be destroyed during the next high water. The station is marked according to note 1.[1] Reference mark No. 1 is described in note 7,[1] except there is no underground mark, and No. 2 is a 1½-inch iron pipe set in and filled with cement. There is a 2-inch iron pipe set in the ground, distant 18.32 meters, a blaze on a willow tree north by east 6.4 meters, and 2 notches on a willow tree easterly 6.52 meters. See note 3.[1]

*W $10_2$* (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). The station is 1 meter west of an old fence and 115 meters south from the south line of a barn, north 72 meters from the wire fence running east and west, and marked according to note 4.[1] The reference mark is described in note 5.[1] See note 3.[1]

*W $5_3$* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). The station is 22 meters from the river bank and is marked according to note 1,[1] except the station mark is 6 inches below the surface of the ground. The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

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[1] See pp. 81 and 82.

*Range 2* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). The station is on the river bank and is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. There is a blaze on an old cottonwood tree, distant 32.0 meters in azimuth 286° 14′. See note 3.[1]

*W 8*$_2$ (*U. S. E.*) (Columbia County, U. S. E., 1912). In a small field westerly from Reeder's house and 2.4 meters west of a north and south fence. The station is marked according to note 1,[1] except the top of the pipe is 2 feet below the surface of the ground. There is a nail in the center of a triangular blaze on a fence post north-northwest 27.4 meters and a similar mark north-northeast 18.8 meters.

*W 6* (*U. S. E.*) (Columbia County, U. S. E., 1912; 1913). The station is on a point south of Reeder's landing on top of a partly undermined bank and is marked according to note 1.[1] The reference mark is described in note 7,[1] except there is no underground mark. The following directions and distances are given: Pipe in the ground 15.89 meters; blazed tree south-southwest 42.67 meters; blazed tree westerly 27.73 meters; blazed tree with one notch southwest 10.88 meters; blazed tree south-southwest 12.74 meters. See note 3.[1]

*W 3* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). On the shore of a slough behind a new island at Willow Bar, 2.4 meters west of a barnyard fence and 9.3 meters south from the south side of a farm road. The station is marked according to note 1,[1] except that the mark is 2 feet below the ground. The reference mark is described in note 7,[1] except there is no underground mark, and is at the southwest corner of a barnyard outside the fence and in the farm road. The southwest corner of the barn is south-southwest 39.0 meters. See note 3.[1]

*W 4*$_2$ (*U. S. E.*) (Multnomah County, U. S. E., 1912). The station is 90 meters north of Reeders Point and is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a blazed cottonwood tree north by east 14.0 meters, a cottonwood tree with a similar mark northeast 6.55 meters, and a small tree east-southeast 5.64 meters. See note 3.[1]

*W 1* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912). On a slough behind a new island near Willow Bar, in a cultivated field 100 meters north of a big barn. The station is marked according to note 1,[1] except the mark is 2 feet below the ground. There is a triangle, with a nail, on a fence N. 54° E. magnetic distant 23.77 meters and a nail on a fence post S. 75 E., distant 21.64 meters. There is a fence easterly 20.5 meters.

*W 2*$_2$ (*U. S. E.*) (Multnomah County, U. S. E., 1912; 1913). About 3 meters from the mud bank of the river, 6 feet above low water, and one-half meter north of a wooden fence. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark, and is near the same fence as the station. The northeast corner of James McIntire's house is southwesterly 93.5 meters. There is a blazed tree west by south 40 meters and one west by north 35.5 meters. See note 3.[1]

*Jewetts* (*U. S. E.*) (Multnomah County, U. S. E., 1912). About 150 meters west of the river bank and 22 meters east of a fence at Jewett's house. The station is marked according to note 1.[1] There is a blazed tree with three notches southwesterly 28.9 meters, a blazed tree west by north 21.9 meters, and a blazed tree with one notch northwesterly 30.2 meters.

*Hewletts 2* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912). North of Hewletts Point, 10.5 meters east of the high-water line, 1.4 meters south of a fence, 8.8 meters northeast of the northeast corner of a shack, and west-southwesterly 44.5 meters from a blazed cottonwood tree. The station is marked according to note 4.[1]

*Morgans 2* (*U. S. E.*) (Multnomah County, U. S. E., 1912; 1913). At Morgans Landing, 10 meters west of the top of the riprapped river bank, 19.8 meters south of Morgan's barn, 27.85 meters south-southeast of the southwest corner of the barn, 1.5 meters south of the barnyard fence, and 4.3 meters east of a north and south fence. The station is marked according to note 4,[1] except that the mark is 6 inches below the surface. The reference mark is described in note 5.[1] See note 3.[1]

*One 3* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). About 33 meter from the top of the river bank, 15 feet above low water, 0.6 meter south of an east and west fence and about 73 meters north of another one. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] See note 3.[1]

*Two 2* (*U. S. E.*) (Multnomah County, U. S. E., 1912; 1913.) The station is in an open, uncultivated field and is marked according to note 4.[1] The reference mark is described in note 5.[1] See note 3.[1]

*Middle* (Clarke County, Wash., E. B. L., 1913). About 30 meters from the east bank of the Columbia River, 150 meters northwest of Blurock Landing, and 15 feet above low water. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] See note 3.[1]

*Four 2* (*U. S. E.*) (Multnomah County, U. S. E., 1912; 1913). On the west bank of the entrance of Willamette River, 8 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] There is a blazed tree distant 16.4 meters in azimuth 70° 48′, a triangular blaze on a tree distant 17.0 meters in azimuth 132° 37′, and a blazed tree southerly 16.2 meters. See note 3.[1]

*Mud* (Multnomah County, E. B. L., 1913). On Nigger Tom Island, 5 meters from the east shore of the Willamette River. The station is marked according to note 2.[1] Reference marks No. 1 and No. 2 are described in note 5.[1] See note 3.[1]

*School* (Multnomah County, E. B. L., 1913). About 200 meters from the west shore of the Willamette River, opposite Pearcy Slough. The station is marked according to note 2.[1] The reference mark is described in note 5. The station is 45.8 meters south of the north fence corner, 30.3 meters north of the south corner, and 2 meters from the fence toward the river. See note 3.[1]

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[1] See pp. 81 and 82.

*Three 3* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912; 1913). About one-half mile south of Blurock Landing, 34.7 meters east of a fence parallel with the river and 0.4 meter south of a fence at right angles to the river. The station is marked according to note 4.[1] The reference mark is 1.2 meters south of a fence and is described in note 5.[1] See note 3.[1]

*End* (Multnomah County, E. B. L., 1913). About 30 meters from the top of the west bank of the Columbia River, 200 meters north of the Willamette River entrance, and 15 feet above low water. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] There is a triangular blaze on a dead tree distant 14.1 meters in azimuth 27° 38′. See note 3.[1]

*Pen* (Multnomah County, E. B. L., 1913). On the east bank of the Willamette River, opposite the lower end of Post Office Bar, 200 meters from the northwest shore of Ramsey Lake, and 125 meters north of the line of woods. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] See note 3.[1]

*Linton* (Multnomah County, E. B. L., 1913). About one-fourth mile west of Linton and about three-fourths of the way up the hillside. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] There are two blazed fir trees, one distant 6.5 meters in azimuth 10° 11′, and the other distant 5.3 meters in azimuth 304° 2′. See note 3.[1]

*Sand* (Multnomah County, E. B. L., 1913). On a sand spit on the east side of the Willamette River, 30 meters from the shore. The station is marked according to note 2.[1] The reference mark is described in note 5.[1] See note 3.[1]

*Howell* (Columbia County, C. R., 1881; 1913). On the west shore of the Willamette River, 113 meters from the top of the bank, 2.3 meters from a fence. The station is marked by a bottle 3 feet below the surface, and directly over this, 1 foot below the surface, is a drill hole in a rock. At the surface there is a standard disk station mark set in concrete. Reference marks Nos. 1 and 2 are described in note 5.[1] See note 3.[1]

*Gatton* (Multnomah County, C. R., 1883; 1913). About 2 miles north of St. Johns, near the end of the high ground between the Columbia and Willamette Rivers, 8 meters south of the top of the bluff. The station is marked by a bottle with a copper tack in the cork buried 3 feet deep; 14 inches below the surface there are 3 bottles with the necks pointing to the station, and at the surface is a standard disk station mark set in concrete. Reference mark No. 1 is described in note 5,[1] and No. 2 is a drill hole filled with lead in a large basaltic rock. See note 3.[1]

*Springville* (Multnomah County, C. R., 1883). On the west bank of the Willamette about 1 mile below St. Johns, about 200 feet above the river level on a sloping bench of land immediately back of an old burnt wharf called Springville. The station is marked according to note 8.[1] There are three cedar stakes around the station as follows: South 1.87 meters, east 1.86 meters, and west 1.83 meters.

*Watts* (Multnomah County, C. R., 1883). On the west side of the Willamette River, on the right of way of the Northern Pacific Railway and 13.4 meters west of the tracks, and 1.64 meters inside the fence. The station is marked according to note 8.[1] There are three cedar stakes around the station as follows: North 1.77 meters, west 1.78 meters, and east 1.77 meters.

*Kaiser* (Multnomah County, C. R., 1883). On the hillside west of the county road and the railroad. The station is marked according to note 8.[1] There are three cedar stakes around the station, as follows: North 1.86 meters, south 1.89 meters, and east 1.71 meters.

*St. John* (Multnomah County, C. R., 1883). On low bottom land close to the shore, 17 meters northeast of a fence running across from the hills, 5.5 meters south of a group of ash tree stumps. The station is marked according to note 8.[1] There are three cedar stakes around the station bearing north, south, and east, respectively, and each distant 1.83 meters.

*Caples* (Multnomah County, C. R., 1883; 1913). About one-half mile from the business center of St. Johns, 5 meters from the edge of a sand bluff abreast of St. Johns dry dock, and 100 feet above low water. The station is marked by a tack in the cork of a bottle 3 feet below the surface; buried 1 foot are 3 bottles with their necks pointing to the station, and at the surface there is a drill hole filled with lead in a large rock. The reference mark is described in note 5.[1] See note 3.[1]

*Hazel* (Multnomah County, C. R., 1883). About 30 meters southwest of the Northern Pacific Railway tracks and about 90 meters above the 7-mile post from Portland. The station is marked according to note 8.[1] There are three cedar stakes around the station bearing north 1.83 meters, west 1.80 meters, and east 1.86 meters, respectively.

*Waud* (Multnomah County, C. R., 1882; 1883). On the east bank of the Willamette River about 1 mile above St. Johns, 9 meters from the edge of the bluff, and about 120 feet above the ordinary stage of the river. The station is marked according to note 8.[1] There are three cedar stakes with copper tacks in the top around the station, as follows: West 1.83 meters, east 1.83 meters, and south 1.87 meters.

*Scott* (Multnomah County, C. R., 1882; 1913). About 2 miles south of St. Johns, 1½ miles west of the north end of Swan Island, in the grounds of Cliff Inn. The station is marked by a tack in the cork of a bottle 3 feet below the surface, 14 inches below the surface by 3 bottles with their necks pointing to the station, and at the surface by a drill hole filled with lead in a rock. The reference mark is described in note 5.[1] The rear chimney of Cliff Inn is in azimuth 232° 41′, and the round barn is in azimuth 307° 01′. See note 3.

*Gravel Bluff* (Multnomah County, C. R., 1882; 1883).—Lost.

*Potter* (Multnomah County, C. R., 1883). On the south side of the Willamette River about 4¼ miles below Port land, 90 meters back of the county road, and 3 meters west of a rail fence inclosing a garden. The station is marked according to note 8.[1] The surface mark was reported lost in 1913.

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[1] See pp. 81 and 82.

*Montgomery* (Multnomah County, C. R., 1882; 1883).—Lost.

*King* (Multnomah County, C. R., 1883). On the nose of a high ridge back of Portland in continuation of the blocks between F and G Streets, 10 meters back of the fence between the Johnson and King properties, and 13 meters from the fence corner. The station is marked according to note 8,[1] except there is no surface mark.

*Tibbetts* (Multnomah County, C. R., 1882; 1883). On the east side of the Willamette River nearly opposite the north end of Ross Island, nearly at the top of a bluff in a locality entirely cleared of trees. The station is marked according to note 8.[1] There are three cedar stakes around the station as follows: North 1.56 meters, south 1.89 meters, and west 1.83 meters.

*Hoffmans Hill* (Multnomah County, C. R., 1883). The station is marked according to note 8.[1] The surface mark was reported lost in 1913.

*Forty* (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913). On the south bank of the Willamette River, in the city of Portland, opposite the western end of Swan Island and about 8 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 5.[1] See note 3.[1]

*R* (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913). About 270 meters eastward of the western end of Swan Island and outside the high-water line. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

*Thirty-nine 2* (*U. S. E.*) (Multnomah County, U. S. E., 1912). On a hill in St. Johns, about 100 feet above low water and about 100 meters from the Standard Oil Co.'s dock. The station is marked according to note 1.[1]

*Thirty-eight 2* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is in an open field and is marked according to note 17.[1]

*Dike* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is on a high bluff behind a sawmill and is marked according to note 17.[1]

*Thirty-seven* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Thirty-eight* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Forty-one* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Forty-two* (*U. S. E.*) (Multnomah County, U. S. E., 1892). The station is near a slough and is marked by a pipe.

*Forty-three* (*U. S. E.*) (Multnomah County, U. S. E., 1906). The station is marked by a pipe.

*Forty-four* (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913). On the south bank of the Willamette River, in the city of Portland, 8 feet above low water. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

*F* (*U. S. E.*) (Multnomah County, U. S. E., 1909). The station is on Swan Island and is marked according to note 1.[1]

*T* (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913). On the edge of a bluff on the southwest side of Willamette Boulevard, in the city of Portland, and opposite the storehouse at 465 Lombard Street. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

*P* (*U. S. E.*) (Multnomah County, U. S. E., 1909; 1913). Nearly on the extension of the north curb line of Willamette Avenue, in front of No. 249 Willamette Boulevard, Portland. The station is marked according to note 4.[1] The reference mark is described in note 7,[1] except there is no underground mark. See note 3.[1]

*Thirty-six* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Forty-five* (*U. S. E.*) (Multnomah County, U. S. E., 1906). The station is marked by a pipe, near P. F. Mills. (Harbor-line monument.)

*Forty-five 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Forty-six 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Forty-seven* (*U. S. E.*) (Multnomah County, U. S. E., 1906). The station is marked by a tack near the lower end of old ballast dock.

*Forty-eight 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Forty-nine 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty-one 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty-two 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty-three 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty-four 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty-five 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty-six 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty-seven 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty-eight 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 16.[1]

*Fifty-nine 2* (*U. S. E.*) (Multnomah County, U. S. E., 1906). See note 17.[1]

*Thirty-five* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is at St. Johns and is marked by a pipe. It is a harbor-line monument.

*Thirty-four* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is near a slough and is marked according to note 17.[1]

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[1] See pp. 81 and 82.

*Thirty-three* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17,[1] and is a harbor-line monument.

*Thirty-two* (*U. S. E.*) (Multnomah County, U. S. E., 1899). This station is marked by a pipe and is a harbor-line monument.

*Thirty* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Thirty-one* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Twenty-nine* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Twenty-eight* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Twenty-six* (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

*Twenty-seven* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Twenty-five* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Twenty-four* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Twenty-three* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Twenty-two* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is on a revetment.

*Twenty-one* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Twenty* (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

*Nineteen* (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

*Eighteen* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Seventeen* (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

*Sixteen* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Fifteen* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Fourteen* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Thirteen* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Twelve* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Eleven* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Ten* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

*Nine* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Eight* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Six* (*U. S. E.*) (Multnomah County, U. S. E., 1899). Lost.

*Seven* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked according to note 17.[1]

*Four* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe in a revetment.

*Five* (*U. S. E.*) (Multnomah County, U. S. E., 1899). The station is marked by a pipe.

SUPPLEMENTARY POINTS.

*Jetty A* (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers, and this station is at the Engineers' mark 33+00. There is no other station mark.

*Jetty B* (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 146+85. There is no other station mark.

*Jetty C* (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 179+36. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

*Jetty D* (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 186+56. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

*Jetty E* (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 246+10. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

*Jetty F* (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The jetty has been measured and marked by the United States Engineers and this station is at their mark 255+28. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

*West end of jetty* (Clatsop County, J. S. H., 1909). On the jetty at the mouth of the Columbia River. The station is marked on the beam midway between the two tracks by three nails driven in to form a triangle.

*Gun* (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is on a battery at Fort Stevens.

*Smith* (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument.

*Old Point Ellice* (*U. S. E.*) (Pacific County, Wash., U. S. E., 1905). Lost.

*Seal* (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

*Elliott* (*U. S. E.*) (Wahkiakum County, Wash., U. S. E., 1905; 1913). Lost.

*Marsh* (*U. S. E.*) (Clatsop County, U. S. E., 1905; 1913). On Marshy Islands, below Woody Island. The station is marked according to note 1.[1] There are no reference marks.

[1] See pp. 81 and 82.

*Old Jim Crow* (*U. S. E.*) (Wahkiakum County, Wash., U. S. E., 1905). Lost.

*Astoria* (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe in the center.

*Dot* (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

*Alderbrook* (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

*Old Tongue* (*U. S. E.*) (Clatsop County, U. S. E., 1905; 1913). This station was recovered in 1913, but the marking is not known.

*Bear* (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument.

*Tongue Point Neck* (Clatsop County, R. D. C., 1851). On the summit of the ridge of the narrow neck of land connecting Tongue Point with the mainland, about 40 feet above the tide. The station is marked according to note 8,[1] except there is no surface mark.

*Shortis Chimney* (Clatsop County, R. D. C., 1852; 1885). The center chimney of a dilapidated house standing quite close to the shore between Upper Astoria and Tongue Point.

*Yellow Bluff* (Wahkiakum County, Wash., R. D. C., 1851). On the east side of Grays Bay on a bank 7 feet above the high-water mark. It is at the foot of a remarkable yellow bluff on ground formed by a slide from the hill above. The station is marked according to note 8.[1]

*John Day Point* (Clatsop County, R. D. C., 1851). About 2 miles S. 42° E. magnetic from Tongue Point, 25 feet above the river, on a rocky point forming the eastern side of the mouth of John Day River. The station is marked according to note 8,[1] except there is no surface mark.

*Settlers Point* (Clatsop County, R. D. C., 1852). On a small clearing, 18 meters from the high-water mark, and 80 feet above the tide. The station is marked according to note 8 [1], except there is no surface mark.

*Grays Bay* (Wahkiakum County, Wash., R. D. C., 1852). Lost.

*Grays River* (Wahkiakum County, Wash., R. D. C., 1852). In the center of a small clearing, 3 feet above the tide, on the east side of the mouth of the Grays River. The station is marked according to note 8,[1] except there is no surface mark.

*Alamicut Point* (Wahkiakum County, Wash., R. D. C., 1852). On the extremity of Alamicut Point. The station is marked according to note 8,[1] except there is no surface mark.

*Welch* (Clatsop County, C. R., 1871). On a sand beach on the north side of an island on the south side of the main channel, about 520 meters from Welch's fish house. The station is marked according to note 9,[1] except the surface mark was omitted.

*Puget* (Wahkiakum County, Wash., C. R., 1871). On the extreme northwest point of Puget Island, 18 meters from the shore on each side. The station is marked according to note 8,[1] except there is no surface mark.

*Point Basalt* (Wahkiakum County, Wash., C. R., 1871). On the edge of the basaltic cliffs, 540 meters above the wharf, 60 meters from the shore, and 200 feet above the river. The station is marked according to note 9,[1] except the surface mark is omitted and the three stakes are distant 1.83 meters.

*Tenasillihee* (Clatsop County, C. R., 1871). About 10 meters from the shore on the northeast point of Tenasillihee Island. The station is marked according to note 9,[1] except that the surface mark is omitted, and the distance to the three stakes is 1.83 meters.

*Snag* (*U. S. E.*) (Clatsop County, U. S. E., 1905). The station is marked by a concrete monument with a 2-inch pipe for the center.

*Skamokowa* (*U. S. E.*) (Wahkiakum County, Wash., 1905). The station is marked by a concrete monument.

*Pole* (Wahkiakum County, Wash., E. B. L., 1913). About 1 mile west of Cathlamet on the lower or northern end of Puget Island, below high-water. The station is marked by a 1½-inch galvanized-iron pipe, 5 feet long and projecting 2 feet above the surface of the ground. The pipe is filled with cement and a standard disk station mark is set in the top.

*Bugby Hole Eccentric* (Clatsop County, E. B. L., 1913). About 200 meters north of Bugby Hole Creek and 5 rails north of the end of the Spokane, Portland & Seattle Railway trestle. The station is marked according to note 2,[1] with the addition that there is a 1½-inch galvanized-iron pipe extending from immediately under the standard disk station mark down nearly to the underground mark. The reference mark is the same as is described in note 5.[1] See note 3.[1]

*Burroughs* (Wahkiakum County, Wash., C. R., 1872). About 2½ miles above the wharf at Cathlamet, 10 meters from the edge of the bank, 154 feet above the river level, and 75 meters southeast of a small log cabin. The station is marked according to note 9,[1] except the surface mark and the stakes are omitted.

*Sandy Point* (Wahkiakum County, Wash., C. R., 1872). On the extreme northwest point of the second island above Cathlamet. The station is marked according to note 9,[1] except the surface mark and the stakes are omitted.

*Mouth* (Clatsop County, C. R., 1872). On a point of the island formed by the Columbia River and Westport Slough, and one-half mile below Westport Wharf. The station is marked according to note 8.[1]

*Gruber* (Columbia County, C. R., 1873). About 80 meters from the bank of Westport Slough at the point where it makes a rectangular bend, on a bench of land 152 feet above tidewater. The station is marked according to note 8,[1] except there is no surface mark. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

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[1] See pp. 81 and 82.

*Skunk Cabbage Ridge* (Columbia County, C. R., 1873). About 4½ miles above Westport on the nose of a high ridge of land overlooking Marshfield, and 300 meters west of a small stream in a deep ravine. The station is marked according to note 8,[1] except the surface mark is a portion of the center pole of the old signal.

*Holland* (Columbia County, C. R., 1873). About 2 miles below Oak Point, 200 meters west of Mr. Holland's house, and about 12 meters from the shore. The station is marked according to note 8,[1] except the surface mark is a section of the original center pole of the signal. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

*Wallaces Island* (Columbia County, C. R., 1873). On the sandy shore at the head of Wallaces Island. The station is marked according to note 8,[1] except the surface mark is omitted. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

*Eagle Cliff* (Cowlitz County, Wash., C. R., 1873). About 1 mile east of George Hume's fishery, 1½ miles below the wharf at Oak Point, and nearly opposite Holland's fish house. The station is marked by a drill hole, filled with lead, in a large rock.

*Alder Bluff* (Cowlitz County, Wash., C. R., 1873). About 4 miles above Oak Point, 1½ miles from Solo Slough, on a basaltic cliff nearly perpendicular 130 feet above the river level. The station is marked according to note 8,[1] except there is no surface mark. Three stakes bear north, south, and east magnetic, distant 1.83 meters.

*Monticello* (Cowlitz County, Wash., C. R., 1873). Midway between Monticello and Freeport, 20 meters from the river bank, and 4 meters from a fence. The station is marked according to note 8,[1] except there is no surface mark. Three stakes around the station have the following magnetic bearings and distances: north 1.83 meters, east 1.83 meters, and south 1.89 meters.

*Cowlitz* (Cowlitz County, Wash., C. R., 1873). On the northwest side of the Columbia River at the mouth of the Cowlitz River, opposite Rainier, and 4 meters from the edge of the bank. The station is marked according to note 8,[1] except there is no surface mark. Three stakes around the station bear north, south, and east magnetic, distant 1.83 meters.

*Cottonwood Island* (Cowlitz County, Wash., C. R., 1873). About 1 mile east of the mouth of the Cowlitz River, on the lower end of Cottonwood Island, 20 meters from the north shore, and 30 meters from the south shore. The station is marked according to note 8,[1] except there is no surface mark. Three stakes were set bearing magnetic north, south, and east, distant 1.83 meters.

*Bluff* (*U. S. E.*) (Cowlitz County, Wash., U. S. E., 1912). On a bluff 10 meters south from the northwest corner of a powder house. The station is marked by a pipe driven in the ground.

*Bend* (*U. S. E.*) (Columbia County, U. S. E., 1912). On Deer Island Point, 27 meters inside the high-water line, and 24 meters from the willows and brush. The station is marked according to note 1.[1]

*H 24* (*U. S. E.*) (Columbia County, U. S. E., 1912). The station is 106.7 meters southwesterly from the high-water line, back in the bushes, and is marked according to note 1.[1]

*Old Orchard* (Columbia County, C. R., 1878). On a bluff sandy bank on the south end of Deer Island, 9 meters from the shore, about 200 meters above a house. The station is marked according to note 8,[1] with the addition of a plank placed 6 inches above the underground mark, with a hole bored in it to mark the station. There are 3 stubs, with a copper tack in the top of each, distant 1.83 meters.

*Maxwell* (Cowlitz County, Wash., C. R., 1878). About 7 meters from the edge of a low bank, 60 meters southeast of the wharf at Maxwells Landing. The station is marked according to note 8.[1] Three stakes were set around the station, as follows: South, 1.86 meters, north and east, each 1.83 meters.

*Adams* (Columbia County, C. R., 1878). About three-fourths mile below Columbia City, on a gravelly bank between the county road and the shore, about 45 meters from the shore and 9 meters east of the road, directly opposite Maxwells Landing, and 60 feet above the river level. The station is marked according to note 8.[1] Three cedar stakes are set as follows: North, 1.86 meters, east, 1.83 meters, and south, 1.80 meters. Three copper tacks in a blazed fir tree bear N. 8° 53′ E. magnetic, distant 5.5 meters.

*Carruthers* (Cowlitz County, Wash., C. R., 1878). On a small point of hard clay a short distance above St. Helens. The station is marked according to note 8.[1] Three stakes were set as follows: North, 1.83 meters, east, 1.93 meters, and south, 1.83 meters.

*Lemont* (Columbia County, C. R., 1878). About one-half mile below St. Helens, on top of a cliff of nearly bare rock, 5.8 meters from the edge, on a small knoll. The station is marked by a drill hole, filled with lead, in the solid rock, Three copper tacks in a triangular blaze on a fir tree bear N. 32° W. magnetic, distant 42.55 meters, and a similar mark on a fir tree bears S. 25° W. magnetic, distant 53.37 meters.

*Balsam* (Cowlitz County, Wash., C. R., 1878). On the east bank of the Columbia River opposite St. Helens, on a low shore 16 meters from the edge of the water, and 30 meters north of a small creek. The station is marked according to note 8.[1] Three stakes were set as follows: North, 1.81 meters, east, 1.87 meters, and south, 1.81 meters. Three copper tacks in a triangular blaze on a balsam tree bear N. 73° E., distant 2.71 meters, and a similar mark on another balsam tree bears S. 53° E., distant 7.94 meters.

*Russell* (Cowlitz County, Wash., C. R., 1878). On the east side of the Columbia River, one-half mile below the mouth of the Lewis River, opposite Willamette Slough, on a sand ridge 4 meters from the shore. The station is marked according to note 8.[1] Three stakes were set as follows: North, 1.79 meters, east, 1.80 meters, and south, 1.83 meters. There are three copper tacks in a triangular blaze in a balm tree N. 30.5° E. distant 6.94 meters, and another tree marked in the same way bears S. 80° E., distant 6.82 meters.

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[1] See pp. 81 and 82.

*Warriors Point* (Columbia County, C. R., 1878). On the extreme point of Warriors Point below the break in the bank and immediately in front of Mrs. Taylor's door. The station is marked according to note 8,[1] except that the underground mark is an earthenware bottle. There is a stub with a copper tack in the top, north and another south, both distant 1.83 meters, and one east, distant 1.80 meters.

*Lake River* (Clarke County, Wash., C. R., 1878). On a low island between Lake and Lewis Rivers, nearly opposite Warriors Point. The station is marked according to note 8.[1] Three fir stakes were set as follows: North, 1.84 meters, east, 1.84 meters, and south, 1.86 meters. Three copper tacks in a triangular blaze on a cottonwood tree bear S. 20° 08′ W. magnetic, distant 5.64 meters, and a similar mark on another large cottonwood tree bears S. 76° 40′ W. magnetic, distant 4.60 meters.

*Shobert* (Clarke County, Wash., C. R., 1881). On the east side of Lake River, about 275 meters southeast of Quigleys Landing, on top of a bank 60 feet above the water. The station is marked according to note 8.[1] There are three stakes around the station, as follows: North, 2.36 meters, east, 2.29 meters, and south, 2.13 meters. Three copper tacks in a fir-tree stump bear N. 38° E. magnetic, distant 9.97 meters, and a similar mark on another fir stump bears west magnetic, distant 6.4 meters.

*Ladd* (Clarke County, Wash., C. R., 1881). In the interior of Bachelor Island, on the first ridge east of a large lake or pond, 16 meters south of an old cattle shed and 120 meters north of a line fence. The station is marked according to note 8.[1] There are 3 cedar stubs around the station as follows: North 1.77 meters, south 1.89 meters, and east 1.73 meters.

*Meadows* (Columbia County, C. R., 1881). About one-half mile above Mr. Saline's place, on a narrow grass-covered ridge between the slough and swamp, about 100 meters from the shore and 50 meters from the edge of the timber, 16 meters south of a bunch of hard hack and 35 meters north of another bunch. The station is marked according to note 8.[1] There are 3 cedar stubs around the station, as follows: North 1.81 meters, south 1.88 meters, and east 1.84 meters.

*Four 2* (*U. S. E.*) (Clarke County, Wash., U. S. E., 1912). In a small field 21 meters inside the high-water line and 2.4 meters west of a rail fence. The station is marked according to note 1.[1] There is a double cottonwood tree with a nail in a blaze and 2 notches on the tree distant 54.25 meters.

*Abrams* (Clarke County, Wash., C. R., 1881). On the east side of Lake River about 1½ miles above Quigleys Landing, on a steep side hill just north of a small gulch, about 45 meters southeast of a group of 3 fir trees. The station is marked according to note 8.[1] There are 3 cedar stubs around the station as follows: North 1.83 meters, east 1.96 meters, and south 1.94 meters. There is a triangular blaze on a small oak tree distant 13.33 meters, and a similar mark on a maple tree distant 12.19 meters.

*Fales house, red chimney* (Clarke County, Wash., C. R., 1881). This is a false chimney of wood, painted bright red.

*Nelson* (Columbia County, C. R., 1881). On the west side of Willamette Slough, nearly opposite the southern end of Wests Island, 122 meters west of the shore line and the same distance east of the shore of a long narrow pond. The station is marked according to note 8.[1] There are 3 cedar stakes around the station, as follows: North 1.85 meters, south 1.85 meters, and east 1.83 meters.

*Cloniger* (Multnomah County, C. R., 1881). About 50 meters from the west bank of Willamette Slough on the farm belonging to Mr. Cloniger and 172 paces northeast of his house. The station is marked according to note 8.[1] There were 3 cedar stakes set as follows: North 1.88 meters, south 1.86 meters, and east 1.85 meters.

*Knapp* (Clarke County, Wash., C. R., 1881). A short distance below Knapps Landing in an open pasture, 26 meters from the shore line. The station is marked according to note 8.[1] There are 3 cedar stakes set as follows: North 1.83 meters, south 1.92 meters, and east 1.82 meters. There is also a cedar stake in an old fence line S. 89° E. magnetic, distant 28.002 meters, and a triangular blaze on a cottonwood tree W. 23° E. magnetic, distant 29.99 meters.

*Sherringhousen* (Multnomah County, C. R., 1878). On the northwest bank of Willamette Slough about one-half mile below Gosas Landing, 60 meters below Mr. Sherringhousen's hay barn and 7 meters from the edge of the bank. The station is marked according to note 8,[1] except there are two bottles lying on their sides instead of three. Three cedar stakes were set, one each north, east, and south, distant 1.83 meters.

*Brookside* (Clarke County, Wash., C. R., 1881). On top of a bluff hill on the east side of Lake River, nearly opposite the mouth of Salmon Creek, about 1 mile south of Mr. Knapp's ranch, about 75 meters north of a good stream of water and 150 feet above the river level. The station is marked according to note 8,[1] except only one bottle was buried, pointing to the station, and it is east about 1.8 meters. There are 3 cedar stubs around the station as follows: North 1.85 meters, east 1.80 meters, and south 1.85 meters.

*Oak Ridge* (Multnomah County, C. R., 1881). In open pasture land on the west side of Oak Island, which is on the west side of Sturgeon Lake in the interior of Sauvies Island nearly opposite Gosas Landing on Willamette Slough. The station is marked according to note 8.[1] There are 3 cedar stakes, as follows: North 1.85 meters, south 1.81 meters, and east 1.85 meters.

*Harris* (Clarke County, Wash., C. R., 1881). On the east bank of the Columbia River back 34 meters and nearly opposite the landing at Reeder's farm on Sauvies Island, 4 meters south of a fence running back from the shore, 14 meters west of a fence parallel with the shore, and 60 meters from the wooded swamp. The station is marked according to note 8.[1] There are 3 cedar stakes, one each north, south, and east of the station, distant 1.83 meters.

*Morgan* (Multnomah County, C. R., 1881). On Sauvies Island, on the lower end of the land owned by Mr. Morgan, in a cultivated field 12 meters from the river bank. The station is marked according to note 8,[1] except there is no surface

[1] See pp. 81 and 82.

mark. There are 3 cedar stakes around the station, as follows: North 1.90 meters, south 1.85 meters, and east 1.83 meters; also 3 nails in a blazed cottonwood tree, distant 3.05 meters. A small house by the river bears N. 34° W. magnetic, distant 58 meters and a corner of a barn bears S. 11° W. magnetic, distant 68 meters.

*Hendrickson* (Clarke County, Wash., C. R., 1881). About 12 meters back from the east bank of the Columbia River, just below Hendrickson Point and exactly opposite the mouth of the Willamette River. The station is marked according to note 8.[1] There are 3 cedar stakes around the station, as follows: North 1.86 meters, south 1.90 meters, and east 1. 83 meters, and a triangular blaze on a cottonwood tree N. 29° E. magnetic, distant 12.26 meters.

*Howell house, east chimney* (Multnomah County, C. R., 1881). About 2 miles above the mouth of the Willamette River on Sauvies Island.

*Hillside* (Multnomah County, C. R., 1883). On the west side of Willamette Slough, about 1½ miles below the head of Sauvies Island, on a bare hillside, about 75 feet above the bottom lands and 55 feet above the county road. The station is marked according to note 8.[1]

*Quigley* (Multnomah County, C. R., 1883). On the brow of a rather steep hillside, about 150 feet above the bottom lands. The ground back of the station forms a gently sloping bench up the hill. The station is marked according to note 8.[1] There are three cedar stakes around the station, as follows: North 1.86 meters, east 1.83 meters, and south 1.89 meters.

*Thistle* (Multnomah County, C. R., 1882; 1883). On the west bank of the Willamette River, about 6½ miles from Portland, 15.54 meters from a fence on west side of the Portland-St. Helens road. The station is marked according to note 8.[1] There are three cedar stakes around the station, as follows: North 1.91 meters, west 1.86 meters, and east 1.83 meters.

*Mann* (Multnomah County, C. R., 1883). On the west side of the Willamette River, 5½ miles below Portland, on sloping ground 30 meters west of the Portland-St. Helens road, and 40 feet above the ordinary river level. The station is marked according to note 8.[1] There are three cedar stakes around the station, as follows: North 1.87 meters, west 1.90 meters, and east 1.83 meters.

*Homestead* (Multnomah County, C. R., 1883).—Lost.

*Crest* (Multnomah County, E. E. S., 1913). The station is the flagpole in the center of the observation tower on the highest point in the well-known Council Crest Park, at an elevation of about 1100 feet. The tower is about 40 feet square.

*Mills* (Multnomah County, E. E. S., 1913). It is the spire of the water tank of the Oregon Planing Mills, near the river, in the northern part of Portland, between Nineteenth and Twentieth Streets and between Vaughn Street and the railroad, about 32 paces from Vaughn Street and 47 paces from Nineteenth Street. The stand is of reinforced concrete, with a platform offering ample room and steady support for a theodolite. The tank is 23.04 meters in circumference.

*Federal east wireless* (Multnomah County, E. E. S., 1913). The eastern one of the two towers in Lents, about 6 miles southeast of Portland, on a lot at the intersection of the O. W. P. R. R. and Main Street. The towers are 146 meters apart and stand in an east and west line perpendicular to Main Street; the western and nearer one is distant 68.6 meters from Main Street at a point 47.5 meters south of the railroad. The towers are 2 meters square, painted white, and 312 feet high.

*Federal west wireless* (Multnomah County, E. E. S., 1913). The western one of the two towers described above under Federal east wireless.

*Y. M. C. A. east wireless* (Multnomah County, E. E. S., 1913). A light steel tower surmounted by a mast on the Y. M. C. A. building, which occupies the end of a block on Taylor Street between Sixth and Seventh Streets. The station is 2.5 meters distant from Sixth Street and 11.1 meters from Taylor Street.

*Y. M. C. A. west wireless* (Multnomah County, E. E. S., 1913). A light steel tower surmounted by a mast on the Y. M. C. A. building, which occupies the end of the block on Taylor Street between Sixth and Seventh Streets. The station is about 2.5 meters distant from Seventh Street and 13.51 meters from Taylor Street.

## COLUMBIA RIVER FROM THE MOUTH OF THE WILLAMETTE RIVER TO CASCADE LOCKS.

### PRINCIPAL POINTS.

*Shaw* (Multnomah County, C. R., 1889). About 35 meters from the head of Haydens Island, 10 meters from the north bank. The station is marked according to note 8.[1] There are three cedar stubs with copper tacks in the tops, as follows: West 1.83 meters, east 1.86 meters, and south 3.67 meters. There are three copper tacks in a blazed balm tree distant 4.83 meters.

*Stansbury* (Multnomah County, C. R., 1889). About one-half mile east of the Portland & Vancouver Railroad, 180 meters south of the county road, and about 6 meters from the brow of the hill. The station is marked according to note 8,[1] except the surface mark is a section of the center pole. There are three stubs marked with copper tacks—north, south, and east—distant 1.83 meters.

*Wintler* (Clarke County, Wash., C. R., 1889; 1900). About 3¼ miles above Vancouver, on a side hill, on uncultivated land, 30 meters north of the county road, in a growth of small fir trees. The station is marked according to note 8.[1] Stakes with copper tacks in the top were placed 1.83 meters south, east, and west of the station. There is a triangular blaze on a large tree distant 3.70 meters in azimuth 4° magnetic, and a small fir tree with a similar mark distant 7.50 meters in azimuth 84.5° magnetic.

[1] See pp. 81 and 82.

*Lower Point* (Multnomah County, C. R., 1889). Lost, 1891.

*Hexter* (Clarke County, Wash., C. R., 1889, 1900). Just east of a road which runs north from the county road and in the back yard of a house owned by Mr. Isaac F. Fletcher. The station is marked by a hole in a brick 2 feet below the surface and at the surface by a hole in a stone. The following azimuths are given: North gable of barn across river, 41° 57′ 31″; chimney Phipps house, 97° 40′ 31″; chimney J. M. French's house, 138° 16′ 51″; cupola Moseley's house, 274° 24′ 21″.

*Jungle* (Multnomah County, C. R., 1889). Lost, 1900.

*Quartermasters wharf* (Clarke County, Wash., C. R., 1889). On the upper wharf of the Vancouver Barracks and is marked by a copper nail with 4 others around it. It is 3.96 meters north of the edge of the wharf, 6.34 meters east of the edge, and 6.55 meters west of the edge. The station is probably lost.

*Rauer* (Multnomah County, C. R., 1889). About 1½ miles below Vancouver, on an island lying abreast of Haydens Island, 4.5 meters from the edge of a vertical bank. The station is marked according to note 8,[1] except the surface mark is a section of the pole projecting 8 inches from the ground. There are 3 stubs around the station, east, west, and south, respectively, distant 1.83 meters.

*Sisters Farm* (Clarke County, Wash., C. R., 1889). About 1½ miles below Vancouver, close to the edge of the river bank, in a public road, opposite the lower end of a double row of piles, and 24 meters above the house belonging to the Sisters of Providence Academy. The station is marked according to note 8,[1] except the underground mark is a cross on a flat stone. There are 3 stubs with copper tacks in them, each 1.83 meters from the station, one east, one west, and one south.

*Allman* (Clarke County, Wash., C. R., 1889). About 3 miles below Vancouver, 13 meters north of the river bank. The station is marked according to note 8.[1] There are 3 stubs around the station, distant 1.83 meters, one each north, east, and west.

*Hayden* (Multnomah County, C. R., 1889). On the north shore of Hayden Island, about 1 mile above the west end. The station is marked according to note 8.[1] There are 3 cedar stubs around the station, distant 1.83 meters south, east, and west. There is a nail in a large blazed willow tree, distant 4.389 meters in azimuth 147° magnetic, and a nail in a small blazed willow tree, distant 4.072 meters in azimuth 259° magnetic.

*Hood* (Multnomah County, C. R., 1891; 1905). On the northern shore of Government Island, about 70 meters from the river shore. There are no trees within about 100 meters of the station. The station is marked by a rectangular cross on a flat stone 3 feet below the surface, and at the surface by a drill hole in a large basaltic rock around which there is a small pile of stones. The following azimuths are given: Chimney of yellow house across the river, 144° 40′ 47″; south gable Love's grist mill, 154° 36′ 57″; Fisher's Landing, schoolhouse cupola 251° 11′ 47″; west gable post office Fisher's Landing 258° 38′ 27″.

*Prune Hill* (Clarke County, Wash., C. R., 1891; 1905). Near the top of a hill, which is clear of timber and covered with grass, 36 meters southwest of an unoccupied house, and about 100 and 150 meters from two fir trees, the tops of which are in range with the station. The station is marked according to note 8.[1]

*Mays* (Multnomah County, C. R., 1891). Lost.

*Taggarts Bluff* (Multnomah County, C. R., 1891; 1901). Nearly abreast of the eastern end of Government Island, near the edge of a sandstone cliff which is the river bank, about 40 meters east of the highest point. The station is marked according to note 8,[1] except that the three bottles were not placed around the station. There is a drill hole filled with lead in the side of a large bowlder facing the station, distant 2.62 meters in azimuth 289°.

*Fisher* (Clarke County, Wash., C. R., 1891; 1900). About one-fourth mile west of the wharf at Fishers Landing, 45 meters from the foot of a hill which is covered with bowlders and underbrush, 192 meters west of a brook, and 153 meters east of a fence at the edge of the forest, and 11 meters back from the river shore. The station is marked by a puncture at the intersection of the cross lines on a stone buried 3 feet below the surface and at the surface by a drill hole filled with lead in a large basaltic rock. Flat stones with arrows scratched on them were buried 1 foot under the ground at equal angles around the station distant 1.83 meters. The following distances and azimuths from magnetic south are given: Blaze on a cottonwood stump distant 11.38 meters 27° 44′, small blackwood tree distant 52.21 meters 137° 47′, blazed willow tree distant 51.51 meters 266° 49′, and highest point of large bowlder distant 41.03 meters 201° 16′.

*Harlow* (Multnomah County, C. R., 1891; 1905). Opposite the village of Troutdale on the extreme point on top of the high pinnacle of rocks at the summit of the bluffs. The station is marked according to note 8,[1] except that the three bottles around the station are omitted. In the group of rocks to the westward there are two small drill holes filled with lead in the face of the rocks toward the station; one is distant 2.079 meters in azimuth 260° magnetic and the other is distant 2.242 meters in azimuth 186° magnetic.

*Daniels* (Clarke County, Wash., C. R., 1891; 1905). On top of the high land known as Prune Hill, nearly abreast of the lower end of Ladys Island just east of a prune orchard, about 6 meters from the fence. Four stakes with copper tacks in the tops were set north, south, east, and west of the station, distant 1.83 meters. The station is marked according to note 8.[1]

*Washougal* (Clarke County, Wash., C. R., 1891; 1901). In a cultivated field in front of Granger's store, about 82 meters south of the main road. The station is marked by a bottle with a copper tack in the cork, buried 3 feet, and at the surface by a drill hole, filled with lead, in a large stone. The following azimuths are magnetic: Old Washougal Hall flagstaff, 73° 38′; Surber's house chimney, 131° 22′; Granger's store, middle of door, 154° 57′; schoolhouse cupola, 220° 18′; large oak, distant 300 meters 264° 51′; and crotch of a small double oak distant about 150 meters 304° 43′.

[1] See pp. 81 and 82.

*Eagles Bluff* (Multnomah County, C. R., 1891; 1900). About 1¼ miles east of the Sandy River, about 156 feet above the level of the river on the west corner of a nearly level bench of land on a round projecting point on the hillside above the tracks of the Oregon Railroad & Navigation Co. and back of the second reverse curve east of Sandy Creek. The station is marked according to note 8,[1] except that the three bottles around the station were omitted. The reference marks are drill holes filled with lead in rocks; one is distant 2.40 meters in azimuth 65° magnetic and the other is distant 1.95 meters in azimuth 111° magnetic.

*Mount Pleasant* (Clarke County, Wash., C. R., 1891). Just below Cape Horn and nearly opposite Rooster Rock, on a level bench of the ridge overlooking Canyon Creek. The station is marked according to note 8.[1] The following magnetic azimuths are given: Lawton's house 56° 24′, Sampson's house 58° 30′, Rooster Rock 133° 53′, Tunnel Rock 181° 55′, Rocky Butte 245° 12′.

*Remington* (Clarke County, Wash., C. R., 1891). The station is marked by a bottle buried 3 feet below the surface.

*Government Island* (Multnomah County, C. R., 1891).—Lost, 1901.

*Quarry* (Clarke County, Wash., C. R., 1891; 1901). About 1½ miles above Fishers Landing, on a slope of the hill, 20 meters south of the road and 40 meters from the river bank, 200 meters east of Muirhard's house, and 18 meters from the edge of a small quarry. The station is marked by a drill hole in the solid rock.

*Ladys Island* (Clarke County, Wash., C. R., 1891; 1900). On the upper end of Ladys Island opposite the village of La Camas, on a level spot a little south of the highest point of a ledge of rocks, 150 meters from the eastern point, and 40 meters from the south side. The station is marked by rectangular cross lines on a flat rock 3 feet below the surface, and at the surface by a drill hole in a large bowlder nearly level with the surface.

*Brush* (Multnomah County, F. M., 1901). On the northeast point of a ridge on a high hill about 1½ miles below Corbett station. A level bench was graded for the signal and this is probably the best indication of the general locality. The station is marked by a wide-mouthed bottle with a glass top secured by a metal screw set 2 feet below the surface. There are 3 witness stubs with copper tacks distant 1.83 meters east, west, and south of the station.

*Cliff* (Multnomah County, F. M., 1901). On the northeast brush-covered slope about 20 meters from the top of the high rocky cliff back of Rooster Rock, about 20 feet below the top of the cliff. A bench was graded out of the side hill for the signal and this is probably the best guide to the location of the station. The station is marked by a drill hole in a flat stone rounded underside, buried 2 feet below the surface. There are stubs each marked with a copper tack distant 1.83 meters east, west, and south. The following azimuths are given: Tree Cape Horn 228° 55′, Rock mid-river 233° 37′, Castle Rock 240° 37′, sawmill smokestack 264° 39′, Rooster Rock 130° 48′.

*Grout* (Clarke County, Wash., F. M., 1901). On top of the bluff on Mount Pleasant, on the farm of F. H. Grout about 40 meters east of the fence between the Grout and Sampson farms. The station is marked by a drill hole in a round stone 10 inches in diameter buried 2 feet. There is a cross on the side of a stone facing the station, distant 2.62 meters S. 88° 15′ E. magnetic, a similar mark distant 4.965 meters S. 29° 55′ E. magnetic, and a cross on the top of a stone, distant 1.640 meters N. 55° 00′ W. magnetic.

*Shepard* (Multnomah County, F. M., 1901). At the edge of a prominent rocky bluff about a mile west of Bridal Veil. The station is marked by a drill hole in the rock at the bottom of a crevice some 4 inches below the surface. Three fir trees are blazed; the first is a small tree on the edge of the bluff distant 3.87 meters, the second tree is 12 inches in diameter and marked with two blazes distant 19.29 meters, and the third is about 14 inches in diameter blazed and marked with a triangle of nails and the letters "U. S. C. S." in tacks distant 33.34 meters. The following azimuths are given: Rooster Rock 84° 47′ 09″, tree on high rock 227° 30′ 50″, rock in mid-river 210° 46′ 02″, and Cape Horn tree 174° 13′ 23″.

*Mount Zion* (Skamania County, Wash., F. M., 1901). On a cone-shaped hill, about 1 mile back from Cape Horn, not on the highest part of the hill but a short distance down the southeast slope. The station is marked by a hole drilled in a stone buried 2 feet, and at the surface is a larger stone with a drill hole 1 inch deep. There are three dead trees blazed, one distant 5.3 meters N. 39° E. magnetic, one distant 11.2 meters S. 44° E. magnetic, and one 11.2 meters S. 15° W. magnetic.

*Angel* (Multnomah County, F. M., 1901). On a rocky bench, on the crest or backbone of a low brushy ridge, about 1 mile east of Bridal Veil, 400 meters back of a long, low point making out into the river, about 200 meters southeast of the house on Mr. Dalton's place. Back of the station is a prominent bluff called Angel's Rest. The station is marked by a drill hole in the sloping face of the solid rock about 4 inches below the surface. There are 3 reference marks, drill holes in outcropping rock, the distances and magnetic azimuths of which are given; distant 0.85 meter 194° 00′, distant 3.89 meters 4° 40′, and distant 1.46 meters 68° 00′.

*Twin Mountain* (Skamania County, Wash., F. M., 1901). On the backbone of the brushy ridge leading up to Twin Mountain, about 50 meters above a bare rounded rocky knob. The location is probably best indicated by a level bench that was dug out of the hillside for the signal. The station is marked by a drill hole in a stone buried 1 foot. There is a trunk of a dead fir tree 2½ feet in diameter blazed with three nails driven in it, distant 7.3 meters N. 33° 18′ E. magnetic, a drill hole in an outcropping rock, distant 3.71 meters N. 6° 36′ E. magnetic, and a drill in another rock outcrop distant 3.26 meters N. 49° 43′ W. magnetic. The following magnetic azimuths are given: Castle Rock 230° 00′, top of Multnomah Falls 287° 16′, high falls west of Multnomah 307° 45′, rock in mid-river 20° 20′.

*Railroad* (Multnomah County, F. M., 1901). On the north side of the Oregon Railroad & Navigation Company's tracks within the right of way about three-fourths mile east of the 30 mile post, and on a narrow bank about 12 feet above the track. The station is marked by a drill hole in a stone 1 foot below the surface. Two trees are blazed with

[1] See pp. 81 and 82.

nails driven into them, one distant 49.04 meters S. 21° 33′ W. magnetic and the other distant 20.18 meters N. 47° 19′ W. magnetic.

*Oneonta* (Multnomah County, F. M., 1901). On a rocky bluff on the west side of Oneonta Gorge. A lone rock in the middle of the river is seen over the outer edge of the cottonwood tree on the first prominent point above Multnomah Falls. The station is marked by a wide mouthed jelly bottle 1 foot below the surface, over which for a surface mark is a stone about 15 inches square with a drill hole in the top. The reference marks are drill holes in rocks, one distant 1.07 meters N. 8° 03′ E. magnetic and has the drill hole on the side toward the station, the second is distant 2.51 meters S. 24° 42′ E. magnetic and has the drill hole on top, the third has the drill hole on top and is close to the edge of the precipice distant 3.17 meters S. 57° 25′ W. magnetic.

*Bluff* (Skamania County, Wash., F. M., 1901). On the crest of the brushy ridge below the high rocky bluff, opposite the railroad section house at Oneonta, about 100 meters from the talus that has fallen from the cliff. The station is marked by a drill hole in a stone set about 4 inches below the surface. For reference marks there is a blazed stump of a small fir tree distant 5.55 meters N. 74° 46′ E. magnetic, a small fir tree blazed with 3 nails distant 16.31 meters S. 82° 34′ E. magnetic, a blazed fir tree distant 15.33 meters N. 34° 50′ W. magnetic.

*Lookout* (Skamania County, Wash., F. M., 1901). On a brush covered rounded hill, on a shoulder overlooking the river and Mr. Graaff's residence, directly back of Butlers Landing. The station is marked by a drill hole in a rock 3 or 4 inches below the surface. For reference marks there are 3 drill holes in rocks with the following distances and magnetic bearings: distant 3.57 meters S. 71° 07′ E., distant 3.96 meters S. 1° 05′ W., distant 2.71 meters S. 25° 41′ W.

*Dodson* (Multnomah County, F. M., 1901). At Dodsons siding on the Oregon Railroad & Navagation Co.'s tracks, about one-half mile above McGowans Cannery, 65.8 meters west of the post marked Dodson's, and 7.86 meters from the north rail of the track. The station is marked by a drill hole in a stone 15 inches below the surface. There are three drill holes in rocks for reference marks, the first is distant 2.12 meters S. 73° 25′ E. magnetic, the second is distant 1.97 meters S. 25° 55′ W. magnetic, and the third is distant 1.69 meters N. 57° 34′ W. magnetic.

*Warren* (Multnomah County, F. M., 1901). On the north side of the Oregon Railroad & Navigation Co.'s tracks, about 150 meters east of Gorman's large barn and about the same distance west of Dodson's store, and 8.17 meters from the north rail of the track. The station is marked 1½ feet below the ground by a stone with a hole drilled in it, and at the surface by a drill hole in a larger stone. There is a triangle of copper tacks on a telephone pole distant 6.288 meters S. 82° 05′ E. magnetic, a fence post with a similar mark is distant 9.42 meters N. 75° 29′ W. magnetic, and a second fence post with a similar mark distant 5.96 meters N. 9° 15′ W. magnetic.

*Climb* (Skamania County, Wash., F. M., 1901). On the shoulder of a high rocky bluff on a mountain about due north of Castle Rock. As you climb the ridge above the timber a small shoulder will be reached that gives the first view of the river but the station is on the larger shoulder about 100 feet above. The station is marked by a hole drilled in a small stone surrounded by a triangle buried 10 inches below the surface. There are 3 small stones with crosses cut on them set 1.83 meters from the station, two are on the crest of the ridge one above and one below the station and the other is down the slope on the east side.

*Bonneville* (Multnomah County, F. M., 1901). On the west side of Tanner Creek, on a steep side hill about 100 meters below the rocky cliff under Potato Hill. A level bench was dug in the side hill for the station. The station is marked by a drill hole in a stone level with the surface of the ground. There is a blazed tree distant 2.04 meters S. 40° 27′ E. magnetic and a similar mark distant 2.19 meters S. 0° 22′ W. magnetic.

*Aldrich* (Skamania County, Wash., F. M., 1901). On the summit of a sharp peak directly opposite Bonneville. The station is marked 1 foot underground by a drill hole in a stone. There are three stones with crosses on them 1.83 meters from the station north, east, and south.

*Moffat* (Skamania County, Wash., F. M., 1901). On the highest point of a comparatively low, bare rocky hill about west of the Cascade Locks, about one-quarter mile from the lake. The station is marked by a drill hole in a stone set 3 or 4 inches below the surface. There is a blazed fir tree 10 inches in diameter distant 19.11 meters N. 46° 34′ E. magnetic, and a similar mark on a fir tree 2 feet in diameter distant 9.69 meters S. 52° 59′ E. magnetic.

*Cascade* (Hood River County, F. M., 1901). On the summit of a sharp rocky hill directly back or southeast of the Cascade Locks. The station is on the hill nearest town and the one farthest west of the four hills in this locality. The station is marked by a drill hole in a rock surrounded by a triangle, set about 6 inches below the surface. There is a blazed stump of a fir tree distant 2.00 meters N. 26° 40′ W. magnetic, and a blazed fir tree about 4 inches in diameter distant 21.12 meters S. 7° 49′ W. magnetic. The following magnetic azimuths are given: southwest end of the rocky bluff near the lake 197° 44′, higher of the two hills back of the station 285° 57′, right tangent to the little island above Bradfords Island 44° 37′, Cascade fish wheel 99° 00′.

*End* (Hood River County, F. M., 1901). On the top of a bluff at the west end of a rocky hill which is nearly surrounded by a pond or slough, about 3 miles above the Cascade Locks. The station is marked by a drill hole in solid rock covered with a thin coating of soil, over which is a pile of rocks. There is a blazed oak 12 inches in diameter standing near the edge of the precipice distant 20.24 meters N. 25° 21′ E. magnetic, a blazed oak tree 18 inches in diameter standing back from the edge in a thicket of small oaks distant 19.29 meters N. 46° 19′ E. magnetic, and a small scrub oak at the edge of the thicket distant 10.52 meters S. 78° 13′ E. magnetic.

*Stackhouse* (Skamania County, Wash., F. M., 1901). On the hillside above the ranch house of Mr. Nix and below that of Mr. Stackhouse, about 1½ miles above Stevenson. The station is marked by a hole drilled in a stone 18 inches below the surface. There are 3 blazed fir trees with nails driven in them, the first is distant 18.212 meters N. 56° 00′ E.

magnetic, the second is distant 7.961 meters S. 7° 01′ W. magnetic. and the third is distant 11.506 meters S. 50° 21′ W. magnetic.

*Bradford* (Multnomah County, F. M., 1901). On the point of a high rocky precipice on the west slope and near the brink, about opposite the upper end of Bradfords Island. A bench was excavated in the steep sidehill for the signal. The station is marked by a drill hole in a rock set level with the surface. There is a blazed fir tree 18 inches in diameter on the crest of the ridge at the edge of the precipice distant 4.14 meters N. 30° 03′ E. magnetic, a similar tree and mark distant 10.27 meters S. 62° 34′ E. magnetic, and a small blazed oak on the west side of the slope distant 7.78 meters S. 15° 43′ E. magnetic.

*Locks* (Hood River County, F. M., 1901). Near the curve of the retaining wall on the eastern side of the upper entrance to the Cascade Locks. The station is marked by a stone with a hole drilled in it, placed 18 inches underground. There are three crosses cut in the top layer of the riprapping of the retaining wall; the first is distant 7.10 meters N. 57° 05′ E. magnetic, the second is distant 4.82 meters S. 82° 51′ W. magnetic, and the third is distant 6.17 meters N. 21° 21′ W. magnetic.

### SUPPLEMENTARY POINTS.

*Headquarters flagstaff, Vancouver* (Clarke County, Wash., C. R., 1881). Masthead of the flagstaff in front of the barracks to the east of the headquarters building.

*Garrison flagstaff, Vancouver* (Clarke County, Wash., C. R., 1881). Masthead of the flagstaff which stands near the center of the parade grounds in the garrison.

*Stenger* (Clarke County, Wash., C. R., 1889; 1900). About 4½ miles above Vancouver on property owned by Mr. Stenger. About 30 meters northeast of a clay pit which was being extended in 1900 so that the station would be destroyed in about 2 years. The station is marked according to note 8.[1]

*Fishers Wharf, southeast pile* (Multnomah County, C. R., 1891; 1900). It is the southeast or upper corner pile of Fishers Wharf. It was whitewashed and used as a hydrographic signal.

*Bartlett's barn, north gable* (Multnomah County, C. R., 1891). Near the north shore of Government Island, about 1½ miles above Fishers Landing, Wash., on Mr. Bartlett's dairy farm.

*Gibbons Creek* (Clarke County, Wash., C. R., 1891; 1900). About 2½ miles east of Washougal, one-fourth mile south of the county road, 32 meters west of Gibbons Creek, 29 meters north of two immense cottonwood trees, and 52 meters south of a long line fence inclosing the pasture lands. The station is marked according to note 8[1] with the exception that there is no surface mark except a portion of the center pole which was left in the ground.

*Williams* (Multnomah County, C. R., 1891; 1900). About 1 mile below Vans Landing, in a peach orchard on a steep hillside, about 40 meters S. 50° W. magnetic of John Williams's house, close to the edge of the bushes, and about 85 feet above the level of the river. The station is marked by a bottle 3 feet below the surface. There are three copper tacks in a large stump distant 4.2 meters S. 84° 37′ E. magnetic. The following azimuths are given: Sandhill fir tree 354° 20′ 33″, Sampson's house west gable 237° 13′ 03″, Washougal Hall 327° 03′ 13″, wharf house south gable 328° 13′ 28″.

*Corbett* (Multnomah County, F. M., 1901). On the sharp ridge of the first little point about 100 meters east of Corbett's railroad station. The station is marked by a drill hole in a stone 2½ feet below the surface. There is a blazed fir tree distant 7.28 meters in azimuth 271° 10′ magnetic, a fir tree with a similar mark distant 6.22 meters in azimuth 345° 30′ magnetic, and a stump with three nails in it distant 3.66 meters in azimuth 225° 34′ magnetic.

## THE SECONDARY TRIANGULATION.

### PRINCIPAL POINTS.

*Roman* (Douglas County, O. B. F., 1903; 1908). On the most westerly of the two summits of the highest peak of the Coast Range, known as Roman Nose or Saddle Mountain, situated near the north line of Douglas County about 5 miles southwest of the junction of Wild Cat Creek with the Siuslaw River. It is on the highest point of the summit, about 6 feet from the southern edge of the bluff and 20 feet from the steep part of the slope south of the station. The peak is bare except for a few low shrubs, and has a steep bluff on the south side, and a gentle grassy slope on the north side. The station is marked by ⅜-inch copper bolt 3 inches long cemented into a drill hole in a stone 12 by 12 by 24 inches, 18 inches below the surface, set with the axis east and west. The surface mark is an old-type station mark, which is a disk and shank cast in one piece. The disk is about 85 millimeters in diameter and has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. This is set in a stone measuring about a foot on each side, with its top flush with the surface. The two reference marks are drill holes in the top of ⅜-inch copper bolts, one of which is leaded or cemented into a drill hole in the nearest outcropping of the solid rock 14.760 meters from the station in azimuth 148° 06′, and the other in a projecting bowlder 6.775 meters from the station in azimuth 205° 33′. Arrows pointing to the reference marks are cut in the rock near each mark. An old burned stump is about 5 feet from the station in azimuth 232°.

*Mary* (Benton County, O. B. F., 1903; 1908). On the highest point of the grassy summit of Mary Peak, about south-southwest from Corvallis. The station is marked by a three-eighths inch copper bolt cemented into a drill hole in a flat stone 4 inches thick and 19 inches in diameter, 22 inches below the surface. The surface mark is an old-type station mark which has a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. This is set in a bowlder 16 by 18 by 30 inches, the top of which is flush with the surface of the ground. The

[1] See pp. 81 and 82.

two reference marks are drill holes in the top of three-eighths inch copper bolts cemented in bowlders at the following distances and azimuths from the station: 13.77 meters, 326° 22′; and 29.36 meters, 58° 11′.

*Table* (Lincoln County, J. S. H., 1908). On a flat-topped mountain known locally as White Rock, southeast of Newport, between the Yaquina and Alsea Rivers, on a small knoll running north and south, about 90 meters southwest of the highest point of the southwest ridge, about 365 meters north of a prominent rocky bluff, and 60 meters north of the highest point of the southeast spur. The station is marked according to note 11.[1] One reference mark is distant 8.47 meters in azimuth 43° 43′, and the other 9.49 meters in azimuth 128° 29′.

*Cummins* (Lincoln County, J. S. H., 1908). On the highest part of the mountain, 20 miles south of Waldport by road and trail. The station is marked by a drill hole 1½ inches deep in a large rock set flush with the surface. One reference mark is a drill hole one-half inch deep in a natural rock projecting about 6 inches a little way down the slope in azimuth 120° 42′, and the other is a drill hole in a large bowlder at the south end of the summit in azimuth 33° 33′.

*Foulweather* (Lincoln County, J. S. H., 1908). A little west of the highest point on Cape Foulweather, about 10 miles north of Newport, in an opening in the timber which can be easily seen from the beach to the south. Two stands were erected from which to occupy this station so as to avoid cutting. The station is marked by a nail in the root of a tree. There is a drill hole one-third inch in diameter and one-half inch deep in a rock about 7 inches square, the top of which is placed 4 inches below the surface, distant 7.26 meters in azimuth about 138°.

*Maple* (Lane County, J. S. H., 1908). On the first hill about one-fourth mile south of Bald Mountain, on the highest part of the top, and in the center of the ridge. The station is marked according to note 11,[1] except the reference marks are drill holes without the brass bolts. One reference mark is distant 6.36 meters in azimuth 89° 19′, and the other is distant 8.02 meters in azimuth 346° 19′.

*Fairview* (Lane County, J. S. H., 1908). On the highest part of the mountain about 6 miles northeast of Heceta between Ten Mile Creek and Big Creek. The station is marked according to note 11.[1] One reference mark is distant 8.65 meters in azimuth 198° 01′, and the other is distant 8.21 meters in azimuth 257° 45.′

*Cape* (Lane County, J. S. H., 1908). On the mountain 13 miles by road and trail north of Florence, about 150 meters east of the timber, and 9 meters south of the highest point which is covered with large bowlders. The station is marked according to note 11.[1] One reference mark is on the largest bowlder on the point projecting 3 feet above the surface, north 9.44 meters, and the other is in a bowlder projecting about 1½ feet, east 8.17 meters.

*Dean* (Douglas County, J. S. H., 1908). On the north slope of the first prominent knoll about 275 meters east of the timbered summit known as Deer Head Point, about 15 or 18 meters from the highest part of the knoll. The station is marked by an inch drill hole in the center of a long, narrow rock buried 4 inches underground. For reference marks there are two trees with a nail in a triangular blaze; one is N. 23° E., distant 15.316 meters, and the other is S. 68° E., distant 14.249 meters. These bearings are probably magnetic.

*Trail* (Douglas County, J. S. H., 1908). On the trail between Gardiner and Florence in some very large timber about 5 miles from Gardiner, about 90 meters beyond a cabin which is passed on the right and close to the trail. The station and cabin are on the same side of the trail. The station was in the top of a tree 160 feet tall and was not marked on the ground. There are two reference marks; one is a drill hole in a rock 18 inches below the surface, over which is another rock with a drill hole 2 inches below the surface, distant 41.16 meters in azimuth 87° 15′, and the other reference mark is the same except the lower mark is buried 24 inches and the upper mark 8 inches, distant 37.18 meters in azimuth 181° 13′.

*Schooner* (Douglas County, J. S. H., 1908). On the south side of the Umpqua River, about three-fourths mile above Reed's cannery, in the timber on the side hill, 12 meters northeast of the highest part of the hill and about 400 feet above the river. The station is marked 14 inches below the surface by a drill hole in a 30-pound rock and 2 inches below the surface by a standard disk station mark set in a 35-pound rock. For reference marks there are three-eighths inch bolts driven into two large trees; one is distant 6.01 meters in azimuth 218° 52′ and the other is distant 16.12 meters in azimuth 303° 33′.

*Burn* (Douglas County, J. S. H., 1908). On top of a burnt ridge south of Gardiner, 11 meters southeast from the highest part of the hill. The station is marked according to note 11,[1] except there is only one reference mark and that is distant 10.79 meters in azimuth 76° 47′ 10.″

*Bald* (Lincoln County, J. S. H., 1908). On Rocky Point, which is a very sharp and prominent point one-fourth mile south-southwest of Bald Mountain summit. Here the ridge forms a horseshoe, Rocky Point being at the northwest end and Bald Mountain at the other. There is a trail at the foot of the point on the west side which goes over the top and within 15 meters of the station. There is a spring about 275 meters southwest and another one to the east. The station is marked by a standard disk station mark set in a large rock flush with the surface. There is a three-eighth inch drill hole at the intersection of cross lines between the letters "U. S.," on the most western prominent shelf of natural rock distant 9.25 meters in azimuth 181° 21′, and a three-eighth inch drill hole at the intersection of three cross lines on top of a large natural bowlder projecting 1 foot on the southwest face of which are the letters "U. S." inverted, distant 3.24 meters in azimuth 20° 14′.

*Iron* (Lincoln County, J. S. H., 1908). On a prominent cone-shaped hill about 1½ miles north of Yaquina Lighthouse, 4.5 meters north of the extreme high point. The hill is timbered about halfway up and the last 100 meters is very steep and covered with loose stones. The station is marked by a standard disk station mark cemented in the natural rock. For one reference mark there is a drill hole in an outcrop of rock distant 8.195 meters in azimuth 95°

[1] See pp. 81 and 82.

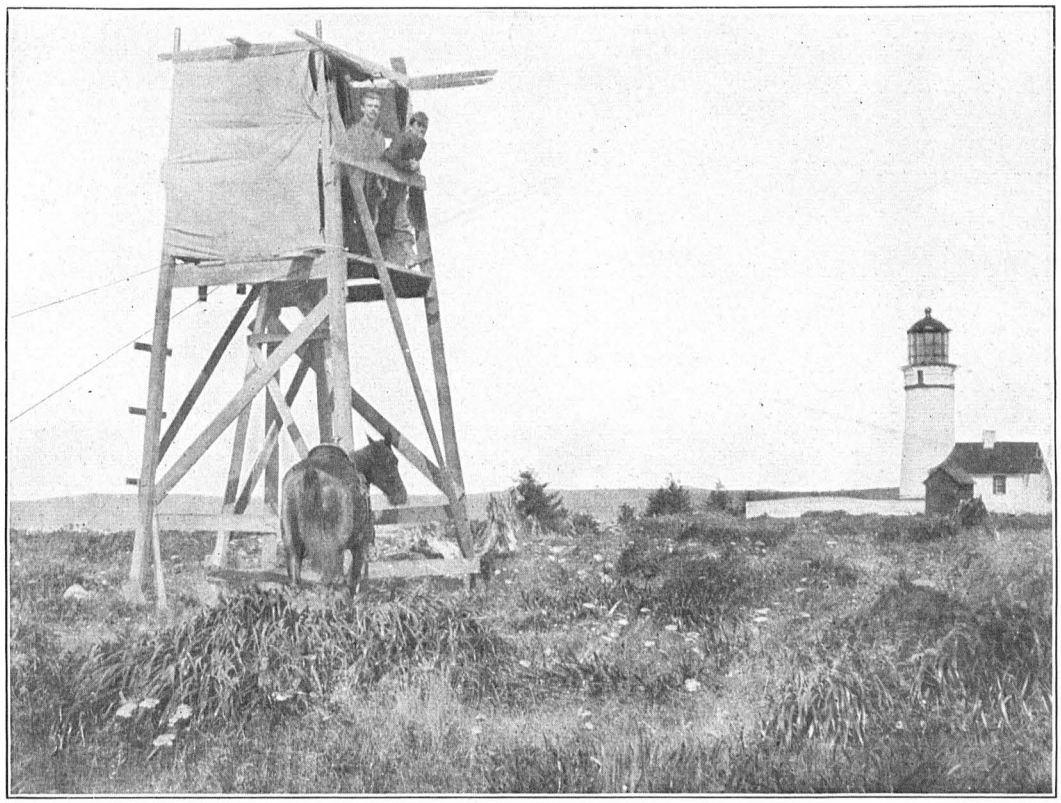

FIG. 4.—STATION CAPE SHOWING THE OBSERVING TOWER WITH THE WIND SHIELD.

19′, and the other is a drill hole in the north end of a quite prominent ledge of rock which lies on the backbone of the ridge which extends northward from the summit, distant 18.260 meters in azimuth 172° 24′.

*Cascade* (Tillamook County, J. S. H., 1908). On the side hill of the southeast ridge of the Cascade Mountain, about 30 meters from the east edge of the timber and 45 meters east-southeast from the top of the first spur. An opening cut through the timber to the north should help to identify the location. The station is marked 2 feet underground by a drill hole at the intersection of cross lines on a flat stone and at the surface by a standard disk station mark set in the end of a large rock. There are four blazed trees marked with nails, as follows: Distant 70.4 meters in azimuth 35° 34′ distant 24.8 meters in azimuth 56° 07′, distant 40.6 meters in azimuth 191° 40′, and distant 43.0 meters in azimuth 288° 11′.

*Salmon* (Lincoln County, J. S. H., 1908). About 6 miles by road and trail southwest of Otis post office on the highest fern-covered hill on the south side of the entrance to the Salmon River, on top of a ridge 1.5 meters across, 27 meters south of the highest point, and directly in the center of the trail. The station is marked by a bolt 1 inch in diameter set in the top of a large rock flush with the surface. The reference marks are 1-inch drill holes one-half inch deep in natural rocks on the hillside; one is distant 3.40 meters in azimuth 85° 54′ and the other is distant 2.00 meters in azimuth 149° 37′.

*Tillamook Head* (Clatsop County, J. J. G., 1874). On the highest point of Tillamook Head, near a large, dry hemlock stump with a copper nail in the top distant 0.70 meter, and a copper nail in a stump northwest is distant 3.99 meters. The station is marked by a drill hole in a stone 18 inches below the surface.

*Saddle Mountain* (Clatsop County, J. J. G., 1874; 1875). Lost.

*Neahkahnie* (Tillamook County, J. J. G., 1875). On the highest point of the east peak of Neahkahnie Mountain. The station is marked by a drill hole in solid rock, and is best reached from the south face of the mountain.

*Foley* (Tillamook County, J. J. G., 1875). On the highest part of a well-defined round-topped grass-covered hill 2,000 feet high between the forks of Foley Creek and one of the tributaries of the south branch of the Nehalem. The station is marked by a one-half inch drill hole in a flat stone 4 inches below the surface. A large dead tree marked by an iron nail bears N. 39° W. magnetic distant 6.20 meters.

*Crag* (Tillamook County, J. J. G., 1875). On a high rocky peak, on the highest part of a ridge running north. The station is marked by a nail hole in a soft rock.

*Miami* (Tillamook County, J. J. G., 1875). A few feet from the summit of the northeast point of the highest hill northwest from the mouth of the Miami River. The station is marked by a drill hole in a granite block projecting 3 inches above the surface.

*Boulder Point* (Tillamook County, I. K., 1866; 1908). On the south side of Tillamook Bay on a heavily timbered prominent point, about 1 mile south of Dick Point dike. The station is marked by a drill hole in a 6-inch square rock buried even with the surface. For reference marks there is a drill hole in a triangular rock projecting about 6 inches, distant 13.27 meters, in azimuth 132° 12′, and a drill hole in a large bowlder projecting 2 feet, distant 5.00 meters, in azimuth 257° 14′.

*Shell Point* (Tillamook County, J. J. G., 1866; 1908). On the east side of Tillamook Bay, on the first prominent point above Bay City, commonly known as Goose Point, about 9 meters from the edge of the grass to the south and 5 meters from the grass to the west. The station is marked by a drill hole in a stone 5 inches square firmly set in the ground. There is a half-inch iron pipe set in a block of concrete 1.083 meters east. This is a United States Army Engineers' station. For a reference mark there is a drill hole in a rounding top stone set above the high-water line, distant 11.59 meters in azimuth 177° 00′.

*Hebo* (Tillamook County, J. S. H., 1908). On a mountain about 3,000 feet high, the highest in the locality, about 27 miles by road south of Tillamook. Approaching from the northwest the station is 4.5 meters to the left of the trail immediately upon reaching the first ridge of the summit. The station is marked 2 feet below the ground by a drill hole in the rock and at the surface by a standard disk station mark set in a flat stone. For reference marks there are drill holes in prominent large rocks; one is distant 6.69 meters in azimuth 67° 54′ and the other is distant 5.82 meters in azimuth 115° 09′.

*Buzzard Butte* (Tillamook County, J. S. H., 1908). Between two small knolls, which are about 4.5 meters apart on top of Bald Butte, west of Beaver, northwest of Hebo, and about 1 mile east and a little south of Buzzard Butte, 1,450 feet above sea level. The station is marked 1½ feet below the surface by a drill hole in a natural rock and at the surface by a standard disk station mark set in a flat rock. The reference mark is a drill hole in a large rock on the highest part of the summit on a small knoll, projecting 3 inches from the ground and distant 2.38 meters in azimuth 227° 30′.

*Ginger* (Tillamook County, J. S. H., 1908). About the center of the top on a little knoll on the highest point of a mountain east of Tillamook, on the Trask River road. The station is marked by a standard disk station mark set in a large rock flush with the surface. The reference mark is an inch drill hole 3 inches deep in a very prominent natural rock formation, distant 9.13 meters in azimuth 44° 00′.

*White* (Douglas County, O. B. F., 1904; 1906). On the highest part of the summit of White Rock, a prominent peak about 15 miles east of Roseburg. The station is marked by a three-eighths-inch copper bolt 3 inches long, cemented into a hole in a large bowlder, and directly above the bolt in the same drill hole is cemented an old-type station mark, which is a disk with a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. A cross in the top of the copper bolt and another in the polished center of the disk mark the station. For

[1] See pp. 81 and 82.

a reference mark there is a drill hole in the top of a three-eighths-inch copper bolt, which is cemented in a large bowlder just east of a prominent ledge and 34.44 meters from the station in azimuth 353° 11′.

*Onion* (Douglas County, O. B. F., 1904; 1906). On the highest part of the bare summit of Onion Springs Mountain, about 1 mile south of Onion Springs, and best reached from Glendale via Galesville and Gilpatrick's ranch. The station is marked by a three-eighths-inch copper bolt cemented in a drill hole in a rocky ledge, and directly above the bolt and in the same hole is cemented an old-type station mark, which is a disk with a polished center surrounded by the raised letters "U. S. C. & G. S." and a raised flange around the edge. A cross in the top of the bolt and another in the polished center of the disk mark the station. The two reference marks are drill holes in three-eighths-inch copper bolts cemented in drill holes; one in a prominent ledge, distant 24.62 meters from the station in azimuth 91° 50′, and the other in an inconspicuous low bowlder at the western edge of the summit and distant 47.22 meters in azimuth 182° 47′.

*Camas* (Coos County, J. S. H., 1906). On the south point of the high ridge which lies to the westward of Camas Valley, locally known as Kenyon Mountain. The eastern and southeastern slopes near the top are bare of trees, while the ridges to the north and west are heavily timbered. The instrument stand was the stump of a tree, so no station mark could be placed. The reference marks are three-fourth-inch holes drilled 2 inches deep in the ledge of rock to the east of the station; one is distant 22.062 meters in azimuth 277° 20′ 14″, and the other is distant 25.540 meters in azimuth 250° 07′ 05″, and the distance between the two marks is 11.700 meters. There is a United States Geological Survey station, a three-fourths-inch copper bolt in the northeast root of a lone fir tree, distant 5.982 meters in azimuth 353° 46′ 14″.

*Boliver* (Coos County, J. S. H., 1907). On a high rocky summit some 25 miles by trail, a little southwest of Camas Valley post office, and about 20 miles by trail west of West Fork station on the Southern Pacific Railroad. The station is marked by a copper bolt 1 inch in diameter and 6 inches long, placed 6 inches below the surface (an old Geological Survey mark), and a standard disk station mark set in cement in a stone is the surface mark. The reference marks are one-half-inch copper bolts set in cement in large stones, one about 6.1 meters southeasterly and the other about 7.6 meters southwesterly.

*Johnson* (Coos County, J. S. H., 1906). On the east side of the open summit known as Lookout Rock, on what is known as Johnson Mountain. About 15 meters southeast of a small fir tree with the lower branches trimmed off. Lines were opened on the west side of the summit to stations *Bennett* and *Sugar*. The station is marked by a standard disk station mark set in a large stone. The reference marks are copper bolts one-half inch in diameter set in cement in large stones, one distant 4.56 meters in azimuth 118° 24′ and the other distant 10.81 meters in azimuth 179° 22′.

*Bennett* (Coos County, J. S. H., 1906). On the highest point of the west summit of Bennetts Butte. The station is marked by a copper bolt set in cement in a drill hole in a stone 10 inches square and 8 inches deep set 2½ feet below the surface, and the surface mark is a standard disk station mark set with cement in a stone. The reference mark is a copper bolt driven in a small fir stump.

*Sugar* (Coos County, J. S. H., 1906). On a high summit 3½ miles east of Myrtle Point on what is locally known as Sugar Loaf Mountain. The station is marked by a copper bolt set in cement in a stone 2½ feet below the surface, and over this is a standard disk station mark set in concrete. There is a one-half-inch copper bolt driven in a small alder tree, distant 17.41 meters in azimuth 224° 24′ 05″, and another in a tree 3 feet above the ground, distant 7.69 meters in azimuth 294° 06′ 33″.

*Westport* (Coos County, J. S. H., 1906). On the highest point of a long, burned ridge, near the north and west edges of a summit covered with snags and second-growth trees. The station is marked by a one-half-inch copper bolt set with cement in a block of wood 10 inches in diameter and 12 inches long set 2½ feet below the surface, above which is a standard disk station mark set in a similar block of wood. There is a one-half-inch copper bolt driven in a snag distant 11.39 meters in azimuth 109° 26′, and a similar mark in a stump distant 19.19 meters in azimuth 259° 11′.

*Cathcart* (Coos County, J. S. H., 1906). On a wooded summit of the same name as the station, about 11 miles east of Marshfield. The station is marked by a one-half-inch copper bolt set in cement in a stone block 10 inches square by 8 inches deep, buried 2½ feet, and directly above this is a standard disk station mark set in a stone 12 inches square by 8 inches deep. The reference marks are one-half-inch copper bolts driven in blazed stumps, one distant 8.05 meters in azimuth 40° 04′ 04″, and the other is distant 7.04 meters in azimuth 343° 58′ 56″. There is a blazed tree 4.6 meters east of the station. This is an old United States Geological Survey triangulation station.

*Noah* (Coos County, J. S. H., 1906). On a high summit locally known as Noahs Butte, covered with second-growth timber, about 5 miles a little north of east from Marshfield. The station is marked by a copper bolt set in a cut stone 2½ feet below the surface, and at the surface by a standard disk station mark set in a cut stone. For reference marks there are one-half-inch copper bolts driven in the tops of large stumps, one distant 14.18 meters southwest, and the other distant 12.41 meters south.

*Marshfield Hill* (Coos County, E. F. D., 1889; 1906). On the brow of the hill just back of Marshfield, about 230 feet above the bay, and about 45 meters north of Nashburg's house. The station is marked by a one-half-inch copper bolt set in a stone buried 3 feet below the surface, and directly above this is a standard disk station mark set in a stone. The reference marks are one-half-inch copper bolts driven in large stumps, one distant 15.22 meters in azimuth 150° 16′ 45″, and the other distant 4.68 meters in azimuth 264° 23′ 17″.

*Cape* (Curry County, J. S. H., 1907). Near the middle one of the three most western projecting points of Cape Blanco and close to the fence line which follows the edge of the cliff. The station is marked by an empty cartridge cemented in a drill hole in the rock 2 feet below the surface and directly over it is a standard disk station mark. The

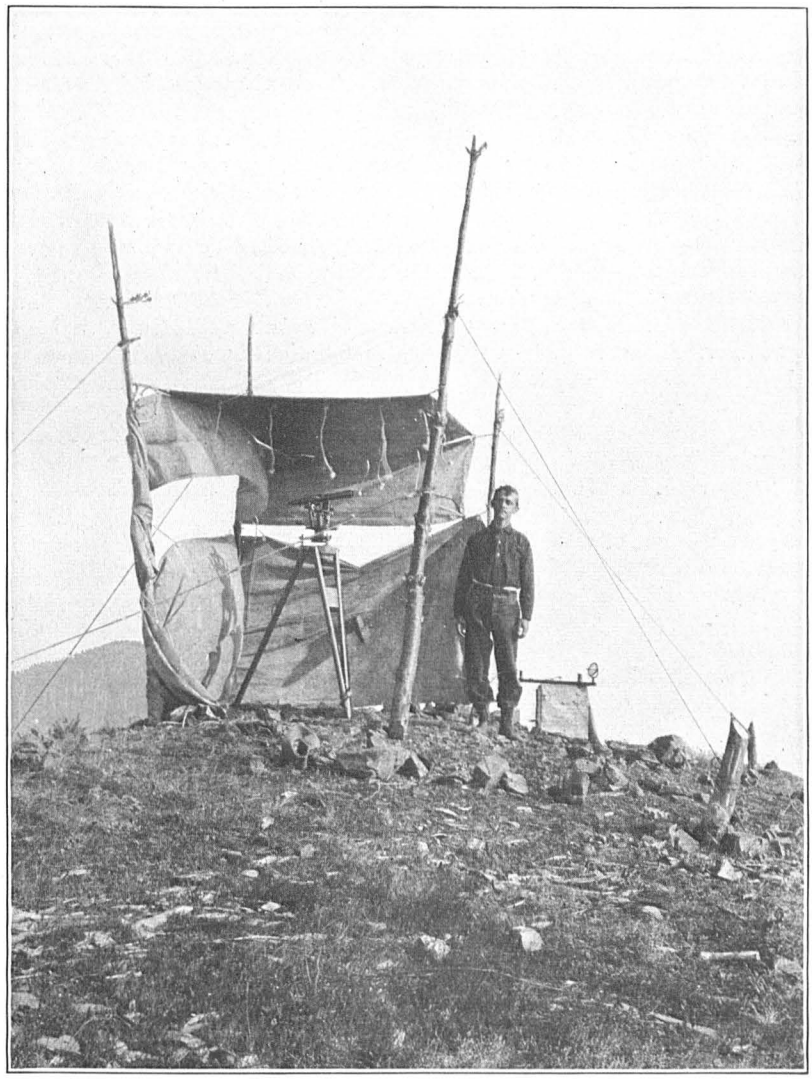

FIG. 5.—STATION BALD SHOWING THE 8-INCH POSITION INSTRUMENT IN PLACE, PROTECTED BY A WIND SHIELD.

reference marks are stones with one-half-inch drill holes in them, one is in the fence line along the cliff in range with the center line of the twin windows on the west side of the first story of the lightkeepers' dwelling, distant 8.56 meters, and the other is in range with the flagpole near the cliff to the north of the station, distant 6.84 meters, and the flagpole is distant 23.23 meters.

*Madden* (Curry County, J. S. H., 1907). On a heavily timbered butte 1½ miles northeast of Charles Zumwalt's place, on the Langlois-Port Orford stage road, one-half mile north of the Sixes River, about 25 or 30 feet southwest of the highest point of the butte. The station is marked by a cartridge shell set in a rock 8 inches square by 12 inches deep 1½ feet underground, and the surface mark is a standard disk station mark set in a stone flush with the surface. The reference marks are one-half-inch iron bolts driven into triangular blazes on fir trees, one distant 3.53 meters in azimuth 189° 31′, and the other distant 5.83 meters in azimuth 293° 38′.

*Butler* (Curry County, J. S. H., 1907). On the highest point of the highest isolated peak of Mount Butler. The station is marked by a three-fourths-inch iron bolt with a square head covered with sheet copper, marked with a cross, and the whole cemented into solid rock. There are two reference marks, each one-half-inch round iron set in drill holes in the rock, one distant 2.59 meters in azimuth 222° 22′, and the other distant 8.33 meters in azimuth 276° 22′.

*Sixes* (Curry County, A. W. C., 1869; 1905). On a high bank south of the Sixes River. The station is marked by a square block of wood with a hole drilled in it and filled with lead and placed 3 feet below the surface, over which is a bottle placed neck down. The surface mark is a standard disk station mark set in concrete. The reference marks are one-half-inch round iron driven into the sides of two small fir tree stumps, one distant 5.38 meters in azimuth 346° 50′, and the other distant 3.48 meters in azimuth 281° 07′.

*Heads* (Curry County, A. W. C., 1869; 1907). On the northern slope of the hill known as Port Orford Heads, in the center of an open field, about 200 yards south of Jensen's house, and about in range with the west side of the house and Maddens Butte. The station is marked by a 1½-inch drill hole in a block of stone filled with lead and buried 3 feet below the surface. At the surface is a standard disk station mark set in a stone. The two reference marks are five-eighths-inch drill holes in stones set flush with the surface of the ground, one distant 23.37 meters in azimuth 156° 53′ and the other distant 13.78 meters in azimuth 301° 55′. There is a blazed pine tree east 37.0 meters.

*Port Orford Astronomical 2* (Curry County, J. S. H., 1907). On the high point and 12 meters from the edge of the bank, in a north and south fence line. The station is marked by a block of blue sandstone with a hole drilled in the top and filled with lead. The two reference marks are one-half-inch drill holes in blocks of sandstone set flush with the surface, one distant 9.11 meters in azimuth 88° 47′, and the other distant 14.68 meters in azimuth 192° 18′.

*Bald* (Curry County, J. S. H., 1907). On the highest point of the bare peak of Bald Mountain about 13 miles southeast of Port Orford by wagon road and trail. The station is marked by a three-fourths-inch iron bolt with a square head covered with sheet copper which is marked with a cross. The bolt is cemented into the rock with its top 6 inches below the surface. There is a pile of stones around the hole in the rock. The reference marks are three blazed trees.

*Squirrel* (Curry County, J. S. H., 1907). On the southwest summit of Bear Camp Ridge, locally known as Squirrel Camp, which lies between the Rogue and Illinois Rivers. The station is about 8 meters southwest of the highest point on the north side of an outcrop marked with a piece of brass one-half inch in diameter with a cross on the top set in rock. There is a piece of brass one-half inch in diameter set in the face of a rock lying on the brow of the hill distant about 14.5 meters in azimuth 111°, and a brass cartridge shell set in stone on the ridge distant about 10.4 meters in azimuth 1°.

*Stack* (Curry County, J. S. H., 1907). On the highest stack of rocks on what is known as Whiskey Flats. The station is a cartridge cemented in a 1-inch drill hole in a rock which lies between two larger and higher rocks bearing nearly east and west. The reference marks are cartridges cemented in holes in the rock, one distant 5.005 meters in azimuth 148° 20′, and the other distant 7.23 meters in azimuth 245° 40′.

*Craggy* (Curry County, J. S. H., 1907). On the spur of the highest peak of Craggy Mountains, about 100 yards west of the summit, on the second level bench from the top and 150 feet lower. The station is marked by a one-half inch drill hole in a rock. One reference mark is a 1½-inch drill hole 1 inch deep, in the bottom of which is a one-half inch drill hole, distant 1.59 meters in azimuth 229° 28′, and the other is a shallow 1½-inch hole in the top of a large isolated rock, distant 7.40 meters in azimuth 318° 22′.

*Bosley* (Curry County, J. S. H., 1907). On Bosley Mountain about 5 meters north of the highest point of rock on a level space. The station is marked by a standard disk station mark set in rock. The reference marks are one-half inch holes drilled in prominent rocks, one distant 7.63 meters in azimuth 261° 18′, and the other distant 7.98 meters in azimuth 23° 07′. A short distance south and a little higher than the station is a United States Geological Survey cairn.

*Sundown 2* (Curry County, J. S. H., 1907). See the description of *Sundown* and the list of positions for the relation of the two stations. The station is marked by a standard disk station mark set in a stone 10 inches square and 14 inches deep, set level with the surface of the ground. A stone cube 16 inches on an edge with a drill hole in the top was set in the ground distant 6.58 meters in azimuth 77° 26′, and there is a one-half inch drill hole in the top of a rock distant 10.09 meters in azimuth 346° 23′. A fir tree 1½ feet in diameter is marked with a nail in a triangular blaze 6 feet from the ground distant about 24.73 meters in azimuth 229° 10′, and a large wire nail in the root of a fir tree stump is distant 16.895 meters in azimuth 359° 22′.

*Grizzly* (Curry County, J. S. H., 1907). On a bushy summit of Grizzly Mountain, about 6 miles by trail southeast of Gold Beach. Grizzly Mountain has two peaks probably 90 meters apart and the station is on the highest point of the northern peak. The station is marked by a hole drilled in a stone set 1 foot below the surface, above which is placed

a standard disk station mark set in a stone level with the surface. The reference mark is a drill hole in the top of a flat rock set in the top of the ridge south of the station, distant 14.38 meters in azimuth 346° 42′.

*Pollywog* (Curry County, H. A. S., 1913). On the highest part of the wooded butte about one-half mile south of Pollywog Butte, on the ridge extending south from Quail Prairie, and lying about 6 miles west of the Red Mountain range. The station is marked according to note 12,[1] with a large cairn of stones surrounding the mark.

*Elk* (Curry County, H. A. S., 1913). On the highest part of the well-known Elk Mountain, which stands on the north bank of the Winchuck River, about 8 miles from the mouth. The station is marked by a standard disk station mark set in a block of concrete 12 by 12 by 24 inches, and a standard disk reference mark is set in a block of concrete distant 2.599 meters in the direction of Bosley Mountain.

*Pack Saddle* (Curry County, H. A. S., 1913). On the highest part of Pack Saddle Mountain, a double-peaked mountain about 12 miles by trail from the Winchuck ranger station. The southwestern peak of this mountain is used by the Forest Service as a lookout station. The station is marked according to note 12,[1] with a standard disk reference mark cemented into a drill hole in the rock, distant 4.049 meters in range between the station and *Elk*.

Oregon, Cal.

*High Divide* (Del Norte County, Cal., H. A. S., 1913). On the highest part of the western bench of the plateau known as High Divide, about 10 miles east of Smith River Corners, Cal. The station is marked according to note 12,[1] with a cairn of stones built 3 feet high over and around the mark. There is a standard disk reference mark set in the highest stone on the hill, almost due west of the station, distant 8.495 meters.

*Long Ridge* (Del Norte County, Cal., H. A. S., 1913). On the highest part of the mountain known as High Dome. This mountain stands about 12 miles northeast of Gasquets Stage station. The station is marked according to note 12,[1] with a standard disk reference mark cemented into a drill hole in the top of a large square rock in place, distant 6.892 meters, in range between the station and *High Divide*.

*Bald Hill* (Del Norte County, Cal., H. A. S., 1913). About 1 mile beyond the Bald Hill ranch house on the old Kelsey trail. The station is marked according to note 12,[1] with a standard disk reference mark cemented into a drill hole in the top of a rock in place, distant 4.563 meters west of the station.

*Gordon* (Del Norte County, Cal., H. A. S., 1913; 1914). On the highest part of the summit of Gordon Creek Mountain, the large mountain standing on the west side of Hurdy Gurdy Creek. The station is marked according to note 12,[1] with a standard disk reference mark cemented in a drill hole in the top of a large rock about 4 feet high, distant 14.417 meters in range between the station and *Crescent City Lighthouse*.

*Child* (Del Norte County, Cal., H. A. S., 1913; 1914). On the western end of the highest part of what is known as Child's Hill, about 6 miles south of the well-known Bald Hills. The station is marked according to note 12,[1] with a standard disk reference mark set in a block of concrete 5.040 meters west.

*Rattle* (Del Norte County, Cal., H. A. S., 1914). On the highest part of Big Rattlesnake Mountain, which lies between Red Mountain and the south branch of the Smith River. The station is marked by a standard disk station mark set in an irregular block with a large cairn of rocks built around it. A standard disk reference mark set in a block of concrete is distant 7.90 meters north of the station.

*Red Mountain* (Del Norte County, Cal., H. A. S., 1913; 1914). About 5 meters north of the highest part of Red Mountain, about 20 miles east of Requa, Cal., on the north bank of the Klamath River. The station is marked according to note 12.[1] A large monument of stone standing 10.760 meters east of the station was used as a reference mark.

*Mound* (Del Norte County, Cal., H. A. S., 1914). On the small grassy knoll almost due south and about 100 feet below the summit of the first hill north of the mouth of the Klamath River, on what is known as the Lockwood place. The station is marked by a standard disk station mark set in a block of concrete, with a standard disk reference mark set in a pine tree about 3 feet above the ground, distant 12.650 meters north.

*Klamath South 2* (Del Norte County, Cal., H. A. S., 1914). On the highest part of the bald hill standing on the south side of the mouth of the Klamath River. The station is marked by a standard disk station mark set in a block of concrete, with a standard disk reference mark cemented into a drill hole in a rock in place, distant 4.280 meters east.

*Flint Rock 2* (Del Norte County, Cal., H. A. S., 1914). On the seaward face of the highest point of the large rock about 1 mile below the mouth of the Klamath River. The station is marked by a standard disk station mark set in a block of concrete, with a standard disk reference mark set in a block of concrete, distant 3.96 meters east.

*Flint Ridge* (Del Norte County, Cal., A. W. C., 1872; 1914). On the long sloping ridge back of Flint Rock, about 800 feet in elevation and 50 or 60 meters from the forest edge. The station is marked by a bottle buried 3 feet below the surface and at the surface by a standard disk station mark set in a bed of concrete.

*High Bluff* (Del Norte County, Cal., A. W. C., 1871; 1914). On the highest part of the first prominent point south of Flint Rock, about 1 meter from the edge of the bluff, which is the northern face and is almost perpendicular. The station is marked by a standard disk station mark set in a block of concrete surrounded by a large cairn of stones.

### SUPPLEMENTARY POINTS.

*Life* (Lincoln County, J. S. H., 1908). On top of a high hill about 365 meters from an old life-saving station, 27 meters from a corner of a lookout cabin, and 37 meters from the edge of the bluff. The station is marked according to note 11;[1] one reference mark is distant 8.30 meters in azimuth 47° 12′, and the other is distant 7.35 meters in azimuth 160° 52′.

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[1] See pp. 81 and 82.

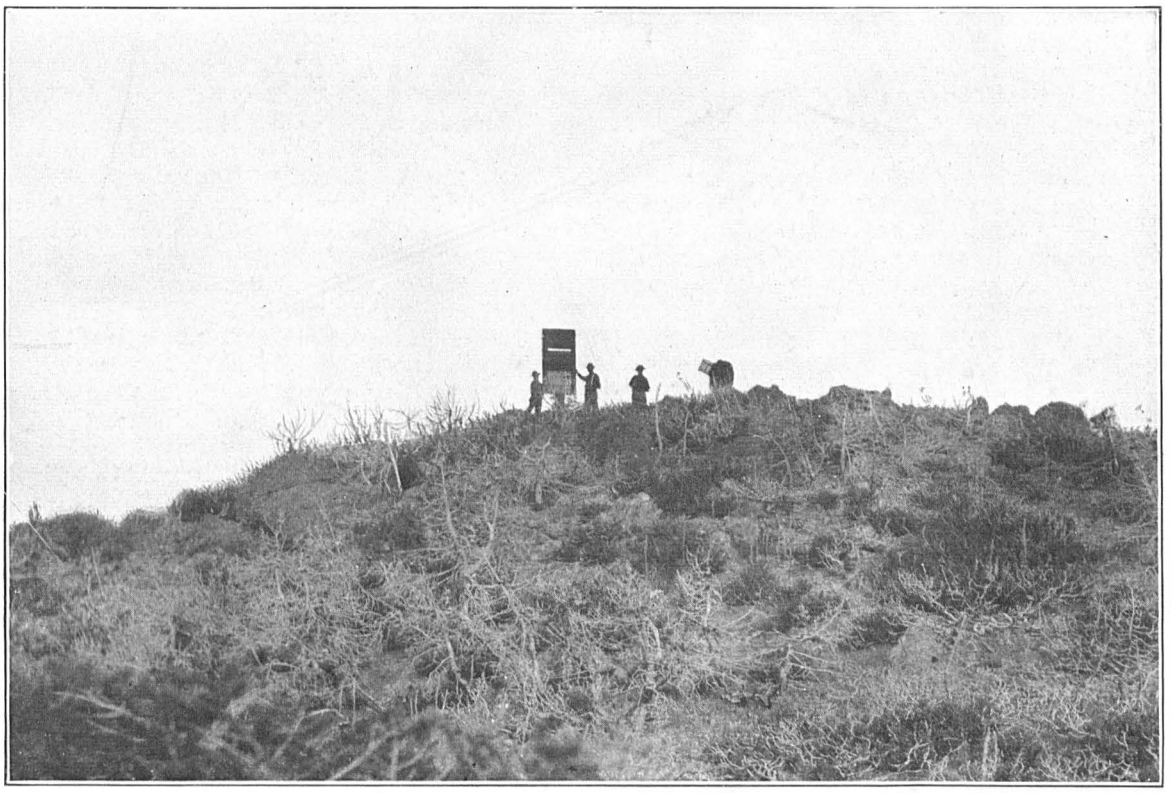

FIG. 6.—STATION BOSLEY SHOWING THE TYPE OF TARGET USED FOR THE SHORTER SECONDARY LINES.

*Bill* (Coos County, J. S. H., 1907). On the highest point of the bare summit known as Bill Peak. The Bandon trail passes at the foot of the summit. The station is marked by a drill hole in a rock 12 inches underground and at the surface by a rock which shows the locality but not the exact spot. One reference mark is a cartridge set in cement in solid rock north 9.10 meters, and the other is a wire nail set in cement in a drill hole in solid rock west 4.63 meters.

*Edson* (Curry County, J. S. H., 1907; 1909). About 25 meters north of the highest point of Edson Butte. There is a United States Geological Survey station marked by a pile of stones at the summit of the butte. The station is marked by a three-eighth inch iron plug with a punch hole in the top, set in cement in a drill hole in the rock, and standing 2 inches above the surface. The reference mark is a cartridge set in cement in a drill hole in the rock distant 5.16 meters in azimuth 140° 51′ 31″.

*Cotton* (Coos County, J. S. H., 1907). On the southwestern spur of the ridge of which Bennett Butte is the summit, about 7 meters west and a little south of the highest point, midway between two large fir snags, and a few feet south of the line joining them. The station is marked by a three-eighths inch drill hole in the top of a rock set 10 inches below the surface and by a three-eighths inch iron slug set in concrete at the surface of the ground.

*Camas U. S. G. S.* (Coos County, U. S. G. S., 1907). See the description of Camas.

*Bear Mountain* (Siskiyou County, Cal., H. A. S., 1914). This is the large rugged individual-looking mountain lying just south of Preston Peak. The top is broad and flat and has several small peaks, none of them rising very high above the summit of the mountain proper.

*Preston Peak* (Josephine County, H. A. S., 1914). This is the highest mountain of the Siskiyou group. The summit is sharp and the sides are steep. There are several slides and waterfalls on the sea side of the summit, and these make it easy to identify.

*Second Peak north of Preston Peak* (Josephine County, H. A. S., 1914). This is the second peak north of Preston Peak, along the same ridge. The peak is very sharp and the south slope is steep, looking from a distance as if it were a perpendicular bluff. It resembles Preston Peak in outline and general appearance, but is not so high.

*Four Brothers No. 1* (Del Norte County, Cal., H. A. S., 1914). One of the four peaks of Ship Mountain, lying near the southwestern end of the Siskiyou range. They all look alike. They come to a sharp peak and the sides are steep. They lie a little closer to the coast than the balance of the Siskiyou group.

*Four Brothers No. 2* (Del Norte County, Cal., H. A. S., 1914). See the description of Four Brothers No. 1.

*Four Brothers No. 3* (Del Norte County, Cal., H. A. S., 1914). See the description of Four Brothers No. 1.

*Four Brothers No. 4* (Del Norte County, Cal., H. A. S., 1914). See the description of Four Brothers No. 1.

## COLUMBIA RIVER TO TILLAMOOK BAY.

### PRINCIPAL POINTS.

*Redwood* (Tillamook County, J. J. G., 1875; 1885). About 2 miles from the point of the sand spit which separates the Nehalem River from the ocean, about 30 meters back from the high-water mark. The station is marked by a drill hole in a stone 2 feet below the surface.

*Fishery* (Tillamook County, J. J. G., 1875). On the east side of the Nehalem River, 3 miles above the mouth, on Fishery Point. The station is marked by a drill hole in a stone 10 inches below the surface.

*Seely* (Tillamook County, J. J. G., 1875). Lost.

*Landing* (Tillamook County, J. J. G., 1875). On Landing Point 120 meters south of some large rocks, about 5 meters back from the high-water mark and 6 feet above it. The station is marked 1 foot below the surface by a drill hole in a rock. There are three stakes around the station each distant 1.83 meters.

*Point* (Tillamook County, J. J. G., 1875). On the highest part of the sand spit one-third mile from the point, near the mouth of the Nehalem River. The station is marked 2 feet below the surface by a drill hole in a stone. Three stakes were set each distant 1.83 meters from the station.

*Keaton* (Tillamook County, J. J. G., 1875). The station is marked by a drill hole in a stone 2 feet below the surface and probably is lost.

*Carlton* (Tillamook County, J. J. G., 1875). On the narrow ridge on top of the tall butte on the shore line at the western slope of the Neah-kah-nie mountain. The butte is bare except on the northern part which is covered with scrubby spruce and grass. The station is 0.9 meter from the edge of the bluff to the west and 28 paces from the point to the north. The station is marked 6 inches below the surface by a drill hole in a rock.

*Sherman* (Clatsop County, J. J. G., 1874). On the highest knoll of the high sand ridge near the ocean, about 4 miles south of Point Adams. The station is marked 2 feet underground by a drill hole in a stone. There are three stakes around the station, each distant 1.83 meters.

*Boom* (Clatsop County, J. J. G., 1874). On a sand ridge about 75 meters from the shore and about 80 feet above sea level, about 230 meters north of a fence. The station is marked 2 feet below the surface by a drill hole in a rock. There are three stakes around the station, each distant 1.83 meters.

*Morrison* (Clatsop County, J. J. G., 1874). On a grassy sand hill which runs the entire length of Clatsop Plains, 41 meters north of a fence, and 60 paces west of another and lower ridge beyond which is a creek. The station is marked 1½ feet below the surface by a drill hole in a stone. Three stakes were placed around the station distant 1.83 meters.

*Goodwin* (Clatsop County, J. J. G., 1874). On a grassy sand ridge, the second west of Mr. Goodwin's house, 11 meters west of the brow of the hill, and 109 meters south of a fence. The station is marked 1½ feet below the ground

by a drill hole in a stone. Three stakes are set around the station, distant 1.83 meters. Mr. Goodwin's house bears S. 44° 30′ E. magnetic, distant 375 meters.

*Lake* (Clatsop County, J. J. G., 1874). On the high ridge at the ocean beach, 107 paces north of the south boundary of Mr. Goodwin's land, 200 meters southwest of a small lake, and 100 paces back from the high water, and 60 feet above it. The station is marked 2 feet below the surface by a drill hole in a stone. Three stakes were set around the station, each distant 1.83 meters.

*Condit* (Clatsop County, J. J. G., 1874). On the second sand ridge west of the road, 46 paces south of Mr. Condit's north boundary fence, and 10 paces west from the brow of the hill. The station is marked 2 feet below the surface by a drill hole in a stone. Three stakes are set around the station, each distant 1.83 meters.

*Callender* (Clatsop County, J. J. G., 1874). On the highest sand hill in the vicinity, 83 meters from the high-water mark, and 75 feet above it, 6 paces west and 20 paces east from the edges of the knoll, and 22 paces from the point of the knoll toward Tillamook Head. The station is marked 2 feet below the surface by a drill hole in a stone. Two stakes are set, one on either side of the station, in a line parallel with the shore, and one at right angles to this line to the east, each distant 1.83 meters.

*Gearhart* (Clatsop County, J. J. G., 1874). On a sand ridge about one-half mile north of the mouth of Nekanakum Creek, 120 paces back from the shore line, 35 meters N. 60° E. magnetic of a round grassy mound, and 50 feet above high tide. The station is marked 2 feet below the surface by a drill hole in a stone. There are two stakes, one on either side of the station, in a line parallel with the shore, and one stake inshore from the station, each distant 1.83 meters.

*Meadow* (Clatsop County, J. J. G., 1874). In a long meadow on the ridge nearest the timber, from which it is 100 paces distant, and 430 meters south of a fence. The station is marked 1½ feet below the surface by a drill hole in a rock. Three stakes, one each north, south, and east, are distant 1.83 meters. There is a copper nail in a blazed pine tree S. 8° 30′ E. magnetic, distant 93 paces.

*Loomis* (Clatsop County, J. J. G., 1874). On the east bank of the Nekanakum Creek, 650 meters south of its junction with the Neocoxie Creek, a few meters west of the county road, and 3 meters from the edge of a bluff which is 12 feet high. The station is marked 1½ feet below the surface by a drill hole in a stone. Two stakes are set in a line parallel with the bank and one at right angles inshore, each distant 1.83 meters. Mr. Loomis's residence is distant 285 meters N. 44° E.

*Grimes* (Clatsop County, J. J. G., 1874). On the peninsula between the ocean and Nekanakum Creek, 870 meters north of a road leading to the beach, 10 meters west of the edge of the pines, 132 meters back from the high-water mark, and 15 feet above the tide. The station is marked 2 feet below the surface by a drill hole in a stone. Two stakes are placed in a line parallel with the beach and one at right angles to this line inshore, each distant 1.83 meters.

*Dunce* (Clatsop County, J. J. G., 1874). On the rocky shore line between the high-water line and the foot of the bluff, at the most westerly point that can be seen from the Seaside House, 4 meters below the extreme high-water mark, and 6 meters above ordinary high water. The station is marked by a drill hole in the top of a flat bowlder flush with the surface.

*Rivulet* (Clatsop County, J. J. G., 1874). In front of the highest part of the last yellow bluff, 100 meters east of a small stream, 15 paces from the foot of the bluff, and 4 paces from the ordinary high-water mark. The station is marked by a drill hole in the top of a large bowlder.

*Cliff* (Clatsop County, J. J. G., 1874). On the most distant point on Tillamook Head, visible from stations Loomis and Grimes, 1 meter in front of the vertical wall of the cliff, and 8 meters from the ordinary tide line. The station is marked by a drill hole in the top of a large irregular bowlder 3 feet high, 4 feet long, and 2 feet wide on top.

*Ledge* (Clatsop County, J. J. G., 1874). Between the foot of the bluff and the high-water mark. The station is marked by a drill hole in the top of a large bowlder.

*Islet 1* (Clatsop County, J. J. G., 1874). A rocky island nearest the shore, 150 feet high, and pointed at the top.

*Islet 2* (Clatsop County, J. J. G., 1874). It is the second island from the shore and second also in size. It is 120 feet high and pointed at the top.

*Pinnacle Rock* (Clatsop County, J. J. G., 1874). A tall rock pillar about 30 feet high at the most western point of Tillamook Head, 10 paces from the foot of the cliff, and surrounded by water at high tide. It has a large base, slim body, and is pointed at the top.

*Dexter* (Clatsop County, J. J. G., 1874). In the deepest part of the bight northeast of Tillamook Head at the point where the Nekanakum Creek approaches nearest to the ocean, on a rocky ridge just back of the driftwood, 13 meters back of the high-water mark, 120 meters west of one fence and 132 meters east of another fence, and 30 paces north of a road. The station is marked by a drill hole in a bowlder flush with the surface.

*Flagstaff* (Clatsop County, J. J. G., 1874). Flagstaff standing near the bathhouse attached to the Seaside House.

*Seaside House, cupola* (Clatsop County, J. J. G., 1874). Flagstaff on the cupola of Mr. Ben Holliday's hotel, the Seaside House.

*Falcon* (Tillamook County, J. J. G., 1875). On the southwest part of Cape Falcon, on the highest part of the prairie where it begins to slope to the westward, 4 paces from the edge of the bluff to the south, and 20 paces to the edge at the west. The station is marked 1½ feet below the surface by a drill hole in a stone. Two stakes were set, one on either side of the station, in a line parallel with the southern edge of the bluff and one to the north at right angles to this line, distant 1.83 meters.

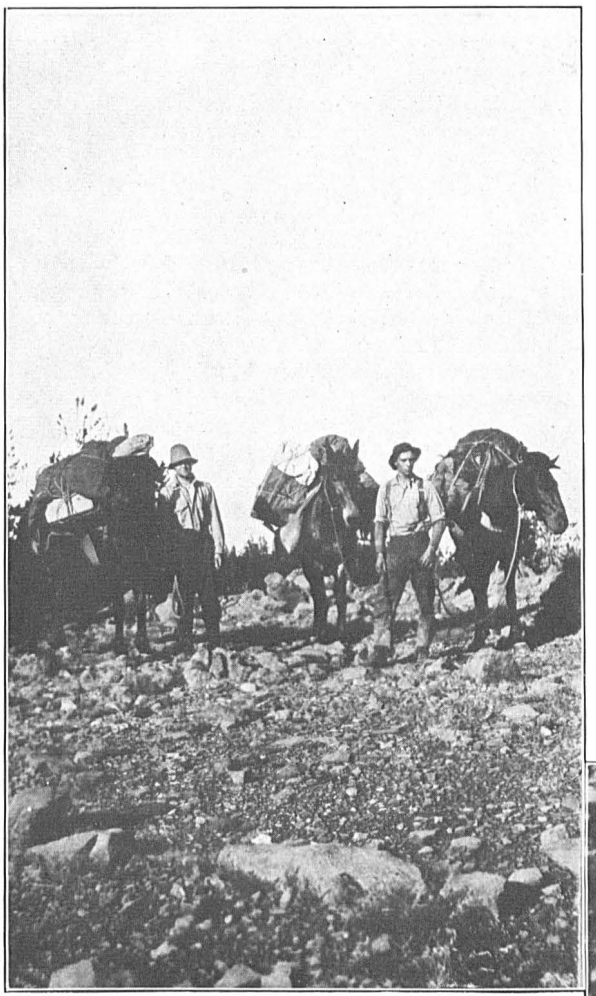

FIG. 7.—A POINT ON A ROCKY SECTION OF THE TRAIL BETWEEN RED MOUNTAIN AND RATTLESNAKE MOUNTAIN, SHOWING THE PACK ANIMALS.

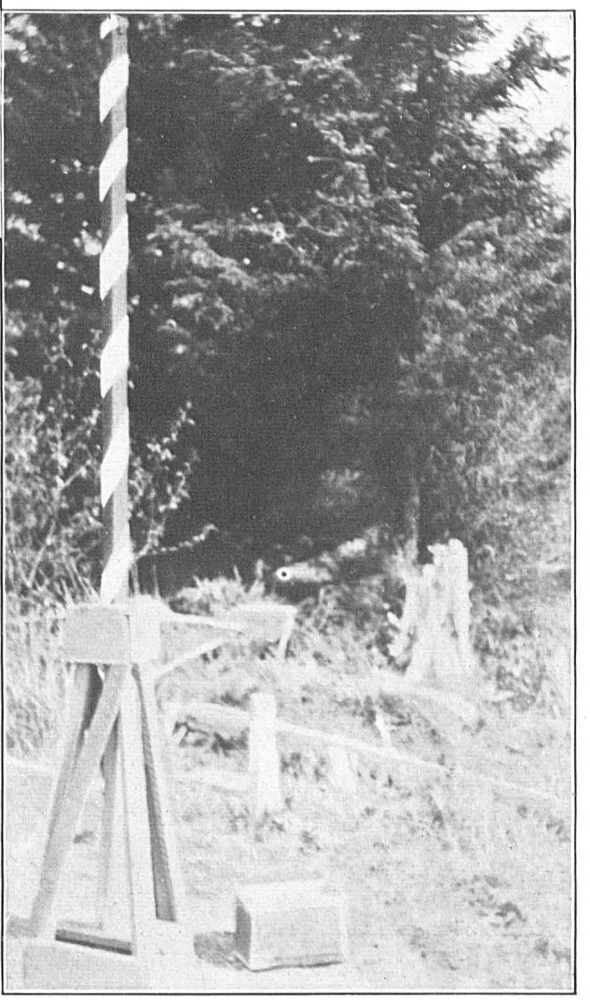

FIG. 8.—THE TYPE OF COMBINATION SIGNAL AND INSTRUMENT STAND USED BY ONE CHIEF OF PARTY WHERE THE LINES WERE SHORT.

*Bend* (Tillamook County, J. J. G., 1875). On the south side of the Nehalem River, on a rounding point partly covered with grass. The station is marked 2 feet below the surface by a drill hole in a stone. There are two blazed spruce trees; one bears N. 71° W. (magnetic), distant 9.93 meters, and the other bears N. 55° E. (magnetic), distant 11.73 meters.

## TILLAMOOK BAY.

### PRINCIPAL POINTS.

*Doty* (Tillamook County, J. S. H., 1908). On the second small spur, 185 meters from the summit, and the same distance beyond the first prominent spur below the summit, 1,360 feet above the sea level. The station is marked by a standard disk station mark set in a rock projecting 2 inches above the surface. The reference mark is a drill hole at the intersection of cross lines in a rock projecting 3 inches above the surface, distant 2.10 meters in azimuth 110° 57′.

*Green Hill 2* (Tillamook County, J. S. H., 1908). On the southeast slope of a hill about 45 meters from the highest part, and below all the prominent trees. The station is marked according to note 11,[1] except the reference marks are nails driven into blazed trees. One reference mark is distant 7.8 meters in azimuth 145° 25′ and the other is distant 5.3 meters in azimuth 221° 07′.

*Pitcher Point* (Tillamook County, J. K., 1866; 1908). A few meters east of the extremity of the last prominent point, approaching from the east, on the south side of Tillamook Bay, about 4 meters northwest of the bluff. The station is marked by a drill hole in a stone, buried on the beach below the high-water mark. There is a large cross cut in the top of a prominent rock distant 2.77 meters in azimuth 202° 27′.

*Tillamook Bay, west base* (Tillamook County, J. K., 1866). On the northwest side of the bay, about 50 meters north of Killchep Point, and near the high-water mark. The station is marked by a drill hole filled with lead, in a stone 2½ feet long, set with the top level with the surface. Two stones were placed one on either side of the station and in line with it and another at right angles to this line, and a drill hole in the top of each is distant 1.22 meters.

*Rocky Point* (Curry County, 1866; 1869). Lost.

*Mud* (Tillamook County, J. K., 1866). On the flats south of the bay, below the high-water mark. The station is marked according to note 10.[1]

*Slough* (Tillamook County, J. K., 1866). Near the edge of a slough, on tide land on the southeast side of Tillamook Bay. The station is marked according to note 10.[1]

*Tillamook Bay, east base* (Tillamook County, J. K., 1866). On the north side of the bay and about 20 meters from the high-water mark, and in front of and about 10 meters distant from Peter Morgan's house. The station is marked by a drill hole filled with lead in a stone 2½ feet long, set with the top level with the surface. Two stones were placed, one on either side of the station and in line with it, and another at right angles with this line, and a drill hole in the top of each is distant 1.22 meters.

*Sand 1908* (Tillamook Bay, J. S. H., 1908). On the west edge of the sand spit on the west side of Tillamook Bay. The station is marked by a nail driven in the top of an old log.

*Pyramid Rock* (Tillamook County, J. S. H., 1908). On the highest point of a large rock, said to be 109 feet high, about 5 miles south of Tillamook bar and 1 mile offshore northwest of Cape Mears Lighthouse. The station is marked by a galvanized-iron pipe 18 inches in diameter and 4 feet long riveted on a brass pipe, which is cemented 1½ feet in the rock. The upper half of the pipe is painted black and the lower half white.

*Spit* (Tillamook County, J. S. H., 1908). On a sand spit on the west side of Tillamook Bay, marked by a redwood post in the sand and projecting 18 inches.

*Stump* (Tillamook County, J. K., 1866). On the north bank of the Kilchis River, and is covered at high water. The station is marked according to note 10.[1]

*Sandstone Point* (Tillamook County, J. K., 1866). Lost.

*Flat* (Tillamook County, J. K., 1866). On the flats, covered at high water, on the west side of Tillamook Bay. The station is marked according to note 10.[1]

*Memalust Head* (Tillamook County, J. K., 1866). Lost.

*Sand Hill* (Tillamook County, J. K., 1866; 1885). On a prominent sand hill on the west side of Tillamook Bay. The station is marked by a drill hole in a rock.

*Bailey Point* (Tillamook County, J. K., 1866). On a prominent point about 100 meters south of Bailey's house. The station is marked according to note 10.[1]

*Green Hill* (Tillamook County, J. K., 1866; 1875). Lost.

*Brush* (Tillamook County, J. K., 1866; 1885). On a high sand hill on the west side of a sand spit, and is marked by a drill hole in a stone.

*Middle* (Tillamook County, J. K., 1866). On the highest part of a ridge. The station is marked according to note 10.[1]

*Sand* (Tillamook County, J. K., 1866). On the sand spit near the south side of the entrance to Tillamook Bay. The station is marked 3 feet below the surface by a drill hole in a stone.

*Log* (Tillamook County, J. K., 1866). On the north shore of the bay, near the high-water mark. The station is marked according to note 10.[1]

*Gap* (Tillamook County, J. K., 1866). Lost 1908.

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[1] See pp. 81 and 82.

## NESTUGGA BAY.

### PRINCIPAL POINTS.

*Round Top* (Tillamook County, J. S. H., 1908). On the highest point of the most prominent bald butte west of Cloverdale, 1,130 feet above high-water mark. The station is marked 1½ feet below the surface by a drill hole in a flat rock and at the surface by a drill hole in a triangular-shaped rock. The reference marks are two blazed snags, one distant 10.9 meters in azimuth 34° 50′, and the other distant 1.40 meters in azimuth 216° 35′.

*Flat* (Tillamook County, J. S. H., 1908). On the highest part of a low, bare, flat-topped ridge about 3½ miles from Cloverdale. The station is marked by a drill hole in the natural rock 14 inches below the surface; over this is a drill hole in an irregular-shaped rock level with the surface. Three galvanized-iron nails in a blaze in an old snag 5 feet in diameter are distant 3.07 meters in azimuth 23° 10′.

*Fletcher* (Tillamook County, C. R., 1883; 1908). On the south side of the Little Nestugga River, 35 meters northwest from the highest part of a hill between the river and the road leading to the Grande Ronde Reservation. There is a large hole 3.5 meters west of the station and a blazed tree 37.8 meters southwest. The station is marked 3 feet underground by a copper tack in the cork of a bottle and at the surface by a drill hole in a large rock.

*Bozley* (Tillamook County, C. R., 1883; 1908). In the middle, east and west, of the northern summit of the highest hill immediately east of the entrance to Nestugga Bay and 39.8 meters east of a fence. The station is marked 2½ feet underground by a copper tack in the cork of a bottle and at the surface by a drill hole 3 inches deep in a large rock. There is a drill hole in a smooth stone on a small knoll directly north, distant 8.115 meters.

*Gage B* (Tillamook County, J. S. H., 1908). On the east side of a high green hill on the north side of Nestugga Bay, about on line between Bozley and Round Top, 33 meters from the top of the hill. The station is marked by an inch drill hole in a large rock flush with surface. There are three galvanized-iron nails in a blaze in a snag about 12 meters west-southwest magnetic, and another blazed snag bears east-southeast magnetic, distant about 8 meters.

*Sheep Hill* (Tillamook County, C. R., 1883; 1908). On the top of a bare hill northeast of and overlooking the entrance to Nestugga Bay and about one-half mile from the bay shore, about 70 meters east of the road that runs around the top of the hill. The station is marked 3 feet underground by a copper tack in the cork of a white glass bottle, and the surface mark is a drill hole in a rock filled with lead. There is a small hole at the intersection of cross lines on a circular rock south 7.205 meters, and there are four galvanized nails in a small blazed tree south 54.4 meters.

*Fern Hill* (Tillamook County, C. R., 1883; 1908). On a high rocky hill covered with spruce, alder, and fern, one-half mile east of the road leading to Grande Ronde Valley. The station is marked 18 inches below the ground by cross lines on a flat rock and at the surface by a drill hole in a rock filled with lead.

*Goose* (Tillamook County, C. R., 1883). Near the mouth and on the north side of the Little Nestugga River, about 330 meters from the end of a small peninsula and 35 meters from the river shore. The station is marked by a copper tack in the top of a cedar post[1] 2 feet long and 6 inches square.

*Craven* (Tillamook County, C. R., 1883). On the north side of the Little Nestugga River, on low land 53 meters from the edge of the woods. The station is marked by a copper tack in the top of a cedar post 2½ feet long and 6 inches square, projecting 4 inches above the surface.

*Vine Maple* (Tillamook County, C. R., 1883). On low ground close to the edge of the woods at the foot of the hill, on a rounded point on the south side of Little Nestugga Bay, about three-fourths mile from the junction with the Big Nestugga Bay. The station is marked 3 feet underground by the cross lines on a flat stone and at the surface by a copper tack in the top of a cedar post 18 inches long by 6 inches in diameter.

*Gage* (Tillamook County, C. R., 1883). On the north side of Nestugga Bay on tide land, about 150 meters from the mud flats and 30 meters east of a small creek. The station is marked by a copper tack in the top of a redwood stake 3 feet long by 6 inches in diameter.

*Grass* (Tillamook County, C. R., 1883). On low ground on the north side of Little Nestugga Bay. The station is marked by a copper tack in the top of a cedar post 18 inches long by 6 inches in diameter.

*Nestugga* (Tillamook County, C. R., 1883). A few meters from the brink of the bluff fronting the entrance to the Nestugga River, about 141 feet above sea level. The station is marked 2½ feet underground by a copper tack in the cork of a bottle and at the surface by a drill hole, filled with lead, in a large rock.

*Point* (Tillamook County, C. R., 1883). About one-half mile from the point of the sand spit forming the north side of the entrance to Nestugga Bay, and about 90 meters from the sea beach at ordinary high water. The station is marked by a copper tack in a block of fir wood, 3 feet long and 8 inches square, set in the sand.

*Shersinger* (Tillamook County, C. R., 1883). On the east side of the Nestugga Bay, about 4 meters from the foot of the bluff. The station is marked underground by crosslines on a flat stone and at the surface by a large rock with rectangular crosslines.

*Beach* (Tillamook County, C. R., 1883). About 1½ miles from the point of the sand spit forming the north side of the entrance to Nestugga Bay, about 90 meters from the sea shore. The station is marked by a copper tack in a cedar post, 2½ feet long and 6 inches in diameter, set in the sand.

*Green Bluff* (Tillamook County, C. R., 1883). On the east shore of Nestugga Bay, on the rocky beach nearly at the extreme high water line and about 7 meters from the foot of a high green bluff. The station is marked 20 inches

[1] See pp. 81 and 82.

underground by cross lines cut on a flat stone and the same kind of mark was placed level with the surface. There is a cedar stake at the foot of the cliff distant 7.47 meters S. 82° W. magnetic.

*Red Rock* (Tillamook County, C. R., 1883). On the sharp point at the foot of the red rocky bluff on the extremity of the point forming the south side of the Little Nestugga River at its junction with the Big Nestugga River. The station is marked 8 inches underground by a cross cut in the solid rock and at the surface by a cross cut in a stone.

*Talbert* (Tillamook County, C. R., 1883). On top of a fern-covered hill, about 200 meters west of the main road from Grande Ronde to Slab Creek. The station is marked 2 feet underground by cross lines on a flat stone and at the surface by a drill hole, filled with lead, in a large rock.

*Shortridge* (Tillamook County, C. R., 1883). On the brow of a bluff close to the ocean, about three-fourths mile south of the entrance to Nestugga Bay, on the summit of a knoll about 175 meters north of the road from Grande Ronde Reservation. The station is marked 3 feet underground by a copper tack in the cork of a bottle and at the surface by a drill hole in a rock filled with lead.

*Faulconer* (Tillamook County, C. R., 1883). On the outer edge of a range of hills fronting the ocean beach and about 1¾ miles south of the entrance to Nestugga Bay, on a small spur of the hill lower than the summits back of it but projecting more to the seaward than any of the others. The station is marked 2½ feet underground by crosslines on a flat rock and at the surface by a drill hole, filled with lead, in a large rock.

*Spruce* (Tillamook County, C. R., 1883). On low grassy land on the south side of Little Nestugga Bay. The station is marked 3 feet underground by cross lines on a flat rock and at the surface by a copper tack in a cedar post 18 inches long by 6 inches in diameter.

*Alder Point* (Tillamook County, C. R., 1883). On the north side of Little Nestugga Bay, on a rounding point between the mud flats and the foot of the hills. The station is marked by a copper tack in a cedar post 2½ feet long and 6 inches in diameter.

*Mullaney* (Tillamook County, C. R., 1883). On low ground on the east side of the Big Nestugga River, one-half mile above the junction with the Little Nestugga River, about 75 meters from the river bank and 40 meters from the foot of the hills. The station is marked 3 feet underground by a beer bottle with a copper tack in the cork and at the surface by crosslines on a large rock.

*Sand Dune* (Tillamook County, C. R., 1883). On a sand dune in the middle of the peninsula 1⅞ miles from the entrance to Nestugga Bay. The station is marked by a copper tack in the top of a cedar post 2½ feet long by 6 inches square.

*Buckhorn* (Tillamook County, C. R., 1883). On the ocean shore about 1½ miles north of the entrance to Nestugga Bay. The station is marked by a copper tack in a cedar post, 2½ feet long and 6 inches in diameter, set in the sand.

*Barnhart* (Tillamook County, C. R., 1883). On the rocky beach close to the foot of the bluff on the north side of the point at the junction of the Big and Little Nestugga Rivers. The station is marked 18 inches underground by crosslines on a flat rock and at the surface by crosslines on a large rock.

*Horseshoe Dune* (Tillamook County, C. R., 1883). The station is marked by a copper tack in the top of a cedar post 3 feet long by 6 inches in diameter.

*Hardy Rock* (Tillamook County, C. R., 1883). On the ocean shore about 2 miles above the entrance to Nestugga Bay, and 110 meters back from the high water line. The station is marked by a copper tack in the top of a cedar post 2½ feet long and 6 inches in diameter.

*Nestugga Bay southeast base* (Tillamook County, C. R., 1883). Close to the edge of the shore on the east side of the Nestugga River. The station is marked 3 feet underground by a copper tack in the cork of a bottle and at the surface by a copper tack in a large block of cedar projecting 3 inches above the surface.

*Drift* (Tillamook County, C. R., 1883). On the ocean shore north of the entrance to Nestugga Bay and 110 meters from the high-water line. The station is marked by a copper tack in the top of a cedar post 2½ feet long by 6 inches in diameter.

*Nestugga Bay northwest base* (Tillamook County, C. R., 1883). On the east side of the Nestugga River about 2 miles from the entrance and 20 meters from the shore line. The station is marked 3 feet underground by a copper tack in the cork of a bottle and at the surface by a copper tack in a block of cedar projecting 3 inches above the ground. There are 3 cedar stakes, one each north, south, and east of the station.

## YAQUINA BAY AND RIVER.

### PRINCIPAL POINTS.

*Jet* (Lincoln County, J. W. M., 1914). Close to the old south jetty, and about 200 meters from the light on the end of the jetty. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

*Port* (Lincoln County, J. W. M., 1914). On a hill in Newport and just back of Abbey Hotel, in a proposed street. The station is marked according to note 13.[1] The reference mark is 3.05 meters east (magnetic).

*Wire* (Lincoln County, J. W. M., 1914). On the first sand hill across the bay from Newport, close to the home of Mr. Tracy Davis, and about 150 meters from the old tramway. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

*Mack* (Lincoln County, J. W. M., 1914). On McLeans Point, about 180 meters east and upstream from Entrance Range rear light, about 7 meters from high water and 4 meters from the bottom of the bluff. The station is marked

[1] See pp. 81 and 82.

by a standard disk station mark set in a pier of concrete resting on solid rock. A standard disk reference mark set in concrete is 2.13 meters north (magnetic).

*Yaquina east base* (Lincoln County, J. W. M., 1914). On the sand flats across Yaquina Bay from Newport, on what is locally known as Sand Beach, 32 paces from an old tramway, and just at the high-water line. The station is marked according to note 13.[1] The reference mark is 12.80 meters south (magnetic).

*Yaquina west base* (Lincoln County, J. W. M., 1914). On the sand flats across from Newport, and not far from the old tramway, at the junction with the jetty, a little below the high-water mark. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

*Hint* (Lincoln County, J. W. M., 1914). On the end of the sand spit which projects off what is locally known as Idaho Point, between the high-water mark and the end of the grass. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

*Bend* (Lincoln County, J. W. M., 1914). On that part of the bay locally known as Sallies Bend, about 1½ miles from Yaquina, about 1.5 meters from high water, and about 6 meters from the foot of the bluff. The station is marked by a standard disk station mark set in concrete resting on solid rock. There is a standard disk reference mark set in concrete 3.05 meters north (magnetic).

*Quill* (Lincoln County, J. W. M., 1914). On the end of Coquille Point on the made ground, known as cribbing, and about 15 meters from the foot of the bluff. The station is marked by a standard disk station mark set in the top of a 1-inch galvanized-iron pipe, the whole being set in a bed of concrete. There is a standard disk reference mark set in concrete 6.10 meters east (magnetic) of the station.

*Made* (Lincoln County, J. W. M., 1914). On the east side of Yaquina Bay about halfway between Yaquina and Coquille Point Light, on made ground known locally as cribbing. It is marked according to note 13,[1] except that the station mark is set in a 1-inch galvanized-iron pipe. The reference mark is 3.05 meters southeast (magnetic).

*Case* (Lincoln County, J. W. M., 1914). Near the high-water mark, on a point owned by Mrs. Mary Case, about 20 meters north-northeast of her house. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

*Yaq* (Lincoln County, J. W. M., 1914). In the front yard and about 10 meters northwest of the Yaquina depot, on a line with the bay side of the building. The station is marked by a standard disk station mark set in a 1-inch galvanized-iron pipe, the whole being set in a bed of concrete 9 inches in diameter and 2 feet deep. There is a beer bottle 2½ feet below the surface. There is a standard disk reference mark set in concrete 3.05 meters east (magnetic).

*Soft* (Lincoln County, J. W. M., 1914). On the mud flats, about 10 meters out from the high-water line, close to a small wharf at West Yaquina. The station is marked by a standard disk station mark set in a 1-inch galvanized-iron pipe 3 feet long, the whole being set in a bed of concrete 8 inches in diameter and 3 feet deep.

*Out* (Lincoln County, J. W. M., 1914). On the west side of the bay, about one-fourth mile above West Yaquina, on mud flats. The station is marked by a standard disk station mark set in a pier of concrete 8 inches in diameter at the top and 2½ feet deep.

*Wise* (Lincoln County, J. W. M., 1914). On a sharp, rocky, wooded point, just out from what is locally known as Wisers railroad cut, about 20 feet above high water. The station is marked according to note 13 [1] except that the surface mark is set in a 1-inch iron pipe. The reference mark is 3.05 meters north by east (magnetic).

*Log* (Lincoln County, J. W. M., 1914). On the west side of Yaquina Bay, across and due northwest (magnetic) from Oneatta, about 10 meters from the rock bluff, between the high and low water marks, near a large log. The station is marked by a standard disk station mark set in the top of a 1-inch iron pipe set in concrete which rests on bed rock. There is a standard disk reference mark set in concrete 6.10 meters west (magnetic).

*Et* (Lincoln County, J. W. M., 1914). On the extreme end of a sharp wooded point, where the Oneatta sawmill was formerly located, just above high water. The station is marked according to note 13,[1] reference mark is 4.69 meters east (magnetic).

*Stump* (Lincoln County, J. W. M., 1914). About 2 miles below Oysterville, on the south side of the bay, at the beginning of the bend, between high and low water marks, and between two large stumps. The station is marked according to note 13,[1] except the station mark is set in a 1-inch galvanized iron pipe. The reference mark is 4.27 meters south (magnetic).

*Water* (Lincoln County, J. W. M., 1914). On the mud flats about one-fourth mile up the stream from Oneatta. The station is marked by a standard disk station mark set in a pier of concrete 8 inches in diameter and 3 feet deep.

*Mud* (Lincoln County, J. W. M., 1914). On the south side of Yaquina Bay, on the mud flats opposite the home of Ed. Harlow. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch pipe. The reference mark is 6.10 meters south (magnetic).

*Road* (Lincoln County, J. W. M., 1914). Close alongside the railroad track, being 1.905 meters from the outside rail. The station is marked by a standard disk station mark cemented in a 1-inch galvanized iron pipe, which is set in a cylindrical bed of cement, 8 inches in diameter at the top, 1 foot deep and resting on bed rock. There is a standard disk reference mark set in concrete 3.05 meters east (magnetic).

*Caf* (Lincoln County, J. W. M., 1914). On the north end of an island known locally as Caffery Island, about 10 meters from the edge of the bluff and 30 feet above high water. The station is marked according to note 13,[1] except the surface mark is set in a 1-inch iron pipe. The reference mark is 3.05 meters south (magnetic).

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[1] See pp. 81 and 82.

*Rail* (Lincoln County, J. W. M., 1914). Directly across the bay from a prominent wooded hill which is on the west side of a small slough, and alongside the railroad, being 1.600 meters from the outside rail, close to the edge of the bluff. The station is marked according to note 13,[1] except that the station mark is set in a 1-inch galvanized iron pipe. The reference mark is 12.19 meters west (magnetic).

*Can* (Lincoln County, J. W. M., 1914). On the north side of Yaquina Bay at the flag station called Oysterville, opposite Oyster City, about 170 meters east of an old cannery. The station is marked according to note 13.[1] The reference mark is 4.27 meters north (magnetic).

*King* (Lincoln County, J. W. M., 1914). At the east end of Oyster City, near the high water and close to a large log sunk in the ground. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch iron pipe. The reference mark is 3.05 meters south (magnetic).

*Gravel* (Lincoln County, J. W. M., 1914).On a gravel beach at the east end of Oyster City, between the high and low water marks. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch galvanized iron pipe. The reference mark is 11.58 meters south (magnetic).

*Slope* (Lincoln County, J. W. M., 1914). Across the river and a little upstream from Oyster City, at the high-water line and about 10 paces from the railroad track. The station is marked according to note 13.[1] The reference mark is 3.05 meters north (magnetic).

*Low* (Lincoln County, J. W. M., 1914). On the north side of Yaquina Bay, about 900 meters east of Oyster City, on a low point near the railroad track. The station is marked according to note 13.[1] The reference mark is 6.10 meters north (magnetic).

*Shell* (Lincoln County, J. W. M., 1914). On a mud beach between the high and low water line, in front of a house belonging to Mr. Morgison, near an old wharf, and surrounded by many clam shells. The station is marked according to note 13.[1] The reference mark is 45.72 meters south of the station (magnetic).

*Pile* (Lincoln County, J. W. M., 1914). The station is a 1-inch drill hole in the top of a pile on the west side of Dr. McIntyre's wharf. A broom stick was stuck in the hole.

*Pine* (Lincoln County, J. W. M., 1914). On the end of a point locally known as Rocky Point, on the high ground between the railroad and the bay. The station is marked according to note 13,[1] except there is no subsurface mark and the concrete rests on hardpan. The reference mark is 4.88 meters north (magnetic).

*Cut* (Lincoln County, J. W. M., 1914). On the north side of the bay about 30 feet above high water, between the railroad cut and the bay. The station is marked according to note 13.[1] The reference mark is 3.05 meters north (magnetic).

*Clay* (Lincoln County, J. W. M., 1914). On the south side of Yaquina Bay, near a channel range and about 50 meters east of the old shipyard. The station is marked according to note 13,[1] except there is no underground mark. The reference mark is 3.05 meters south (magnetic).

*Shelf* (Lincoln County, J. W. M., 1914). On the north side of Yaquina Bay, between the houses belonging to Jackson and McIntyre, on a shelf of soft rock about 2 feet under water at high water. The station is marked according to note 13.[1] The reference mark is 3.66 meters east (magnetic).

*Boone* (Lincoln County, J. W. M., 1914). On land owned by the old Boone estate, about 100 meters east of a deep cut, 1.5 meters from the outside rail. The tide flats extend out some distance opposite the station. The station is marked according to note 13.[1] The reference mark is 6.70 meters west (magnetic).

*Slue* (Lincoln County, J. W. M., 1914). On a marshy point near the water's edge, north of a slough and not far from the old Boone homestead. The station is marked according to note 13.[1] The reference mark is 3.05 meters west (magnetic).

*Wharf* (Lincoln County, J. W. M., 1914). On the east side of the Yaquina River close to a small wharf near the old Jackson place, between high and low water, in a black muck marsh. The station is marked according to note 13.[1] The reference mark is 53.03 meters east (magnetic).

*Slip* (Lincoln County, J. W. M., 1914). On the marshy flat between the round point across from Mill 4 railroad station and the small wharf near Mr. Jackson's house. The station is marked according to note 13.[1] The reference mark is 5.49 meters east (magnetic).

*Hill* (Lincoln County, J. W. M., 1914). At the east end of Boones Slough, not far from the old Boone place, on the side of a hill on the west side of a railroad track, about 30 feet above high water. The station is marked according to note 13.[1] A standard disk reference mark in concrete is 3.66 meters west (magnetic) of the station.

*Red* (Lincoln County, J. W. M., 1914). Close to a railroad cut, not far from the east end of a trestle, between the track and the bluff. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

*Spit* (Lincoln County, J. W. M., 1914). On a sand spit which extends southwest from a round point. It is near the round point and bare at about half tide. The station is marked according to note 13.[1] The reference mark is 28.04 meters east (magnetic).

*Near* (Lincoln County, J. W. M., 1914). On the round point across from Mill 4 railroad station, on the mud beach between high and low water. The station is marked according to note 13.[1] The reference mark is 13.41 meters south (magnetic).

*Mill* (Lincoln County, J. W. M., 1914). On a grassy marsh at high water. The station is marked according to note 13.[1] The reference mark is 3.66 meters west (magnetic).

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[1] See pp. 81 and 82.

*Dead* (Lincoln County, J. W. M., 1914). On the west end of a large marsh which extends nearly from the Montgomery house to the station, near the high-water line. There are many large dead tree trunks along the shore. It is marked according to note 13.[1] The reference mark is 6.10 meters north (magnetic).

*Alder* (Lincoln County, J. W. M., 1914). Across the bay and about one-half mile east of Mill 4 railroad station, on a mud point covered with water-logged limbs of trees. The station is marked according to note 13.[1] The reference mark is 3.66 meters south (magnetic).

*Soap* (Lincoln County, J. W. M., 1914). Across the bay and about one-fourth mile southeast of the old Montgomery place, on a round soapstone point at the high-water mark. The station is marked according to note 13.[1] The reference mark is 2.44 meters south (magnetic).

*Grass* (Lincoln County, J. W. M., 1914.) Near the middle of the marsh, between the current jetty and Mill 4. The station is marked according to note 13.[1] The reference mark is 5.49 meters north (magnetic).

*Apple* (Lincoln County, J. W. M., 1914). On the west side of the bay, near an apple tree in front of the old Montgomery place. It is marked according to note 13.[1] The reference mark is 5.49 meters west (magnetic).

*Dark* (Lincoln County, J. W. M., 1914). On a point covered with alder trees, directly across the bay from the old Montgomery place, a few feet below the high-water mark. The station is marked according to note 13.[1] The reference mark is 6.40 meters east (magnetic).

*Field* (Lincoln County, J. W. M., 1914). On the east side of the bay, just across from the jetty light, and a few meters south of a cleared field. The station is marked according to note 13.[1] The reference mark is 6.10 meters east (magnetic).

*Dune* (Lincoln County, J. W. M., 1914). About one-fourth mile north of the Montgomery house, on a pile of sand dumped by dredges about 30 meters from shore. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

*Hump* (Lincoln County, J. W. M., 1914). About 1½ miles south of Toledo, on the southwest side of the river, about 15 feet above high water, on the top of a small embankment by the railroad. The station is marked according to note 13.[1] The reference mark is 1.52 meters northwest (magnetic).

*Dike* (Lincoln County, J. W. M., 1914). About 1½ miles south of Toledo, on the northeast side of Yaquina River, about 3 meters from the high-water line, on top of a small dike formed when the river was dredged. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch iron pipe, and the whole is then set in concrete. The reference mark is 7.92 meters north (magnetic).

*Flat* (Lincoln County, J. W. M., 1914). About 1 mile south of Toledo, on the tide flats about 64 paces from the high-water mark. The station is marked by a standard disk station mark set in a 1-inch iron pipe 1 foot long, the whole being set in a pier of concrete 10 inches in diameter and 2½ feet deep. There is a standard disk reference mark 3.05 meters east (magnetic).

*High* (Lincoln County, J. W. M., 1914). On the west side of the river, about 1 mile below Toledo, on a hill just above the railroad tracks, 6 paces back from the railroad fence and 40 feet above the high-water mark. The station is marked according to note 13,[1] except that the surface mark is set in a 1-inch iron pipe. The reference mark is 7.92 meters east (magnetic).

*Saw* (Lincoln County, J. W. M., 1914). About one-half mile south of Toledo, near an old sawmill and in the yard belonging to Mr. Altery. The station is marked according to note 13.[1] The reference mark is 7.92 meters east (magnetic).

*Launch* (Lincoln County, J. W. M., 1914). On the tide flats near the Toledo launch works. The station is marked according to note 13.[1] The reference mark is 15.24 meters south (magnetic).

*City* (Lincoln County, J. W. M., 1914). In the city of Toledo, close to the city dock, also on a line with the extension of the principal street of the city on an embankment about 25 feet above high water, between the railroad track and the river. The station is marked according to note 13.[1] The reference mark is 3.05 meters south (magnetic).

*Last* (Lincoln County, J. W. M., 1914). About one-fourth mile west of the city dock in Toledo, on a mud dike near the water and about 100 meters southeast of a railroad trestle. The station is marked according to note 13.[1] The reference mark is 7.32 meters south (magnetic).

*Sea* (Lincoln County, J. W. M., 1914). On a sand knoll on the seacoast about midway between the south jetty and the old life-saving station. The station is marked according to note 13,[1] except there is no reference mark.

*Nye* (Lincoln County, J. W. M., 1914). Near that part of Newport called Nye Beach, on a sand hill about 300 meters back from the coast and about one-half mile north of the old Yaquina tower. The station is marked according to note 13,[1] except there is no reference mark.

*Shade* (Lincoln County, J. W. M., 1914). Across the bay and about southwest from the old Oneatta sawmill, at the high-water mark, and about 6 meters from the foot of the bluff. The station is marked by a 1-inch galvanized iron pipe 1 foot long set in a bed of concrete 2 feet deep, resting on hardpan.

*Stream* (Lincoln County, J. W. M., 1914). About one-half mile southeast of the Toledo city dock, on the tide flats on the north side of the river. The station is marked according to note 13,[1] except there is no reference mark.

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[1] See pp. 81 and 82.

## HECETA HEAD TO SIUSLAW RIVER.

### PRINCIPAL POINTS.

*Spur* (Lane County, J. S. H., 1908). On the south side of Siuslaw River, 1½ miles upstream from Florence, on the north slope, and about 90 meters east of the highest point of the ridge. A line of sight was cleared to the south and several to the north and northwest, and these will serve to locate the general locality. The station is marked 15 inches below the surface by a cross marked on the bottom of a bottle and at the surface by a standard disk station mark set in a rock. There is a blazed fir tree, 8 inches in diameter, distant 8.74 meters S. 91° W. magnetic and a blazed willow tree 6 inches in diameter distant 3.29 meters N. 83° E. magnetic.

*Cannery Hill* (Lane County, L. A. S., 1883; 1908). On a chaparral covered sand hill about 120 meters east of an old cannery and sawmill and near the western edge of the summit. The station is marked by a drill hole in a piece of the backbone of a whale buried 2 feet and at the surface by a standard disk station mark set in a rock. The two reference marks are three-eighths-inch brass bolts cemented in rock. One is west 8.30 meters and the other is northeast 8.24 meters.

*Sugar Loaf 2* (Lane County, J. S. H., 1908). On the north side of the river, three-fourths mile east of the outer point, 50 meters back from the top of the bluff, on a round topped sand-hill covered with brush. The station is marked according to note 11.[1] One reference mark is distant 5.32 meters in azimuth 6° 06′ and the other is distant 5.56 meters in azimuth 263° 17′.

*Green* (Lane County, J. S. H., 1908). About 2 miles north of east of Florence. There is a long ridge of hills about 275 meters east of a road, and it is on the highest part of the one farthest north that the station is located. The station is marked according to note 11.[1] One reference mark is distant 6.80 meters in azimuth 175° 35′ and the other is distant 6.27 meters in azimuth 253° 48′.

*Snag* (Lane County, J. S. H., 1908). About 2½ miles northeast of Heceta Lighthouse, about 60 meters from the summit of a long sloping bald ridge covered with fern and scattering snags. The station is marked according to note 11.[1] One reference mark is distant 8.03 meters in azimuth 27° 39′ and the other is distant 8.87 meters in azimuth 301° 26′.

*Loaf* (Lane County, J. S. H., 1908). About 1 mile northeast of Heceta Lighthouse, on a small sand hill covered with brush, about 150 meters south of another sand hill and about 115 meters east of the road. The station is marked according to note 11.[1] One reference mark is distant 5.78 meters in azimuth 286° 01′ and the other is distant 6.81 meters in azimuth 158 °26′.

*Plateau* (Lane County, J. S. H., 1908). About 4 miles northeast of Heceta Lighthouse, near the southeast corner of a large flat-topped hill, about 15 meters from where it begins to break on the east side. The station is marked according to note 11,[1] except the surface mark is a drill hole in a stone. One reference mark is distant 8.46 meters S. 8° E. magnetic and the other is distant 8.87 meters S. 58° W. magnetic.

*Heceta* (Lane County, J. S. H., 1908). About one-fourth mile northeast of Heceta Lighthouse, on the highest bald hill in the vicinity, about 6 meters west of the highest point of the hill and about 2 feet lower in elevation. The station is marked according to note 11.[1] One reference mark is distant 7.62 meters in azimuth 52° 59′ and the other is distant 7.02 meters in azimuth 9° 54′.

*Turn* (Lane County, J. S. H., 1908). On the high bluff about 550 meters southeast of Heceta Lighthouse, on the north slope of the ridge about 8 meters from the top. The station is marked according to note 11.[1] One reference mark is distant 7.19 meters in azimuth 243° 18′ and the other is distant 6.69 meters in azimuth 7° 26′.

*Tree* (Lane County, J. S. H., 1908). About 900 meters east of Heceta Lighthouse, and 75 meters from the road. The signal was a tree wrapped with cloth and the point sighted upon and located was projected to the ground and is marked 14 inches below the surface by a drill hole in a rock and at the surface by a drill hole in another rock. There is a blazed stump of a snag southeast 3.3 meters, and a blaze on the east side of the signal tree is distant 1.04 meters.

*Head* (Lane County, J. S. H., 1908). On the south slope of the bald hill 46 meters northeast of Heceta Lighthouse, 2.7 meters east of a fence, 6.1 meters east of the edge of the bluff, and 5.5 meters south of the edge of the bluff. The station is marked according to note 11.[1] One reference mark is distant 7.84 meters in azimuth 38° 25′ and the other is distant 6.64 meters in azimuth 275° 13′.

## UMPQUA RIVER.

### PRINCIPAL POINTS.

*Wind* (Douglas County, J. S. H., 1908). On the high sand hill one-half mile northwest of the life-saving station. The station was only marked temporarily by a stake driven in the sand.

*Bench* (Douglas County, J. S. H., 1908). On a sandstone bluff, 135 meters below the site of the old cannery, and opposite the life-saving station, 9.5 feet above mean low water. The station is marked by a brass bolt set in the sandstone bluff with cement. The letters "U. S. E." and "B. M." are marked in the cement around the station. The station was established by the United States Army Engineers as a reference bench mark for a tide gauge.

*Brushy Hill 2* (Douglas County, J. S. H., 1908). On the highest part of a brush-covered hill on the north side of the Umpqua River, and about 4 miles west of Gardiner. The station is marked 3 feet underground by a standard

[1] See pp. 81 and 82.

disk station mark set in stone and at the surface by a drill hole in the end of a large, long rock. For a reference mark there is a drill hole in a rock buried flush with the surface distant 8.72 meters in azimuth 273° 31′.

*Cab* (Douglas County, J. S. H., 1908). About 1½ miles northwest of the Umpqua Life-Saving Station, 45.7 meters south and 9.1 meters east of the upper life-saving station lookout cabin. The station is marked according to note 11,[1] except there are no reference marks.

*Sand hill 2* (Douglas County, J. S. H., 1908). On the westerly slope of the sand hill close to the bank of the Umpqua River, 2 miles upstream from the life-saving station and 1 mile south of Florence stage landing. The station was only marked temporarily by a stake in the sand.

*Beach* (Douglas County, J. S. H., 1908). On a small knoll on the sand beach about 320 meters north of the mouth of the Umpqua River, and about 1,100 meters west of the life-saving station, and 91 meters east of the lower life-saving station lookout cabin. The station is marked according to note 11,[1] except there are no reference marks.

## COOS BAY.

### PRINCIPAL POINTS.

*Mill* (Coos County, J. S. H., 1906). On a prominent hill or bluff in a suburb of Marshfield known as Kittyville, in front of and about 100 meters distant from a large, white house, and northwest of a mill and shipyard. The station is marked by a copper bolt set in a cut stone 3 feet underground and at the surface by a standard disk station mark set in cement in a cut stone. The reference marks are one-half inch copper bolts driven in large stumps, one distant 2.69 meters in azimuth 21° 02′ and the other is distant 10.10 meters in azimuth 128° 04′ 27″.

*White Point 3* (Coos County, J. S. H., 1906). On the outer extremity of White Point, 2.6 meters from the edge of the point in the direction of Marshfield, 1.4 meters from the edge of the bank to the northward, and 50 meters northwest of Timmerman's house, and 20 feet above high water. The station is marked by a hole drilled in a rock buried 2 feet and at the surface by a standard disk station mark set in a cut stone.

*Pierce* (Coos County, J. S. L., 1863; 1906). On the top of the bluff on the south side of Pierce Point. The station is marked by a drill hole in a stone buried 1.3 feet below the surface and directly over this is a standard disk station mark set in a stone 12 inches square and 8 inches deep. There is a blazed tree distant 6.45 meters just south of the line to Capt. Dryden's house, and another one inshore of the line to Crawford's house, distant 10.91 meters.

*Porter* (Coos County, E. F. D., 1889; 1906). On the summit of the knoll just back of the California Lumber Co.'s mill. Large water tanks are located on the north side of the same knoll. The station is marked by a hole drilled in an irregular shaped stone buried 1½ feet and the surface mark is a standard disk station mark set in a stone 12 inches square by 10 inches deep. There is a copper nail driven 1 inch from the top of the largest water tank distant 4.19 meters, and a copper nail in a blazed stump, the only one on the knoll, distant 1.96 meters.

*Dewey* (Coos County, J. A. L., 1862; 1889). On the top of a small point forming the southern limit of a bight and just back of Dewey Rock. The station is marked by a drill hole in a stone 1½ feet below the surface and by 3 stubs with copper tacks distant 1.83 meters.

*Mabry* (Coos County, J. S. L., 1862; 1889). On the eastern side of the bay opposite North Bend Point, on a small nearly level spot about 35 feet above high-water mark. The station is marked by a drill hole in a stone 1½ feet below the surface. There is an old pine stump about 3 meters from the station at the edge of the bluff.

*North Bend 2* (Coos County, E. F. D., 1889). About 50 meters below the northeast extremity of North Bend Point. The station is marked by a drill hole in a stone. There is a large blazed pine tree 6.77 meters inshore and another one is north 14.95 meters.

*Russell* (Coos County, J. S. L., 1862; 1889). On top of a bluff forming the eastern point of the entrance to North Slough. The point is covered with timber and heavy underbrush. The station is marked by a drill hole in a stone 1.3 feet below the surface. There is a copper nail in a blazed stump distant 10.29 meters and a stump of the edge of the bluff is distant 2.59 meters.

*North Slough 89* (Coos County, E. F. D., 1889). On a low sand spit on the west side of the entrance to North Slough. The station is marked by a drill hole in a stone 3 feet below the surface and at the surface by a wooden block 12 inches square with a copper nail for the station mark. On account of the drifting sand the marking probably is not permanent.

*Simpson* (Coos County, J. S. L., 1862; 1889). On the top of the bluff on the west end of the point known as North Bend. The station is marked by a drill hole in a rock 1.6 feet below the surface. There are 3 stubs with copper tacks in the top distant 1.83 meters from the station, two are in a line parallel with the top of the bluff and the other is at right angles inshore.

*Pony* (Coos County, J. S. L., 1862; 1889). On Pony Point on a narrow belt of open ground lying between the high-water mark and the edge of the woods, on a small mound near a very small rivulet. The station is marked by a drill hole in a stone 1.1 feet below the surface. There are 3 stubs with copper tacks distant 1.83 meters.

*North Slough* (Coos County, J. S. L., 1862).—Lost.

*Ridge* (Coos County, J. S. L., 1863). On the drifting sand hills of the shore of the bend. The station is marked by a cross on a stone 1.2 feet below the surface; over this is a block of wood with a drill hole to mark the center.

*Hutchinson* (Coos County, J. S. L., 1862).—Lost.

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[1] See pp. 81 and 82.

*Tophet* (Coos County, J. S. L., 1862; 1863). On the straight shore line south of Pony Point. The station is a hole drilled in the top of a stump 1 meter from the high-water mark.

*Henderson* (Coos County, J. S. L., 1861; 1863). On the highest of a group of small sand hills forming the northern boundary of the small prairie on which Henderson's house is located. The station is marked by a cross on a flat stone 1.6 feet below the surface. Three stakes set around the station are each distant 1.83 meters.

*Cemetery* (Coos County, J. S. L., 1861; 1889). Near the first open spot north of the highest part of the bluff. The station is marked by a hole drilled in a stone. There are 3 stubs around the station with copper tacks in the top distant 1.83 meters.

*Coos Bay north base* (Coos County, J. S. L., 1861; 1863). On the west side of the bay opposite Empire City, 20 paces from the high-water mark. The station is marked by a copper bolt set in a section of a spruce log 3 feet long and 26 inches in diameter, projecting 2 inches above the surface of the ground. There are three stakes around the station each distant 1.83 meters.

*Coos Bay south base* (Coos County, J. S. L., 1861; 1863). On the west side of the bay on a slight raise in the land belonging to Mr. Henderson. The station is marked by a copper bolt set in a block of wood 3½ feet long 26 inches in diameter set level with the surface. There are three stakes around the station each distant 1.83 meters.

*Telegraph* (Coos County, J. S. L., 1862; 1863). On the highest part of the bluff immediately north of Empire City. The station is marked by a nail in the bottom of a hole drilled in the top of a stump.

*Ridge 2* (Coos County, E. F. D., 1889). About 130 meters from the shore on a timbered ridge about 2.5 meters wide, running northwest and southeast, 275 meters northeast of the old Henderson house, and about 80 feet above the high-water mark. The station is marked by a drill hole in a stone 2 feet below the surface. There is a large pine tree on the eastern slope of the ridge distant 1.63 meters north-northeast and another tree about 1 meter from the edge of the ridge with a similar mark distant 11.48 meters northwest.

*Hutchinson 2* (Coos County, E. F. D., 1889). On a small ridge of land at the edge of a marsh. The station is marked by a bottle buried neck down 2½ feet below the surface and over this is a stub with a copper tack to mark the station.

*Pest* (Coos County, E. F. D., 1889). On the north side of the bay directly opposite Empire City on the highest sand hill in the vicinity about 365 meters back of the pesthouse. The station is marked by a drill hole in a rock 2 feet below the surface.

*Empire 2* (Coos County, E. F. D., 1889). Lost.

*Midway* (Coos County, E. F. D., 1889). On the east side of the bay, about midway between Empire City and Pigeon Point and about 230 meters southwest of Girouni's house at the mouth of Second Creek, on a small sand ridge about 6 meters from the high-water mark and about 12 feet above it. The station is marked by a hole drilled in a stone buried 2 feet below the surface.

*Grove* (Coos County, E. F. D., 1889; 1909). On the north shore of the bay on the summit of hill at the eastern edge of the first grove of timber above the entrance. The station is marked by a drill hole in a rock 2½ feet below the surface. There is a blazed fir tree marked with a copper tack southwest 12.74 meters, a tree with a similar mark northwest 19.87 meters, and a tree with the same mark south 4.6 meters.

*Pigeon 2* (Coos County, E. F. D., 1889; 1909). The station is marked by a bottle buried 3 feet below the surface; over this is a wooden stake with a copper tack.

*North Spit* (Coos County, E. F. D., 1889). On the southeast extremity of the dry sand spit on the north side of the entrance to the bay, about 25 meters from the high-water mark on the bay side, and about 10 feet above high water. The station is marked by a bottle buried neck down 4 feet below the surface; over this is a cedar stake 4 feet long with a copper tack in the top flush with surface.

*Fossil 2* (Coos County, E. F. D., 1889). On the point forming the northeast end of Rocky Point. The station is marked by a drill hole in a rock 3 feet below the surface. There is a large blazed fir tree to the east of the station.

*Coos Head 2* (Coos County, E. F. D., 1889). Lost.

*Empire 3* (Coos County, J. S. H., 1909). Within 3 paces of the upper edge of the bluff back of the old mill, and about 45 meters to the northeast of a small ravine. This part of the bluff is clear of timber. The station is marked by a pipe driven into the ground and surrounded by concrete.

*Jetty* (Coos County, J. S. H., 1909). On the jetty on the west side of Coos Bay, about 400 yards below the Government works. The station was not permanently marked.

*Ocean* (Coos County, J. S. H., 1909). On the sand spit on the west side of Coos Bay, some 200 yards from the ocean. The station was temporarily marked, but no attempt was made to make the mark permanent.

*Coos Head 3* (Coos County, J. S. H., 1909). The station is marked by a pipe projecting about 1 foot above the ground There is a blazed snag 3 feet in diameter with a nail driven in the blaze 5.25 meters south, and a similar blaze and nail on a snag 2½ feet in diameter, distant 5.86 meters east.

*Crawford 2* (Coos County, E. F. D., 1889). Lost.

*Timmerman* (Coos County, E. F. D., 1889; 1890). On the narrow neck of land dividing the bay from Isthmus Slough, about 365 meters southeast of the Methodist church, and about 210 meters east of the Town Site Co.'s office. The station is marked by a drill hole in the end of a brick buried 1½ feet. There is a large blazed fir tree 15.30 meters west.

*White Point 2* (Coos County, E. F. D., 1889). Lost.

*Isthmus 2* (Coos County, E. F. D., 1889). On the outer extremity of the marshy point forming the north side of the entrance to Isthmus Slough. The station is marked by a drill hole in a stone 2 feet below the surface. There are 3 stakes around the station northwest, southwest, and southeast, distant 1.83 meters.

*Marsh* (Coos County, E. F. D., 1889). On a low timbered point about halfway between Marshfield and Eastport and about 14 meters from the edge of the hard land. The station is marked by a drill hole in a stone buried 2 feet. There are 3 stubs with copper tacks distant 1.83 meters from the station, 2 in line and the other at right angles.

*Coos* (Coos County, J. S. L., 1863; 1889). On the point of marsh dividing Kitchen Slough from Coos River. The station is marked by a drill hole in a stone 1.2 feet below the surface. There are 3 stubs with copper tacks in the top each distant 1.83 meters.

*Grass* (Coos County, E. F. D., 1889). On the edge of the marsh to the eastward of the high wooded point on the west side of the mouth of Catching Slough and 3 meters south of a small slough running northwest toward the dyke. The station is marked by a drill hole in a stone 1 foot below the surface. There are 3 stakes marked with copper tacks distant 1.83 meters.

*Coos River Hill* (Coos County, E. F. D., 1889). On the southern edge of the summit of the first hill on the north side of the Coos River, about 2 meters east of a boundary fence running north and south across the hill, and about 400 meters southeast of McIntoshes' house. The station is marked by a drill hole in the end of a brick buried 2 feet. There is a blazed fir tree, 4½ feet in diameter, northeast 15.94 meters, and a small blazed pine tree southeast 11.43 meters.

*Loggie* (Coos County, E. F. D., 1889). On the first high point on the east side of Catching Slough, on the western slope about 80 feet above the marsh. The station is marked by a drill hole in a stone 1 foot below the surface. There is a blazed stump northwest marked with a copper tack distant 12.446 meters, and a stump with a similar mark is distant 14.304 meters southeast.

*Ross* (Coos County, E. F. D., 1889). On the slope of the first bare hill on the west side of Catching Slough about 1 mile above its mouth, and on the north side of Ross Slough, about 275 meters south of the Southern Oregon Co.'s water tank, and about 50 feet above tidewater. The station is marked by a drill hole in a stone 1½ feet below the surface with some pieces of brick around the stone. There is a large blazed fir tree with a copper tack to the southward distant 13.20 meters.

*Violet* (Coos County, J. S. L., 1862; 1889). On a bare green knoll on the northeast side of Pony Point. At the edge of the woods southwest of the station there is a large pine tree blazed and marked with a copper nail distant 28.04 meters. In the direction of the first point up the bight on the west side is a depression in the highest part of this point. The center of this depression is distant 12.94 meters.

*Branch* (Coos County, J. S. L., 1863; 1889). On the first point south of Pony Point, on the west side of Pony bight, distant from the shore line of the marsh 3.9 meters. The largest pine tree in the vicinity is blazed and marked with a copper nail, distant 6.89 meters in a prolongation of the line to Russell Point. The station is probably marked by a drill hole in a stone underground. There are three stubs with copper nails in the top, distant 1.83 meters, one in azimuth 146° 45′, the second in azimuth 326° 45′, and the third in azimuth 236°.

*Haynes* (Coos County, J. S. L., 1862; 1889). On a small tongue making off from the bluff on the southeast face of Haynes Point. The station is marked by a drill hole in a stone 1.35 feet below the surface. There is a large blazed pine tree, marked with a copper nail, leaning over the eastern bank, distant 6.42 meters, and a small blazed pine tree on the west bank, distant 2.69 meters.

*Charleston 2* (Coos County, E. F. D., 1889). On a bluff at the south side of the entrance to Coos Bay. The station is marked by a bottle buried 2 feet and at the surface by a wooden stake with a copper tack. There is a blazed cedar tree distant 12.5 meters.

*Bluff* (*U. S. E.*) (Coos County, U. S. E., 1907). The station is marked according to note 14.[1]

*Curve* (*U. S. E.*) (Coos County, U. S. E., 1907). The marking of this station is unknown.

*Grass Mound* (*U. S. E*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*Nelson* (*U. S. E.*) (Coos County, U. S. E., 1907). The station is marked according to note 14.[1]

*Midway Point* (*U. S. E.*) (Coos County, U. S. E., 1907). The station is marked according to note 14.[1]

*Marsh* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*Empire Dock* (*U. S. E.*) (Coos County, U. S. E., 1907). The marking of this station is not known.

*Sand Beach* (*U. S. E.*) (Coos County, U. S. E., 1907.) This station is marked according to note 14.[1]

*Mabry* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*Lookout Point* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*Jarvis* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*Pony Point* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*Henderson* (*U. S. E.*) (Coos County, U. S. E., 1907). The station is marked according to note 14.[1]

*Island* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*Hay Barn* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*North Bend* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*Stave Mill* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

*Crawford Point* (*U. S. E.*) (Coos County, U. S. E., 1907). This station is marked according to note 14.[1]

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[1] See pp. 81 and 82.

*Barker* (Coos County, E. F. D., 1889). On a bluff point on the east side of South Slough, directly opposite the entrance to the bay, about one-half mile south of Rocky Point Jetty, 4 feet from the edge of the bluff, and 50 feet above the tide. The station is marked by a drill hole in a flat stone buried 2 feet below the surface. There is a blazed spruce tree, marked with a copper tack, to the eastward, distant 2.80 meters, and another spruce tree, marked in the same manner, to the northward, distant 5.42 meters.

## PORT ORFORD.

### PRINCIPAL POINTS.

*Arch Rock* (Curry County, A. W. C., 1869). On the highest of the rocks composing the Orford Reef, with a large arch running through it from the north to the south, on the eastern face of the rock, on the top of the first bench, 51 feet above sea level. The station is marked by a hole 3 inches square and 3 inches deep drilled in hard rock.

*Blanco* (Curry County, A. W. C., 1869). Lost.

*Bluff* (Curry County, A. W. C., 1869). On the edge of the bluff where the curve in the shore line from Cape Blanco joins the main trend. The station is marked by a bottle buried neck down 3 feet below the surface. Three stakes bearing north, south, and west magnetic are distant 1.83 meters.

*Port Orford north base* (Curry County, A. W. C., 1869). Lost.

*West* (Curry County, A. W. C., 1869). Lost.

*Wilson* (Curry County, A. W. C., 1869). Lost.

*Rocky Point* (Curry County, A. W. C., 1869). Lost.

*Best Rock* (Curry County, A. W. C., 1869). On the largest of the rocks of Orford Reef, the top of which presents a rounded appearance from all directions. The station is a little to the south of the middle of the rock, 143 feet above sea level, and is marked by a drill hole in the rock 3 inches deep covered with a great cairn of loose stones.

*Point Orford Astronomic* (Curry County, A. W. C., 1869). Lost.

*Round* (Curry County, A. W. C., 1869). Lost.

*Pine Hill* (Curry County, A. W. C., 1869; 1890). On the highest point of the long grassy ridge running from the north end of the lagoon above Port Orford to within one-half mile of Elk River, about midway between the lake and the end of the ridge, and 175 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark. The following magnetic azimuths and distances to blazed trees are given: S. 16° E. 15.0 meters; N. 9° W. 10.30 meters; N. 50° 30′ W. 16.12 meters.

*Arch Rock Summit* (Curry County, A. W. C., 1869). On the summit of the highest of the rocks composing the Orford Reef with a large arch running through it north and south, 149 feet above sea level. The station is marked by a drill hole in the hard rock.

*Port Orford south base* (Curry County, A. W. C., 1869; 1907). On a large isolated rock, directly at the foot of the trail leading from Port Orford to the west beach, the stream forming the outlet of Garrison Lagoon runs past the southeast side of the rock. The station is in the center of the oblong space, 30 by 60 feet, forming the top of the rock, and is marked by an inverted wine bottle buried 2 feet below the surface, and at the surface by a standard disk station mark.

## SAN SEBASTIAN TO CHETKO RIVER.

### PRINCIPAL POINTS.

*Dolan* (Curry County, A. W. C., 1873; 1907). On a high knoll one-half mile south of the point where the road crosses Myers Creek, a little southwest of the highest point of the hill. The station is marked by a stone with a cross on it buried 3 feet and the surface mark is a stone with a 1-inch drill hole set level with the surface. The reference mark is on the highest point except for a mound of earth 6 feet to the north, 2 feet east of the edge of a hole and in range with the station mark and the largest rock on the beach. The reference mark is a one-half-inch drill hole in a rock set level with the surface, distant 8.53 meters in azimuth 262° 15′.

*Red Rock* (Curry County, A. W. C., 1873; 1907). The station is located in a depression in a large bunch of rocks on a ridge bare on the south side and top, but timbered on the north side, about 3 miles south of the point where the road crosses the Pistol River. The station is marked by a bottle buried 1 foot and at the surface by a stone 12 inches square and 8 inches deep with a drill hole in the top. There is a cross on a flat rock higher than the station, distant 2.99 meters in azimuth 208° 43′, a drill hole in the top of a ledge of rock lower than the station, distant 41.462 meters in azimuth 73° 06′, and a drill hole in a point of rock distant 3.48 meters in azimuth 207° 51′.

*Sundown* (Curry County, A. W. C., 1873; 1907). On the western end of a ridge about 3 miles due east of Pistol River, on an open space covered with dead brush, with timber directly to the east. See the description of *Sundown 2* and the list of geographic positions. The station is marked by a glass bottle buried 3 feet below the surface.

*Crooks Point* (Curry County, A. W. C., 1872). On a bare wind-swept sand hill on the point of land from which Macks Reef starts. Directly opposite the station is a high rock. The station is marked according to note 9,[1] except the surface mark was omitted.

*San Sebastian* (Curry County, A. W. C., 1873). On the highest point of the long ridge or backbone which forms the main portion of Cape San Sebastian, 30 meters south of a split or gap in the ridge. The station is marked according to note 15.[1] There is a rocky point due north 23 meters and one due south, distant 6 meters.

*Cove* (Curry County, A. W. C., 1873). On the summit of a hill forming part of a long ridge leading up from Hunter Cove to Cape Sebastian, about opposite Island Rock. The station is marked according to note 15.[1] The station was looked for in 1907 but could not be found.

*Cove Island* (Curry County, A. W. C., 1873). On the highest part of the large island lying in Hunters Cove. The station is marked according to note 15.[1]

*Schumaker* (Curry County, A. W. C., 1873). On a prominent hill north of Dolan's house and south of the cove. There are a few scattering fir trees on the northern flank of the hill. The station was marked according to note 15.[1]

*Fairview* (Curry County, A. W. C., 1873). Close to the forest edge on the long ridge that runs back from Cape San Sebastian. The station is marked according to note 15.[1]

*Crooks Hill* (Curry County, A. W. C., 1872). On the first mountain south of Pistol River, on the prominent ridge known as Crooks Hill, about midway down the ridge on a prominent isolated bare knoll. The station is marked according to note 9.[1]

*Bluff* (Curry County, A. W. C., 1873; 1907). On the highest part of a very prominent bluff, the sea face of which is a precipice of rock directly opposite the mouth of the Pistol River. The station is marked according to note 15.[1]

*Loma* (Curry County, A. W. C., 1873). On a loma or isolated hill readily picked out from the surrounding hills. The station is marked according to note 15.[1] It is not likely that the station can be recovered.

*Pistol River* (Curry County, A. W. C., 1873). Near the brow of the hill, on the bluff on the north bank of the Pistol River opposite the prominent old shell mound. The station is marked according to note 15.[1]

*Crook* (Curry County, A. W. C., 1873). On an isolated loma or rounded hill at the right of the point where the trail climbs the bluff after leaving the river. The station is marked according to note 15.[1] It probably can only be recovered by means of other triangulation.

*Dune* (Curry County, A. W. C., 1873). The station is located on a sand dune and is marked according to note 15.[1]

*Sand Flower* (Curry County, A. W. C., 1873). On a sand dune partially grassed over, north of Crooks Point and about three-fourths of a mile from the rocks off that point. The station is marked according to note 15.[1]

*Lookout* (Curry County, A. W. C., 1873). On the brow of a hill which has a heavy fir forest on the north and a sand slide on the east side. The hill commands a view of the windings of Pistol River. The station is marked according to note 15.[1]

*Macks Point* (Curry County, A. W. C., 1872). On the second point south of Pistol River, the first point south of Crooks Point, directly opposite Macks Rock, about 4.6 meters inland from the bluff. The station is marked according to note 9,[1] except the surface mark was omitted.

*Ridge Knob* (Curry County, A. W. C., 1872). About one-fourth mile from the beach on the first prominent knoll bare of timber, on the highest part of the knoll. The station is marked according to note 9.[1]

*Snodgrass* (Curry County, A. W. C., 1872). On top of a bare hill which is west of the Snodgrass house, very near to the steep western face. The station is marked according to note 9.[1]

*Rocky Prairie* (Curry County, A. W. C., 1872). On the highest part of a hill which is covered with low brush on the north side, and has a small slide of red earth on the south. It is the only hill in the vicinity commanding a view of the coast line and up and down the country. The station is marked according to note 9.[1]

*Burnt Point* (Curry County, A. W. C., 1872). On the first prominent point below the now deserted Hous-ta-nat-na Indian village, on the highest point to the seaward of two peculiar round hills. The station is marked according to note 9.[1]

*Smith Hill* (Curry County, A. W. C., 1871; 1872). On the highest part of the hill rising directly behind Smith's house, 717 feet above sea level. The station is marked according to note 9.[1]

*Bush Mound* (Curry County, A. W. C., 1872). On the highest point of the hill to the west of the point where the coast trail enters the timber. The hill is rocky and bare on the seaward side but covered with timber on the opposite side. The station is marked according to note 9.[1]

*Red Mound* (Curry County, A. W. C., 1872). On a range of hills about 2½ miles from the coast, on the center and the highest part of the prominent mountain that shows reddish color from the sandstone on its surface. The station is marked according to note 9.[1]

*Bellevue* (Curry County, A. W. C., 1871; 1872). On top of the high hill rising out of the plateau above Cresswell's, west of the trail running over the mountain to Rogue River. The station is marked 3 feet below the surface by a glass bottle and at the surface by a drill hole filled with lead in a stone block. Three stakes each 0.91 meter distant bear north, south, and east magnetic.

*Sister Knob* (Curry County, J. J. G., 1871; 1872). In the center of the eastern one of the two remarkable conical hills 385 feet above sea level. The station is marked 3 feet below the surface by a bottle and at the surface by a drill hole filled with lead in a stone block. Three stakes bear north, east, and south (magnetic) distant 0.91 meter.

*Black Mound* (Curry County, A. W. C., 1872). On the first prominent mountain of the range north of the Chetco River, about 6 meters south of the trail that leads over the mountain top. The station is marked 2 feet underground by a glass bottle and at the surface by a drill hole filled with lead in a rough stone. There are three redwood stakes, one each north, south, and east magnetic.

*High Mound* (Curry County, A. W. C., 1870). On a high mound about 2 miles north of the Chetko River, directly opposite the island rock, known as Whales Head. The sea face of the mound is perpendicular and the mound itself is

[1] See pp. 81 and 82.

220 feet above the highwater mark. The station is marked according to note 15,[1] except there is as a surface mark a stone block with a drill hole in the center filled with lead.

*Miller* (Curry County, A. W. C., 1870). On the long ridge coming down on the north side of the Chetko River, directly in the trail leading up the face of the ridge, 640 feet above sea level. The station is marked according to note 15.[1]

*New* (Curry County, A. W. C., 1872). On the highest part of the ridge, on the right of the trail from Whales Head to Tommys Creek, and about 300 meters from the deep canyon of Tommys Creek. The station is marked according to note 9,[1] except the surface mark is missing.

*Head Island* (Curry County, A. W. C., 1871). On the highest point of the seaward one of the two large islands lying off Whales Head, 123 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

*Trail* (Curry County, A. W. C., 1871). Close to the trail on the righthand side just at the point where it commences to descend toward Whales Head. The locality probably can be determined from the stumps left from opening the lines of sight. The station is marked according to note 9,[1] except there is no surface mark.

*Sand Hill* (Curry County, A. W. C., 1871). On the high hill forming the end of the long ridge making down beyond Bellevue, 497 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

*Cresswell* (Curry County, A. W. C., 1871). Very near the edge of the bluff beyond Cresswell's house. The station is marked according to note 9,[1] except there is no surface mark.

*Barnacle Rock* (Curry County, A. W. C., 1871). On a flat rock northeast of a high conical rock directly off Sand Hill. The only mark is a hole cut in the rock for the foot of the center pole.

*Elk* (Curry County, A. W. C., 1872). On the highest part of a small conical hill on the face of the ridge. The station is marked according to note 9.[1]

*Thomas Hill* (Curry County, A. W. C., 1872). On the highest point of the hill bare of timber and is marked according to note 9,[1] except the surface mark was omitted.

*Deep Gulch* (Curry County, A. W. C., 1872). On the extreme apex of a conical-shaped hill on the end of a very prominent point projecting into the sea, at the extreme end of the beach beyond Tommys Hill. The station is marked according to note 9,[1] except the surface mark was omitted.

*Green Hill* (Curry County, A. W. C., 1871). On a conical hill in the center of the plateau to the west of the stream making into the coast at Whales Head, 679 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

*Seal Point* (Curry County, A. W. C., 1872). On the highest part of a hill on a point about 1 mile north of Deep Gulch. It is the first hill north of a curious little basin surrounded by precipices. The station is marked according to note 9,[1] except the surface mark was omitted.

*Thomas Point* (Curry County, A. W. C., 1872). On the highest part of the point projecting the farthest toward the sea. The station is marked according to note 9,[1] except the surface mark was omitted.

*Red Bush* (Curry County, A. W. C., 1871). In the center of a knoll that rises out of the flat bench or plateau, 354 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

*Lone Knob* (Curry County, A. W. C., 1871). On a peculiar round hill on the plateau above Lone Ranch and 400 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

*Sandy Point* (Curry County, A. W. C., 1871). On top of a long sandy slide in the bank to the left of the point where the trail goes down to Lone Ranch. The station is marked according to note 9,[1] except there is no surface mark.

*Acorn* (Curry County, A. W. C., 1871). Northeast of Sister Knob on a round hill near the forest. The station is marked according to note 9,[1] except there is no surface mark.

*Black Point* (Curry County, A. W. C., 1871). On a low point covered with black bushes, near the bluff and about 190 feet above sea level. The station is marked according to note 15.[1]

*Bench* (Curry County, A. W. C., 1871). On the bank of the next stream beyond Flat Knoll, to the right of where the road runs down into the gulch, 290 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

*Flat Knoll* (Curry County, A. W. C., 1871). In the center of a knoll on top of the prominent hill beyond the little creek that the trail crosses beyond Low Point and 203 feet above mean low water. The station is marked according to note 9,[1] except there is no surface mark.

*Low Point* (Curry County, A. W. C., 1871). On the next prominent point beyond High Mound and beyond where the trail turns off to go to Lone Ranch, near the edge of the bluff, 158 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

*Taylor* (Curry County, A. W. C., 1871). On a rounded hill near the coast, west of the trail after it crosses the little stream where there is a little farmhouse and cattle yard. The station is marked according to note 9,[1] except there is no surface mark.

*Hidden* (Curry County, A. W. C., 1871). Northeast of High Mound, near the edge of the forest, behind several stony hills, and 350 feet above sea level. The station is marked according to note 9,[1] except there is no surface mark.

*Loma* (Curry County, A. W. C., 1870). On a peculiar mound-shaped hill covered with small bushes about halfway between the trail and the forest-covered ridge beyond. The station is marked according to note 15.[1]

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[1] See pp. 81 and 82.

## CHETKO RIVER TO TRINIDAD HEAD.

### PRINCIPAL POINTS.

*North Chetko* (Curry County, A. W. C., 1870). On a long point ending in rugged rocks north of the Chetko River. A trail leads from Mr. Miller's house toward the station, but in order to reach the station it will be necessary to descend to the beach and then again mount the rocks. The station is marked according to note 15,[1] except there is as a surface mark a roughly squared stone block with a drill hole filled with lead in the top.

*Red Point* (Curry County, A. W. C., 1870). About 20 meters from the edge of the bluff bank of a point, which shows red when seen from below, on the farm of Mr. Cooley and nearly opposite his house. The station is marked according to note 15,[1] except that it has as a surface mark a roughly squared stone block with a drill hole filled with lead.

*Fence* (Curry County, A. W. C., 1870). On Miller's farm about 55 meters west of the northeast corner of the orchard fence on a bench about 160 feet above the sea. The station is marked according to note 15.[1]

*Cooley* (Curry County, A. W. C., 1870). On the bluff ocean bank on the farm of Mr. Cooley. Follow the road toward Chetko until you come to the point where it descends the bank, then turn to the left, cross the fence, and the station will be found on the first projection south of the bank. The station is marked according to note 15.[1]

*Pine Hill* (Curry County, A. W. C., 1870). On the right side of the road going north, above where it takes an abrupt turn to go down toward the Chetko River, on top of a hill that is very steep toward the road. Cross the little gulch just before the fence corner and the station is just above. The station is marked according to note 15.[1]

*Bare Ridge* (Curry County, A. W. C., 1870). On the second bench of a long ridge ending in a conical hill, about 500 feet above the road and 580 feet above the sea. The station is marked according to note 15.[1]

*North Winchuck* (Curry County, A. W. C., 1870). On the edge of the bluff bank about one-fourth mile north of the Winchuck River. To reach it follow the line of fence down from the road that formerly marked the State boundary to the bluff edge and the station is about 100 meters south. It is marked according to note 15,[1] except there is as a surface mark a stone block with a drill hole filled with lead in the top.

*Rocky Butte* (Curry County, A. W. C., 1870). Near the center of the flat space on the top of a singular rock rising boldly from the even slope between the road and the sea on land owned by Mr. Otto. The station is marked according to note 15.[1]

*Otto* (Curry County, A. W. C., 1870). On the first top or bench of the ridge directly north of Mr. Otto's house, 100 feet above the road on the right side going north, and 280 feet above the sea. The station is marked according to note 15.[1]

*Henderson* (Curry County, A. W. C., 1870). About one-half mile beyond the Winchuck River. Going northward along the road there is a large rock on the left and beyond it the home of Mr. Henderson. The station is on the first bench of the mountain east and 500 feet above the road and about 700 feet above the sea. The station is marked according to note 15.[1]

*Oregon-California Boundary Monument* (Del Norte County, Cal., and Curry County, Oreg., A. W. C., 1870). The station was established by Daniel G. Major, United States land survey, in 1869, on the east side of the road about one-fourth mile south of the Winchuck River. It is 10 meters east of the road, about 2 meters west of the fence, and about 200 meters south of a barn belonging to Mr. Jackson and surmounted by a pair of elk antlers. The station is marked by a fir post about 4 feet high, roughly hewn on four sides about 5 inches square, set firmly in the ground and surrounded by a cairn of loose stones. On the west side it is marked "42 I 1869;" on the east "212 M 28 C;" on the south "C;" and on the north "O."

*Northwest Seal Rock* (Del Norte County, Cal., A. W. C., 1870). On Northwest Seal Rock, which culminates in a sharp apex. The station is on a sort of bench about 3 feet below the highest part. A natural cavity was widened to admit the foot of the signal and this is the only station mark. There are three iron spikes 2 inches in diameter driven around the station, used to hold the guy ropes.

*Pyramid* (Del Norte County, Cal., A. W. C., 1870). On the west side of the top, which is very small, of a conical hill covered with low bushes, directly north of the mouth of Smith River. The road runs between this hill and the end of the long ridge. The station is marked according to note 15,[1] with the addition of a square stone block, with a hole drilled in the center and filled with lead, used as a surface mark.

*Peak* (Del Norte County, Cal., A. W. C., 1870). On a conical peak north of Gilberts Creek. It is the highest bare peak seen from the road after crossing the creek. There are some fir trees immediately back and the nearest one was blazed and some tacks driven into the wood. The station was marked according to note 15.[1]

*Cone Rock* (Del Norte County, Cal., A. W. C., 1870). In the center of the top of a large cone-shaped rock lying off the coast between the mouth of the Winchuck River and Island Rock. A hole drilled for the signal is the only mark.

*Boulder* (Del Norte County, Cal., A. W. C., 1870). On the ridge north of Gilberts Creek. To reach the station follow the ridge up and cross a depression after the first summit is reached, then the station lies to the right on a flat-topped hill. The station is marked according to note 15.[1]

*Bush* (Del Norte County, Cal., A. W. C., 1870). Going north along the road across Gilberts Creek, on the other side of which lies a mountain with an arm extending toward the sea. The road sweeps around the base of this moun-

[1] See pp. 81 and 82.

tain and when near the bank passes close by a large rock; turning off here and mounting the face of the ridge, the station will be found on the first bench, marked according to note 15.[1]

*Hillside* (Del Norte County, Cal., A. W. C., 1870). On the right side of the road above the Yonkers farm, on the hillside near the pine forest, and 110 feet above the road. The station is marked according to note 15.[1]

*Low Dune* (Del Norte County, Cal., A. W. C., 1870). Near the center of a low sand dune, shifting in character, on the bluff bank opposite a large isolated rock on shore. The station is marked according to note 15.[1]

*Island* (Del Norte County, Cal., A. W. C., 1870). On the highest part and near the center of the large island rock lying off the mouth of Smith River. The station is marked according to note 15.[1]

*Cone* (Del Norte County, Cal., A. W. C., 1870). On a rounded grassy sand dune near the coast. The station is marked by a piece of stone one-half inch (probably foot) in diameter and 6 inches long shaped like a cylinder, with a hole bored in the top and filled with lead, set 3 feet below the surface. At the surface is a roughly squared stone with a hole drilled in it and filled with lead. Three stubs with copper tacks in the top of each were placed north, south, and east (magnetic) of the station, distant 0.91 meter.

*Head* (Del Norte County, Cal., A. W. C., 1870). On the end of the long ridge making down beyond Smith River, at the right of the road going north and 200 feet above it. The station is marked according to note 15,[1] with the addition of a square stone block, with a drill hole filled with lead in the top, as a surface mark.

*Last* (Del Norte County, Cal., A. W. C., 1870). On grassy ground on top of a bluff bank, north (?) of a large creek coming down from the hills. The station is marked according to note 15.[1]

*Patch* (Del Norte County, Cal., A. W. C., 1870). On the side of the hill near the edge of the forest, on the right of the road going north, on the farm of Mr. Yonkers and southeast from his house. The station is marked according to note 15.[1]

*East* (Del Norte County, Cal., A. W. C., 1870). On a spur making out from the mountain ridge above Smith River, 425 feet above mean low water. The station is immediately above some outcropping yellow rock which is visible from below the face of the ridge. The station is marked according to note 15,[1] with the addition of a square stone block with a drilled hole filled with lead as a surface mark.

*Low Rock* (Del Norte County, Cal., 1870). On the center of a low flat rock, the southern one of three, lying off the mouth of Smith River. The rock is about 12 feet high and when there is any swell the sea washes over it constantly. An iron bar, 4 inches square and 8 feet long, set in a square hole drilled in the solid rock marks the station.

*Spur* (Del Norte County, Cal., A. W. C., 1870). On the middle dune, which is covered with a green plant, on the end of a long ridge running down from Scott's house toward Smith River. The station is marked according to note 15.[1]

*Great Sand Dune* (Del Norte County, Cal., A. W. C., 1870). On a great sand dune and as the sand is loose and drifting it probably can not be recovered. The station is marked according to note 15.[1]

*Indian* (Del Norte County, Cal., A. W. C., 1870). On a low sand dune to the southward of a gap or low place in the line of sand dunes opposite the south end of the western arm of Lake Earl, about 100 meters from the high-water mark, with a few Indian huts below and to the north of it. The station is marked according to note 15,[1] except there is a roughly-squared block of blue sandstone, with a hole 1½ inches deep in the top filled with lead for a surface mark.

*Eureka* (Del Norte County, Cal., A. W. C., 1870). On a high sand ridge grassed over and forming the west side of the northeast arm of Lake Earl, about 100 meters from the lake edge. A few large firs grow on the side of the bank toward the lake. The station is marked by a bottle buried 3 feet below the surface, and at the surface by three stubs with copper tacks in the top of each, 0.91 meter, and bearing north, south, and east.

*Lake End* (Del Norte County, Cal., A. W. C., 1870). On a sand dune between high-water mark and the edge of the marsh at the northwest end of Lake Earl. The station is marked by a bottle buried 3 feet below the surface, and at the surface by three stubs with copper tacks in the top of each, distant 0.91 meter, and bearing north, south, and east.

*Lake Earl north base* (Del Norte County, Cal., A. W. C., 1870). Located about one-third of the way between T. A. Scott's lower ranch and the upper called Toutocket, between the northeast and northwest arms of Lake Earl, on a level grassy flat. A road from the lower to the upper ranch passes on the left, looking north, distant about 40 meters. The station is marked by a bottle buried 3 feet below the surface, and near the surface by a roughly-squared stone with a 2 inch hole drilled in it and filled with lead. A copper tack in the lead marks the station. Three stubs each with a copper tack in the top are distant 0.91 meter bearing north, south, and east.

*Lake Earl south base* (Del Norte County, Cal., A. W. C., 1870). On the west of the road and 71 paces northwest of a large post, and in line with the post and a willow copse to the westward. The station is marked by a bottle buried 3 feet below the surface, and at the surface by a square block of blue basalt, with a hole 1¼ inches in diameter and 2 inches deep filled with lead, with a copper tack set in the lead. Three stubs each with a copper tack in the top are distant 0.91 meter and bear north, south, and east.

*Gravel* (Del Norte County, Cal., A. W. C., 1870). On a little round sand knoll on the narrow ridge separating Lake Earl from the ocean. A bed of gravel comes up nearly to the station on the ocean side. The station is marked according to note 15.[1]

*Burnt Ranch* (Del Norte County, Cal., A. W. C., 1870). On the hill near the edge of the bluff going down to the slough, in the Indian village of Toutocket, sometimes called Burnt Ranch. The station it marked according to note 15.[1]

*Ridge* (Del Norte County, Cal., A. W. C., 1870). On a grassy knoll surrounded by a swamp, about midway between Scott's house and the northeast arm of Lake Earl. There are a few fir trees growing on the side of the knoll toward the lake. The station is marked according to note 15.[1]

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[1] See pp. 81 and 82.

*Lake Mound* (Del Norte County, Cal., A. W. C., 1870). On a round grassy knoll on the south side of Lake Earl opposite Scott's house and west of the Indian Rancherie. The Lake turns here with an arm to the east and south. The station is marked according to note 15.[1]

*Squaw* (Del Norte County, Cal., A. W. C., 1870). On a large mound on the west side of the eastern and southern arm of Lake Earl, a few feet north of the largest of several Indian huts, and south of some Indian graves. The station is marked according to note 15.[1]

*Red Point* (Del Norte County, Cal., A. W. C., 1870). On the low gravel flat between the marsh and the lake, on the east side of the eastern arm of Lake Earl, and on a point that forms the north side of the bight into which Jordans Creek empties. A quantity of red sorrel gives a ruddy hue to the point as seen from the opposite shore. The station is marked according to note 15.[1]

*Swamp* (Del Norte County, Cal., A. W. C., 1870). On low ground, overflowed in the winter, on the southeastern side of Lake Earl, on the left of the narrow passage leading into the mill. A few dwarf firs are between the station and the lake and behind the station is quite a mass of undergrowth. The station is marked according to note 15.[1]

*Lake* (Del Norte County, Cal., A. W. C., 1870). About midway between Lake Earl and the ocean, on the sand knoll on the north side of the narrow place where the lake approaches the ocean. The lake discharges through this narrow place in the winter. The station is marked according to note 15.[1]

*Yank* (Del Norte County, Cal., A. W. C., 1870). On a sand dune, the northern and eastern face of which is covered with fir trees, about 300 meters northwest of the house of a settler called Yank. The road to *Yank* passes at the foot of the dune. The station is marked according to note 15.[1]

*Pine Bush* (Del Norte County, Cal., A. W. C., 1870). On the highest sand hill in this vicinity, about half way between the beach and the fir forest, with a marsh on the east, and several ponds, during the rainy season, on the west. The east side of the knoll is covered with pine bush. The station is marked according to note 15.[1]

*Pond* (Del Norte County, Cal., A. W. C., 1870). On a small hill partially covered with scrubby fir bushes. Behind the hill is a pond whose surface is covered with lilies. The station is marked according to note 15.[1]

*Stick* (Del Norte County, Cal., A. W. C., 1870). On the line of sand dunes just above the high-water mark. The station is marked according to note 15.[1]

*Hut* (Del Norte County, Cal., A. W. C., 1870). On the first ridge of sand dunes east of the high-water mark, with a few Indian huts to the west, and a pond of fresh water, during the rainy season, on the east. The station is marked according to note 15.[1]

*Round* (Del Norte County, Cal., A. W. C., 1870). The station is on a small round sand dune and is marked according to note 15.[1]

*Skull* (Del Norte County, Cal., A. W. C., 1870). On a large sand dune, where several skulls were found, it having been an Indian burying ground. The station is marked according to note 15.[1]

*Forest Mound* (Del Norte County, Cal., A. W. C., 1870). On a high sand mound which forks into two long ridges on the west, near the edge of the forest, with a low marsh skirting the hill on the north. The station is marked according to note 15.[1]

*Pine* (Del Norte County, Cal., A. W. C., 1870). The station is on the inner line of sand dunes, near the forest. It is marked according to note 15.[1]

*Flag* (Del Norte County, Cal., A. W. C., 1870). On the first prominent sand knoll back of the beach about 100 meters from the high-water mark. The station is marked according to note 15.[1]

*Firknoll* (Del Norte County, Cal., A. W. C., 1870). On a sand dune 40 feet high and 310 meters distant from the beach, near the edge of the forest, with dwarf firs surrounding it on three sides, leaving it open to the sea. The station is marked according to note 15.[1]

*Drift* (Del Norte County, Cal., A. W. C., 1870). On the first ridge of a sand dune about 70 meters from the high-water mark. The station is marked according to note 15.[1]

*Knob* (Del Norte County, Cal., A. W. C., 1870). On a long sand ridge sparsely covered with grass, sloping to the east, to the edge of the fir forest, distant about 10 meters. The station is marked according to note 15.[1]

*Sand* (Del Norte County, Cal., A. W. C., 1869). On the highest of the sand dunes near the point where the forest comes down to the shore of Pelican Bay, beyond which the shore line becomes low, and confused sand dunes appear. The following magnetic azimuths are given: Westernmost rock of reef, 98°; highest point Star Rock, 42°; center of the top of Rock St. George, 13°. The only station mark mentioned is a stub with five copper tacks in the top, 1½ feet southeast of the station.

*St. George* (Del Norte County, Cal., A. W. C., 1869). On the summit of the highest rock of Point St. George, which is connected with the main shore by a narrow neck of land. The seaward face of the rock shows white. The station is marked by a bottle buried neck down 3 feet below the surface, and at the surface by a stone block with a hole drilled in the center and filled with lead. There are three stubs around the station, with five copper tacks in the top of each, distant 1.83 meters, bearing north, south, and east, respectively.

*St. George north base* (Del Norte County, Cal., A. W. C., 1869). On the ridge of a chain of sand hills running nearly parallel and about 70 meters east of a fence, extending in a southerly direction. The following bearings are given: Castle Peak Rock, highest point, S. 12° E. (magnetic); Point Rock, highest point, south (magnetic); St. George Rock, highest point, S. 32° W. (magnetic); and five copper tacks in a blazed fence post, distant 86.3 meters, N. 70° E. (magnetic).

[1] See pp. 81 and 82.

The station is marked by a bottle buried neck down 3 feet below the surface, and at the surface by a hole drilled in a block of blue sandstone and filled with lead. There are three stubs around the station, one each north, south, and east, distant 1.83 meters. In the top of each there are five copper tacks.

*Woodedge* (Del Norte County, Cal., A. W. C., 1869). On a mound close to the forest line. The following magnetic azimuths are given: Top of St. George Rock, 28°; westernmost rock of reef, 95°; five copper tacks in a tree, distant 13.59 meters, 235°. The station is marked by a bottle buried neck down 3 feet below the surface.

*Mound* (Del Norte County, Cal., A. W. C., 1869). On the northwestern part of the last one of a series of mounds in an easterly direction from Rock St. George. The station is marked by a bottle buried neck down 3 feet below the surface. There are three stubs, with five copper tacks in the top of each, distant 1.83 meters, and bearing, respectively, north, south, and east. The following magnetic azimuths are given: Connection Rock, 337°; top of Castle Peak Rock, 4°; Point Rock, 29° 40′; center of top of Rock St. George, 72°.

*Shell* (Del Norte County, Cal., A. W. C., 1869). Located on the northeast bluff of Point St. George. The ground in the vicinity is covered with shells and loose stones. The center of the top of St. George Rock bears S. 7° E. (magnetic), and the highest point of Star Rock bears S. 53° W. (magnetic). The station is marked by a bottle buried neck down 3 feet below the surface. There are three stubs, with five copper tacks in the top of each, distant 1.83 meters and bearing, respectively, north, south, and east.

*St. George south base* (Del Norte County, Cal., A. W. C., 1869). On the plateau north of Castle Peak Rock, and 150 meters inshore. Five copper tacks in a blazed tree, distant 91.1 meters, bear S. 48° E. (magnetic). The highest point of Castle Peak Rock bears S. 17° E. (magnetic); Point Rock highest point bears S. 11° W. (magnetic); and St. George Rock highest point bears N. 87° W. (magnetic). The station is marked by a bottle buried neck down 3 feet below the surface, and at the surface by a block of blue sandstone with a hole drilled in the center and filled with lead. There are three stubs around the station, one each north, south, and east, distant 1.83 meters. In the top of each there are five copper tacks.

*Castle Rock* (Del Norte County, Cal., A. W. C., 1869). On the right hand knob, looking south, of the highest peak of the large rock known as Castle Island or Castle Rock. At a little distance the peak resembles the horn of a rhinoceros and can not be mistaken. The only mark is the hole which was drilled for the foot of the signal.

*Connection Rock* (Del Norte County, Cal., A. W. C., 1869). Near the center of the large rock lying off Preston Point and showing white from the shore. A hole drilled to receive the foot of the signal and a cairn of rock piled up around it are the only marks.

*Preston 2* (Del Norte County, Cal., A. W. C., 1869). On Preston Island. No permanent mark.

*Wynell* (Del Norte County, Cal., A. W. C., 1869). A few feet east of the road leading from Crescent City to White's ranch and in sight of the latter. The station is marked by a bottle buried neck down 3 feet below the surface. The following magnetic azimuths are given: Five copper tacks in a tree distant 29.41 meters, 299° 30′; top of Castle Peak Rock 29°; and Rock Point 75° 30′.

*White* (Del Norte County, Cal., A. W. C., 1869). On the highest part of the bluff that is inshore from two isolated rocks off Point St. George, which are connected with the mainland at low water only. The station is marked by a bottle buried neck down 3 feet below the surface. There are four stubs with five copper tacks in the top of each, distant 1.83 meters, and bearing, respectively, north, south, east, and west.

*Point* (Del Norte County, Cal., A. W. C., 1869). On the first of the two rocks lying off Point St. George, which are connected at low water with the mainland. The station is marked by a bottle buried neck down 3 feet below the surface. Three stubs bearing, respectively, north, south, and east, with five copper tacks in the top of each, are distant 1.83 meters.

*Crescent City Azimuth* (Del Norte County, Cal., A. W. C., 1870). On a bluff bank about 3 meters from the edge. The station is marked by a bottle buried 3 feet below the surface and at the surface by a stone block 4 inches square, with 1½-inch hole drilled 2 inches deep and filled with lead. A copper tack is driven in the lead and the letters "U. S. C. S." are carved in the stone. Three very heavy posts were set around the stone and a fence built to protect it from the cattle.

*Battery Point 2* (Del Norte County, Cal., A. W. C., 1869). Lost 1871.

*Steamboat Rock* (Del Norte County, Cal., J. S. L., 1859; 1869). On the highest part of Steamboat Rock, about 7.5 meters from the northern edge of the top of the rock, about 15 meters from the southern edge, and 12 meters from a small but very noticeable prominence on a large detached piece of rock on the south end of the ridge. The station is marked by a one-half inch hole drilled 1½ inches in solid rock.

*Whalers Island* (Del Norte County, Cal., J. S. L., 1859; 1869). On the second, counting from the northward of the four prominent knobs on Whalers Island, on a flat spot 1½ feet square, having three small projections rising around it, forming sort of a basin, near the center of which is the station. The station is marked by a drill hole one-half inch in diameter and 1 inch deep.

*Smyth 2* (Del Norte County, Cal., G. D., 1871). On a long, low, gradually rounding point about a mile east of Elk Creek. The station is marked by a bottle buried 2½ feet below the surface, and at the surface is a stone 8 by 6 by 4 inches, with a one-half inch hole drilled in it.

*Ehroser 2* (Del Norte County, Cal., A. W. C., 1871). On a narrow ridge of sand extending along the beach just above the high-water mark. The station is marked according to note 15.[1]

[1] See pp. 81 and 82.

*Round Rock* (Del Norte County, Cal., J. S. L., 1859; 1869). On the top of Round Rock, which is about 20 feet in diameter and nearly level, with some three or four slight elevations or mounds. The station is on the northeast one of these mounds and is marked by a one-half inch drill hole in the rock 1½ inches deep.

*Alexander* (Del Norte County, Cal., A. W. C., 1871). On the bank just behind the driftwood southeast of Alexander's stable, and immediately outside the fence, 18 meters from the southeast corner of the stable, and 0.89 meter from the fence. The station is marked according to note 15.[1]

*Crescent City northeast base* (Del Norte County, Cal., J. S. L., 1859; 1869). Lost.

*Smyth* (Del Norte County, Cal., J. S. L., 1859). Lost.

*Crescent City southwest base* (Del Norte County, Cal., J. S. L., 1859; 1869). Lost.

*Astronomical* (Del Norte County, Cal., ——, 1853). Lost.

*Battery* (Del Norte County, Cal., J. S. L., 1859). Lost 1869.

*Preston* (Del Norte County, Cal., J. S. L., 1859). Lost.

*Sister Rock* (Del Norte County, Cal., A. W. C., 1871). On the highest peak, 108 feet above sea level, of the largest of the three rocks lying offshore below Crescent City and known as Sister Rocks. The station is marked by a bottle with the neck broken off, placed in a natural crevice in the rock.

*Long Point* (Del Norte County, Cal., A. W. C., 1871). On a long projecting point, close to the trail and west of it, 765 feet above sea level. The station is marked according to note 15.[1]

*White Knob* (Del Norte County, Cal., A. W. C., 1871). On the high knob or point that forms the end of the stretch of beach below Crescent City. To reach the station follow the trail up to the first ridge and turn to the right. It will be found on a rock forming the southern point. The station is marked by a hole drilled in the rock and filled with broken glass.

*Woody Point* (Del Norte County, Cal., A. W. C., 1871). On an open point well down toward the edge of the bluff and west of the trail. The station is marked according to note 15.[1]

*Green* (Del Norte County, Cal., A. W. C., 1871). On a point making out from near the branching of the trails below Long Point, partly down the hill, on a round hummock on the face of the ridge, 780 feet above sea level. The station is marked according to note 15.[1]

*Bush* (Del Norte County, Cal., A. W. C., 1871). The station is on a prominent point, and it is marked according to note 15.[1]

*Point* (Del Norte County, Cal., A. W. C., 1871). On a long projecting point easily distinguished by several large rocks on its sea surface. The station is on top of one of these rocks where the surface was covered with a thick growth of small bushes. It is necessary to use ladders to reach the top of the rock. The station is marked according to note 15.[1]

*Grant* (Del Norte County, Cal., A. W. C., 1871). West of the trail on the only clear point, on the bluff edge, in the vicinity, 740 feet above the sea level. The station is marked according to note 15.[1]

*Low* (Del Norte County, Cal., A. W. C., 1871). On a great slide of earth which is now solid. The station is marked according to note 15.[1]

*Near* (Del Norte County, Cal., A. W. C., 1871). On a projecting point close to the trail. The station is marked according to note 15.[1]

*Wilson* (Del Norte County, Cal., A. W. C., 1871). On a high pine-backed hill on the left side of the trail going toward the Klamath River, behind a number of rocks on the sidehill. The station is marked according to note 15.[1]

*Last* (Del Norte County, Cal., A. W. C., 1871). On a marked bluff or point making out beyond Wilson Creek or False Klamath, and about halfway between the creek and the long point off which lay the island rocks, about 180 feet above the sea level. The station is marked according to note 15.[1]

*Rock* (Del Norte County, Cal., A. W. C., 1872). On the highest point of a small rock, not over 18 or 20 feet in height, below the False Klamath, and about 1¼ miles offshore. The station was in a natural crevice in the rock and the stones piled around the signal serve as the only station mark.

*Halfway* (Del Norte County, Cal., A. W. C., 1872). On the summit of a hill about halfway between the False Klamath and the Klamath River. The station is marked according to note 15.[1]

*Pine Ridge* (Del Norte County, Cal., A. W. C., 1872). On the summit of a high hill crowned with a few small pine trees, with the trail passing on the upper side and only a few feet distant. The station is marked according to note 15.[1]

*Council Mound* (Del Norte County, Cal., A. W. C., 1872; 1873). On a rounded hill or knoll forming the culmination of the long ridge on the north side of the Klamath River, on the left side of the trail going south and distant about 300 meters. The station is marked according to note 15.[1]

*Flint Rock* (Del Norte County, Cal., A. W. C., 1872; 1873). Lost.

*Council Point* (Del Norte County, Cal., A. W. C., 1872). On a prominent point of the long ridge on the north side of the Klamath River, about 300 feet above the beach, in front of quite a prominent clump of rocks, with the trail passing above it distant about 300 meters. The station is marked according to note 15.[1]

*Klamath South* (Del Norte County, Cal., A. W. C., 1872; 1873). Lost. The station was marked according to note 15.[1]

*Redding Rock* (Humboldt County, Cal., A. W. C., 1874). Redding Rock is a single isolated peak of quartz, 5 miles offshore from Gold Bluffs. (See fig. 9.) The station is on the highest point of the rock, 94 feet above high water. The station is marked by a square hole drilled in the rock at the bottom of which is a round hole in which an iron pin 1½ inches in diameter is set. Around the station are some iron pintles set in the rock at requisite distances to which the guy ropes were attached.

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[1] See pp. 81 and 82.

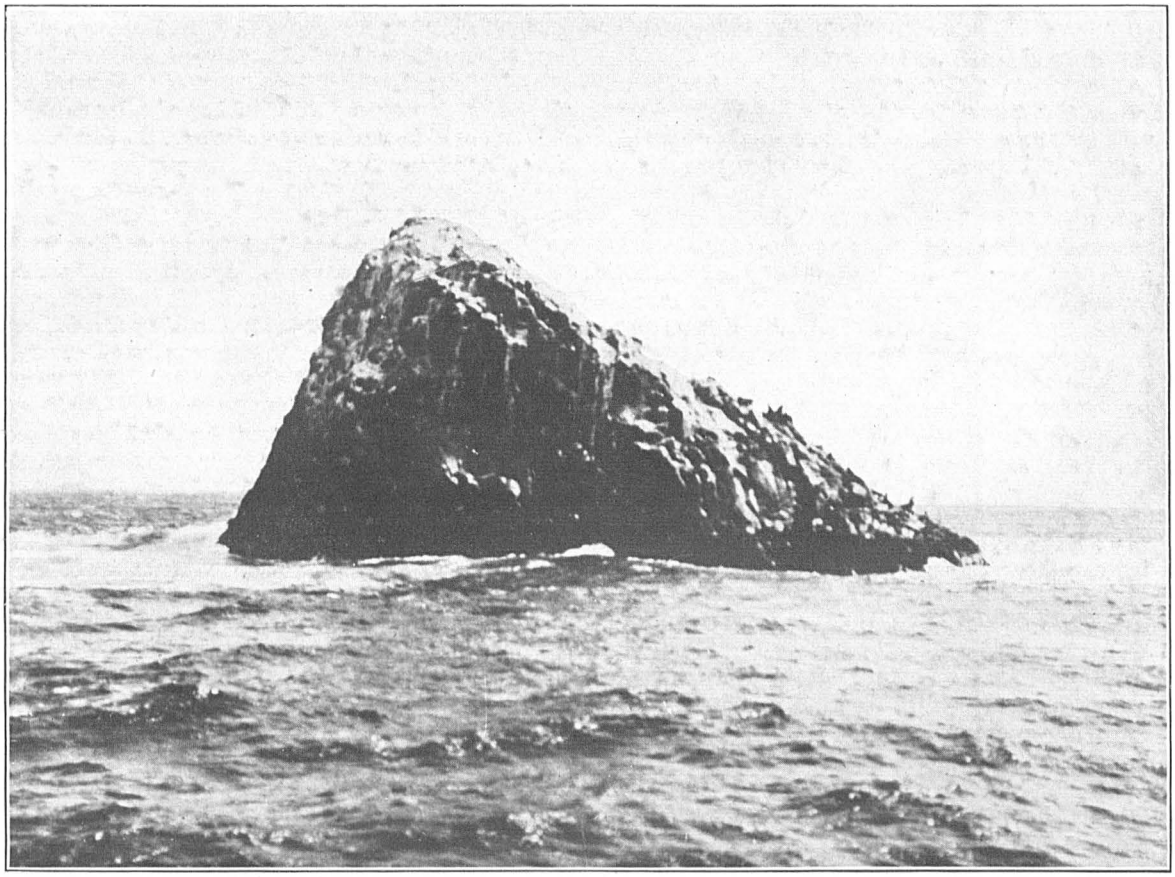

FIG. 9.—REDDING ROCK, CALIFORNIA, ONE OF THE MANY ROCKS OFF THE COASTS OF CALIFORNIA AND OREGON.

*Split Rock* (Humboldt County, Cal., A. W. C., 1874). On a remarkable promontory or projection of the coast line, on the right of the trail going south from the mouth of the Klamath River. The station is marked according to note 15.[1]

*Alder Butte* (Humboldt County, Cal., A. W. C., 1874). On a prominent butte south of Split Rock, on the left of the trail going south. Below the station there is a grove of alders. The station is marked according to note 15.[1]

*Johnson* (Humboldt County, Cal., A. W. C., 1874). Following the trail south from the ranch of Mr. Johnson, up the hill and through the timber until a bare ridge is finally reached. From here the trail leads down to the Ossegan Indian village and creek of the same name. As the trail begins to descend turn sharply to the right and the station will be found on a commanding point overlooking the sea, about 400 meters from the trail. The station is marked according to note 15,[1] except there is a stone above the bottle with a drill hole in it.

*Upper Bluff* (Humboldt County, Cal., A. W. C., 1874). On the bench or slide from the main bluff near the works of the Upper Gold Bluff Mining Co., and 10 meters north of an old rotten stump. The Upper Gold Bluffs are one continuous line of vertical cliffs south from Ossegan Creek, and the station is just north of the point where the first break in this line occurs. The station is marked by a bottle buried 3 feet below the surface, and at the surface by a drill hole in a square stone block, and by four stubs with copper tacks in the top of each and bearing north, south, east, and west (magnetic).

*Mussel Point* (Humboldt County, Cal., A. W. C., 1874). About 1½ or 2 miles beyond the Lower Gold Bluff mine and dwelling houses, on a bold promontory which is the first marked point projecting beyond the beach below the bluffs. The station is marked by a bottle buried 3 feet below the surface, and at the surface by a drill hole in a square stone, surrounded by four stubs with copper tacks in the tops bearing north, south, east, and west (magnetic).

*Sharp Point* (Humboldt County, Cal., A. W. C., 1874). On an exceedingly prominent knoll or promontory standing out from the mainland about 1 mile south of the spot where the stone lagoon approaches the beach. The station is on the sharp apex of the peak forming the end of the point, on a spot leveled off to afford room for the signal. A rock left standing was dressed off square and a drill hole in this rock marks the station.

*Big Lagoon* (Humboldt County, Cal., A. F. R., 1870; 1874). Nine miles north of Trinidad by the coast trail, on the northern end of the bluff north of Rock Point, about 300 meters south of the point where the coast trail leaves the bluff and leads on to the Big Tyoon beach, about 60 feet above the tide. The station is marked by a stub 3 feet long with the top level with the surface surrounded by four witness marks with tacks in the top of each, distant 1.83 meters, bearing north, south, east, and west.

*Patricks Pinnacle* (Humboldt County, Cal., A. F. R., 1870; 1874). On the point known as Rocky Point about 8 miles north of Trinidad by the coast trail, on a pinnacle of rocks piled up in a huge mass of fragments. The station is marked by a stub 2 feet long with rocks piled up around it.

*Inner Turtle Rock* (Humboldt County, Cal., A. F. R., 1870). On the highest point of the smaller of the two Turtle Rocks, the last off-lying rocks north of Trinidad. There is no permanent station mark.

*Patricks Point South* (Humboldt County, Cal., A. F. R., 1870). About 7 miles north of Trinidad by the coast trail. The station is marked by a nail in the top of a stub 3 feet long, set level with the surface.

*Castle* (Humboldt County, Cal., A. F. R., 1870). On the prominent rock called Castle Rock, overlooking the Forty Nine trail and within shooting distance thereto. The station is the lowest point in the hole in the rock, said to have been used as a rifle pit by a former settler named Patrick.

*Bight Tree* (Humboldt County, Cal., A. W. C., 1870). The station is a tree marked by girdling about 1 foot wide and 3 feet above the ground, in the deepest part of the indentation between Trinidad Head and Big Lagoon, on the top of the bluff about 200 feet above the tide.

## COMPUTATION, ADJUSTMENT, AND ACCURACY OF THE ELEVATIONS.

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

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

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

in which $h_2$ and $h_1$ are elevations of the stations, $\zeta_2$ and $\zeta_1$ are the measured zenith distances as corrected for height of instrument and of object observed, $s$ is the horizontal distance between the stations, and $\rho$ is the radius of curvature.

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

[1] See pp. 81 and 82.

The elevations given in the following tables were adjusted in several sections. The weight $p$ assigned to each difference of elevation was computed by the formula $\log p = 9 - 2 \log s$. The length of line corresponding to unit weight is 31.7 kilometers, or 19⅔ miles. Hence there is an equal chance whether the elevation over a line of this length is in error by an amount greater or less than the probable error of unit weight.

The following table gives the probable error of unit weight of the several sections. The elevations in the "Vicinity of Portland" are from Special Publication No. 13, "The California-Washington Arc of Primary Triangulation," and are a part of the adjusted elevations between the Willamette base net and Tacoma base. The probable error of unit weight given here is derived from this whole section.

| Section. | Probable error of unit weight. |
|---|---|
| | *Meters.* |
| Umpqua River to Tillamook Bay | ±1.18 |
| Coos Bay and San Sebastian | ±1.19 |
| Rogue River to Klamath River | ±1.98 |
| Mouth of Columbia River | ±1.58 |
| Vicinity of Portland | ±0.78 |

## ELEVATIONS.

The datum for all elevations is mean sea level.

The elevations are divided into three classes: First, those fixed directly by spirit leveling or by tidal bench marks which are subject to very small errors; second, the stations in the main scheme, which are fixed by reciprocal measures of vertical angles; third, the intersection stations, of which the elevations are fixed by the measure of vertical angles which are not reciprocal, since the intersection stations are not occupied, and whose elevations are subject to errors which may be as great as 3 meters.

The accuracy with which the elevation of any station in the main scheme is determined depends mainly upon the remoteness of that station from the nearest one of which the elevation is fixed by spirit leveling. Long Ridge, with a probable error of ±1.17 meters, is probably the least accurately determined of any of the stations in the main scheme between Rogue River and Klamath River.

### TABLE OF ELEVATIONS.

*Umpqua River to Tillamook Bay.*

| Station. | Point to which elevation refers. | Elevation. | | Station. | Point to which elevation refers. | Elevation. | |
|---|---|---|---|---|---|---|---|
| | | Meters. | Feet. | | | Meters. | Feet. |
| *Class 1.* | | | | *Class 2*—Continued. | | | |
| Bench | Station mark | 1.77 | 5.81 | Cummins | Station mark | 755.6 | 2479.0 |
| *Class 2.* | | | | Table | do | 838.9 | 2752.3 |
| | | | | Life | do | 36.0 | 118.1 |
| Beach | Station mark | 5.5 | 18.0 | Iron | do | 198.6 | 651.6 |
| Wind | do | 17.2 | 56.4 | Yaquina Lighthouse | Center of ball | 51.9 | 170.3 |
| Cab | do | 5.0 | 16.4 | Bald | Station mark | 849.7 | 2787.7 |
| Sand Hill 2 | do | 32.6 | 107.0 | Foulweather | do | 315.0 | 1033.5 |
| Umpqua River Lighthouse | Center of ball | 53.0 | 173.9 | Cascade | do | 477.1 | 1565.3 |
| Brushy Hill 2 | Station mark | 74.5 | 244.4 | Salmon | do | 180.9 | 593.5 |
| Burn | do | 134.1 | 440.0 | Hebo | do | 961.0 | 3152.9 |
| Dean | do | 479.0 | 1571.5 | Buzzard Butte | do | 513.8 | 1685.7 |
| Trail | do | 268.4 | 880.6 | Round Top | do | 364.3 | 1195.2 |
| Maple | do | 343.8 | 1127.9 | Flat | do | 303.5 | 995.7 |
| Cape | do | 431.7 | 1416.3 | Fletcher | do | 64.3 | 211.0 |
| Sugar Loaf 2 | do | 35.3 | 115.8 | Bozley | do | 157.3 | 516.1 |
| Cannery Hill | do | 43.3 | 142.1 | Sheep Hill | do | 119.4 | 391.7 |
| Green | do | 140.7 | 461.6 | Gage B | do | 151.8 | 498.0 |
| Spur | do | 200.2 | 656.8 | Ginger | do | 468.4 | 1536.7 |
| Snag | do | 442.4 | 1451.4 | Shell Point | do | 2.6 | 8.5 |
| Loaf | do | 52.4 | 171.9 | | | | |
| Heceta | do | 160.6 | 526.9 | *Class 3.* | | | |
| Heceta Head Lighthouse | Center of ball | 67.9 | 222.8 | | | | |
| Turn | Station mark | 104.1 | 341.5 | Doty | Top of peak | 438.3 | 1438.0 |
| Head | do | 84.0 | 275.6 | Boulder Point | Station mark | 0.8 | 2.6 |
| Fairview | do | 703.0 | 2306.4 | Euchre Mountain | Top of trees | 786.3 | 2579.7 |
| Plateau | do | 437.1 | 1434.0 | Cape Lookout Summit | do | 605.8 | 1987.5 |
| Tree | do | 115.6 | 379.3 | Green Hill 2 | Station mark | 126.8 | 416.0 |

*Coos Bay and San Sebastian.*

| Station. | Point to which elevation refers. | Elevation. | | Station. | Point to which elevation refers. | Elevation. | |
|---|---|---|---|---|---|---|---|
| | | Meters. | Feet. | | | Meters. | Feet. |
| *Class 1.* | | | | *Class 2.*—Continued. | | | |
| U. S. G. S. bench mark Marshfield. | Bronze tablet marked 11. | 3.28 | 10.778 | Stack | Station mark | 1062.7 | 3486.5 |
| *Class 2.* | | | | Craggy | do | 1368.3 | 4489.2 |
| | | | | Bosley | do | 1037.4 | 3403.5 |
| | | | | Grizzley | do | 705.4 | 2314.3 |
| Camas | Station mark | 995.6 | 3266.4 | Sundown 2 | do | 648.0 | 2126.0 |
| Bolivar | do | 1309.8 | 4297.2 | Dolan | do | 216.1 | 709.0 |
| Johnson | do | 890.8 | 2922.6 | Red Rock | do | 394.6 | 1294.6 |
| Bennett | do | 661.5 | 2170.3 | *Class 3.* | | | |
| Sugar | do | 453.8 | 1488.8 | | | | |
| Westport | do | 216.8 | 711.3 | Butler | Station mark | 891.4 | 2924.5 |
| Cathcart | do | 557.6 | 1829.4 | Cotton | do | 566.4 | 1858.3 |
| Marshfield Hill | do | 70.6 | 231.6 | Salmon Mountain | Top of peak | 962.4 | 3157.5 |
| Noah | do | 279.6 | 917.3 | Port Orford astronomic 2 | Station mark | 74.1 | 243.1 |
| White Point 3 | do | 8.6 | 28.2 | Arch Rock | Top of rock | 35.0 | 114.8 |
| Mill | do | 51.3 | 168.3 | Colliers Butte | Top of sharp peak. | 1315.4 | 4315.6 |
| Porter | do | 20.3 | 66.6 | Heads | Station mark | 78.2 | 256.6 |
| Pierce | do | 15.9 | 52.2 | Madden | do | 242.4 | 795.3 |
| Edson | do | 841.8 | 2761.8 | Rocky Peak | Top of peak | 971.3 | 3186.7 |
| Bill | do | 464.0 | 1522.3 | Saddle Mountain | do | 1332.9 | 4373.0 |
| Bald | do | 900.5 | 2954.4 | Sixes | Station mark | 60.5 | 198.5 |
| Cape | do | 56.0 | 183.7 | Mount Emery or Chetko | Top of peak | 829.5 | 2721.4 |
| Squirrel | do | 1611.0 | 5285.4 | | | | |

*Rogue River to Klamath River, Cal.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Class 1.* | | | | *Class 3.* | | | |
| Redding Rock | | 0.00 | 0.00 | Mound | Station mark | 244.8 | 803.1 |
| *Class 2.* | | | | Klamath South 2 | do | 144.2 | 473.1 |
| | | | | Preston Peak South | Top of peak | 2206.0 | 7237.5 |
| | | | | Small Hill southwest of Bosley. | Bushes | 625.5 | 2052.2 |
| Pollywog | Station mark | 811.1 | 2661.1 | Bear Mountain | Top of peak | 1948.1 | 6391.4 |
| Elk | do | 504.6 | 1655.5 | Second peak north of Preston Peak. | do | 2069.9 | 6791.0 |
| Pack Saddle | do | 815.7 | 2676.2 | Four Brothers No. 1 | do | 1588.7 | 5212.3 |
| High Divide | do | 708.8 | 2325.4 | Four Brothers No. 2 | do | 1608.7 | 5277.9 |
| Long Ridge | do | 1056.0 | 3464.6 | Four Brothers No. 3 | do | 1611.2 | 5286.1 |
| Bald Hill | do | 585.2 | 1919.9 | Four Brothers No. 4 | do | 1602.2 | 5256.6 |
| Gordon | do | 1256.1 | 4121.1 | Preston Peak | do | 2217.2 | 7274.3 |
| Child | do | 698.2 | 2290.7 | Peak No. 6 | do | 1911.3 | 6270.7 |
| Rattle | do | 1100.5 | 3610.6 | Sawtooth north | do | 1759.1 | 5771.3 |
| Red Mountain | do | 1287.7 | 4224.7 | Sawtooth south | do | 1753.2 | 5752.0 |
| | | | | Peak No. 8 | do | 1575.2 | 5168.0 |

*Mouth of the Columbia River.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Class 2.* | | | | *Class 2*—Continued. | | | |
| Scarboro Hill 2 | Station mark | 207.3 | 680.1 | Tillamook Head | Station mark | 346.3 | 1136.1 |
| Saddle Mountain 2 | do | 995.6 | 3266.4 | Battery | do | 81.7 | 268.0 |

*Vicinity of Portland, Oreg.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Class 1.* | | | | *Class 2*—Continued. | | | |
| Oregonian | Top of tower | 69.22 | 227.10 | Fir | Station mark | 345.9 | 1134.8 |
| *Class 2.* | | | | Monument, General Land Survey. | do | 289.7 | 950.5 |
| | | | | Warren | do | 38.9 | 127.6 |
| River | Station mark | 50.2 | 164.7 | Rocky Butte | do | 185.3 | 607.9 |
| Cem | do | 825.8 | 2709.3 | | | | |
| Hill | do | 296.8 | 973.8 | | | | |

## EXPLANATION OF THE SKETCHES.

On the following sketches there are shown the location of all the points whose positions are given in this publication, except those in the table of lost positions and the reference marks whose positions are computed, so that the names of all the stations in any locality may be secured simply by the inspection of a sketch, and then from the index their positions may readily be found in the table of positions. A line of the main scheme is shown as a full line when observed over in both directions, and is broken at one end when not observed over from the station at that end of the line. The stations that were occupied are shown by a triangle and the unoccupied stations by a circle. The measured bases are indicated by a heavy line.

On the first of the sketches is shown the general location in the United States of the areas covered by published triangulation which has been rigidly computed on the North American datum. The second is an index map for the sketches which show the triangulation in detail.

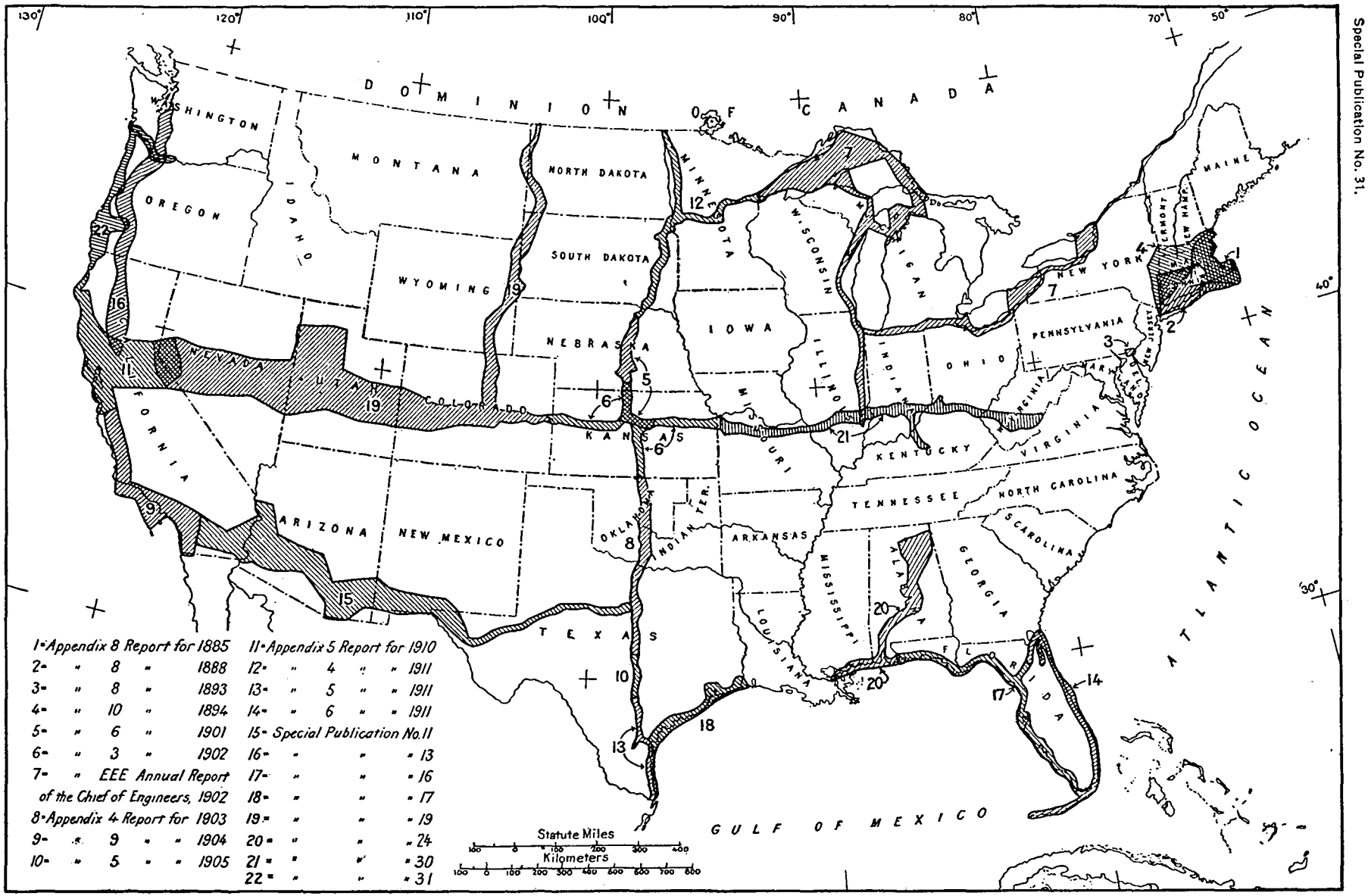


FIG. 10.—INDEX MAP SHOWING AREAS COVERED BY PUBLISHED TRIANGULATION WHICH HAS BEEN RIGIDLY COMPUTED ON THE NORTH AMERICAN DATUM.

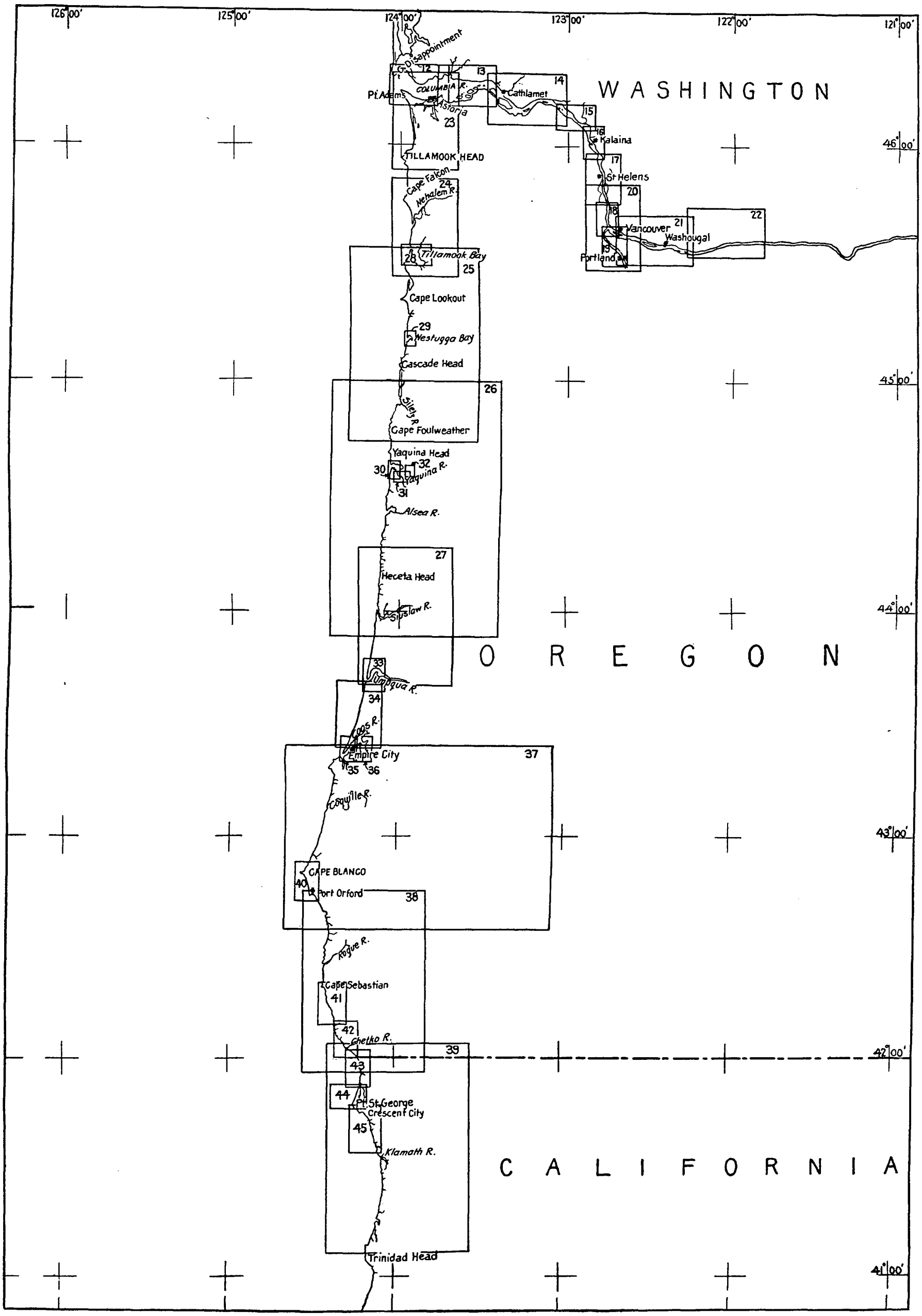


FIG. 11.—INDEX MAP SHOWING THE LIMITS OF EACH OF THE FOLLOWING SKETCHES.

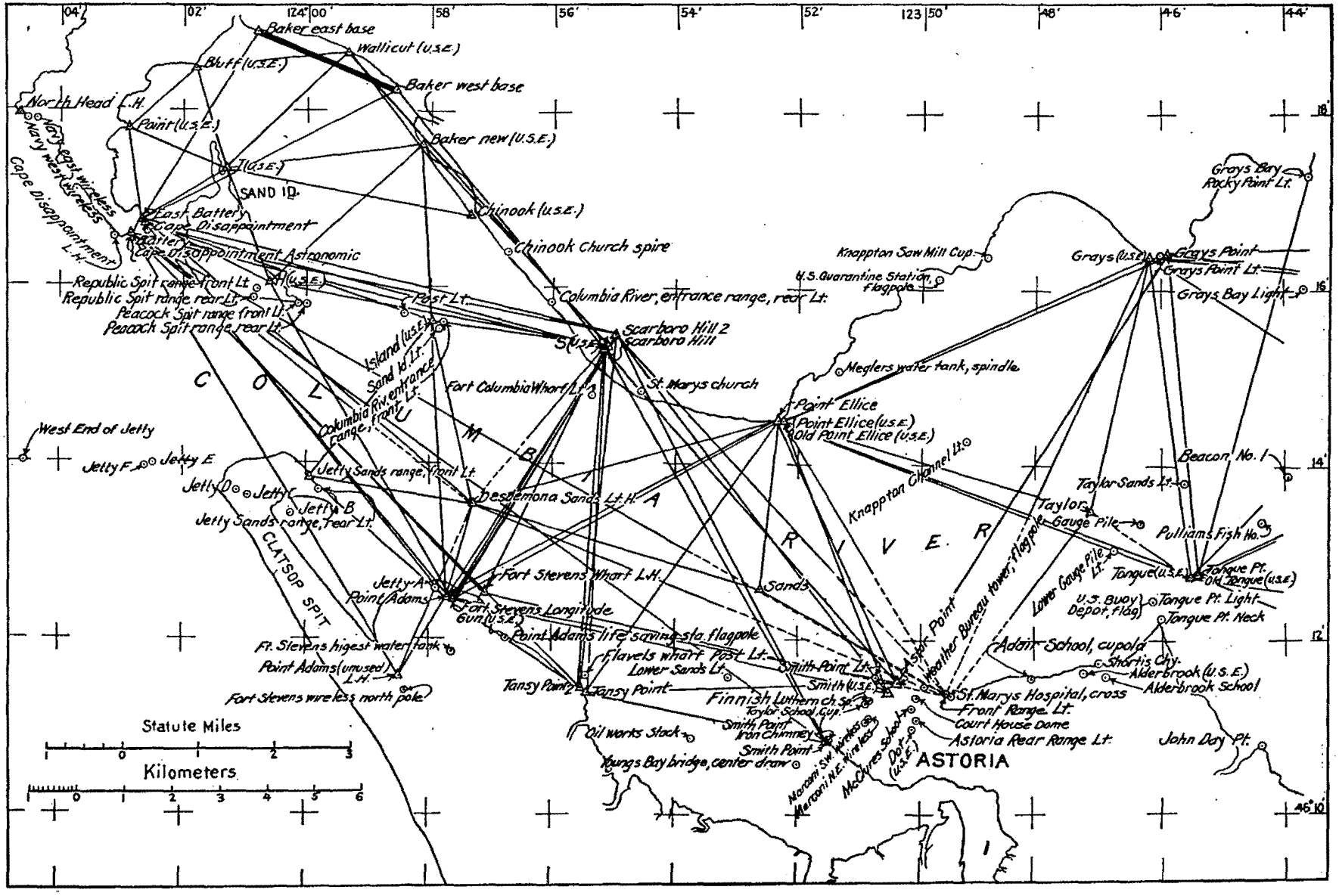


FIG. 12.—TRIANGULATION. MOUTH OF THE COLUMBIA RIVER.

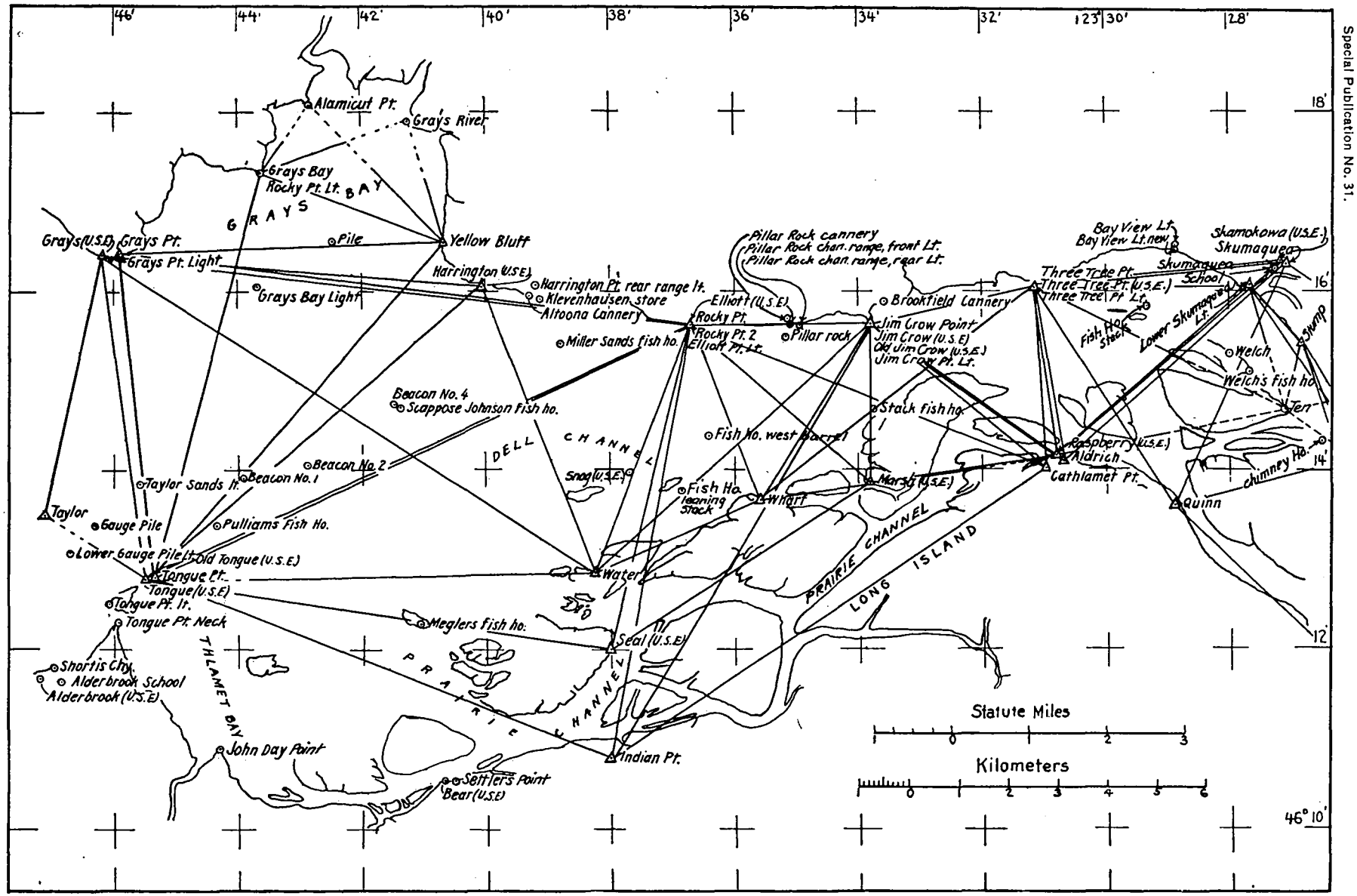


FIG. 13.—TRIANGULATION, COLUMBIA RIVER, GRAYS BAY TO THREE TREE POINT.

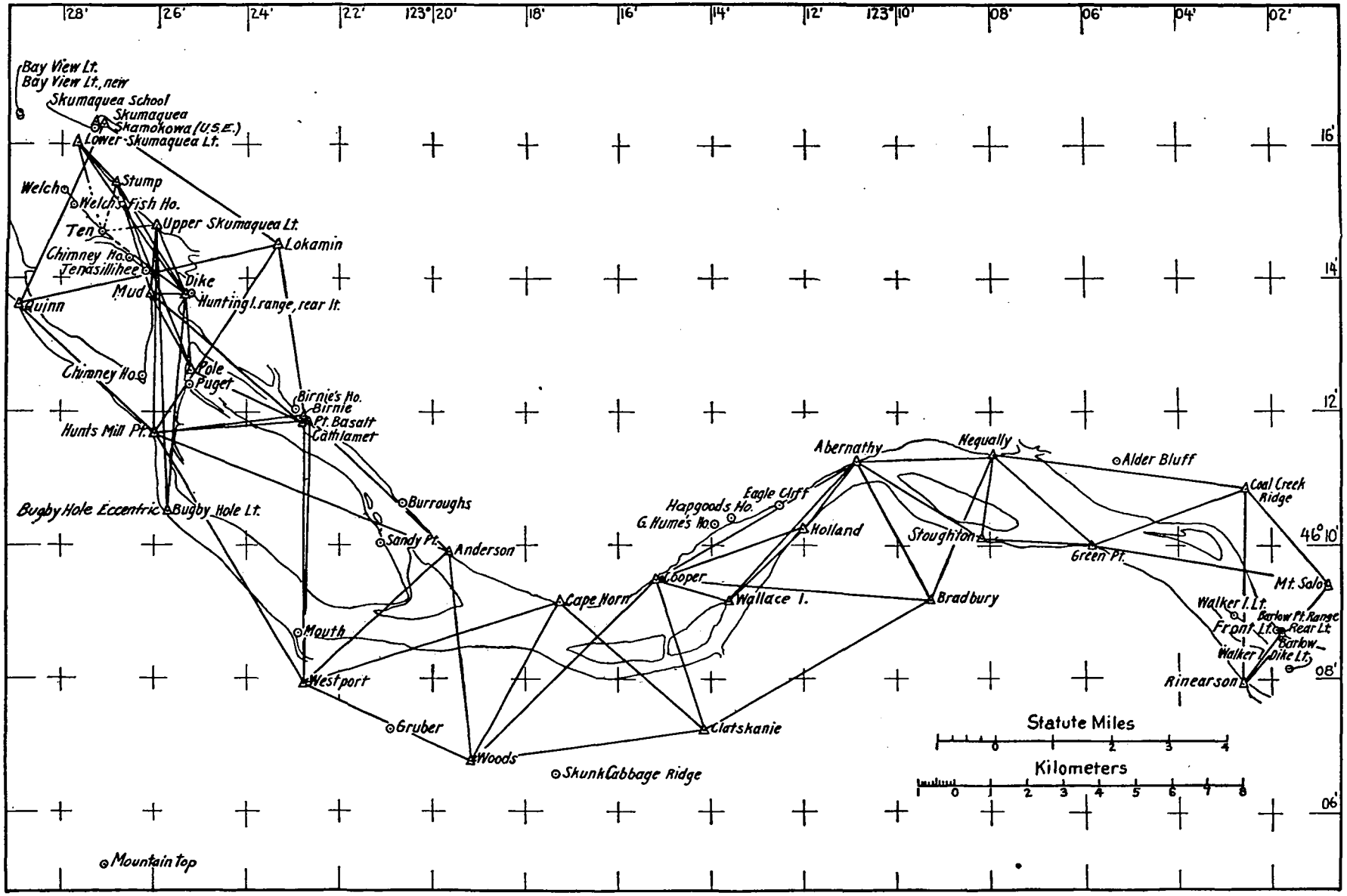


FIG. 14.—TRIANGULATION, COLUMBIA RIVER, SKUMAQUEA TO WALKER ISLAND.

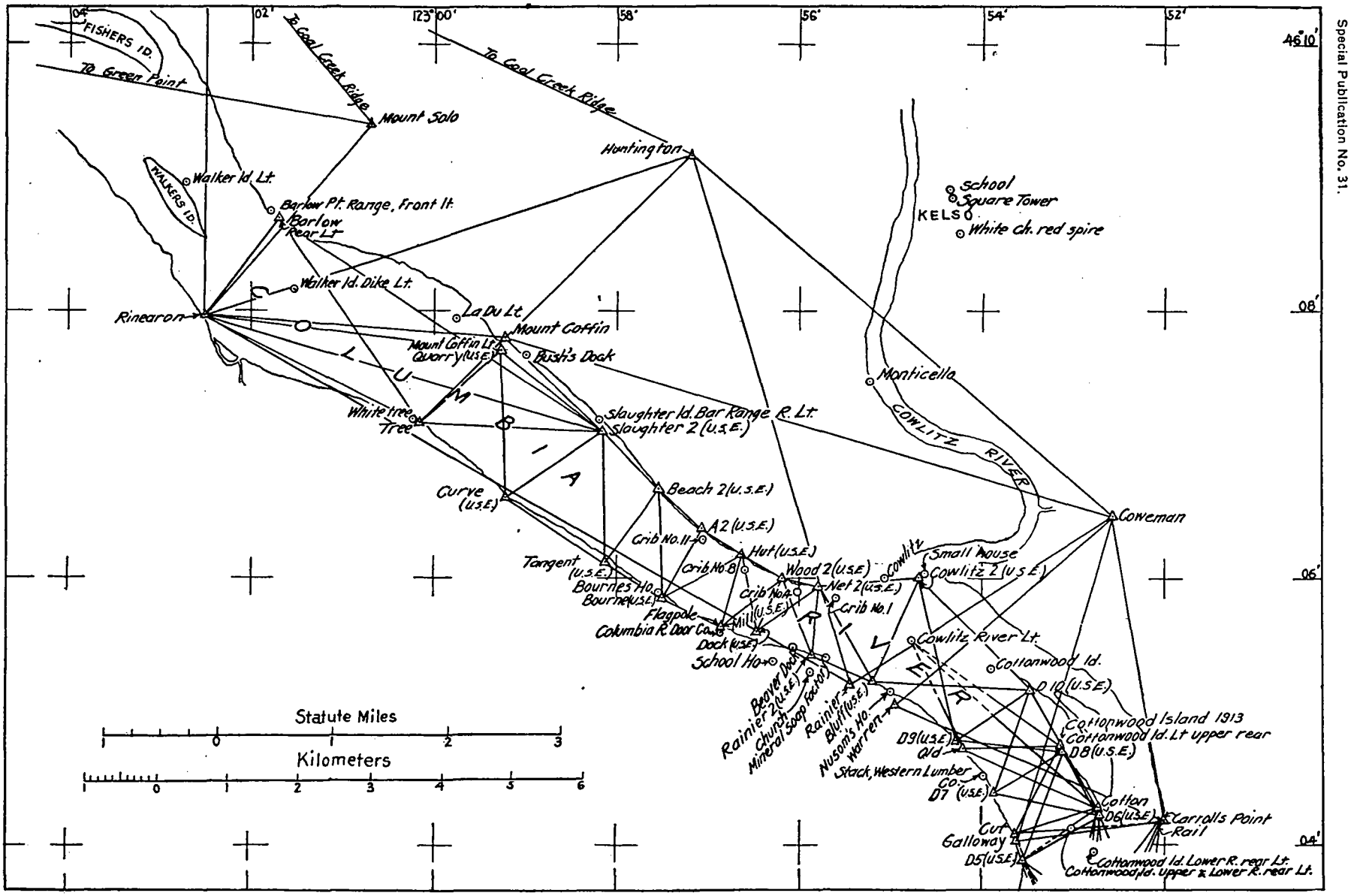


FIG. 15.—TRIANGULATION, COLUMBIA RIVER, WALKER ISLAND TO COTTONWOOD ISLAND.

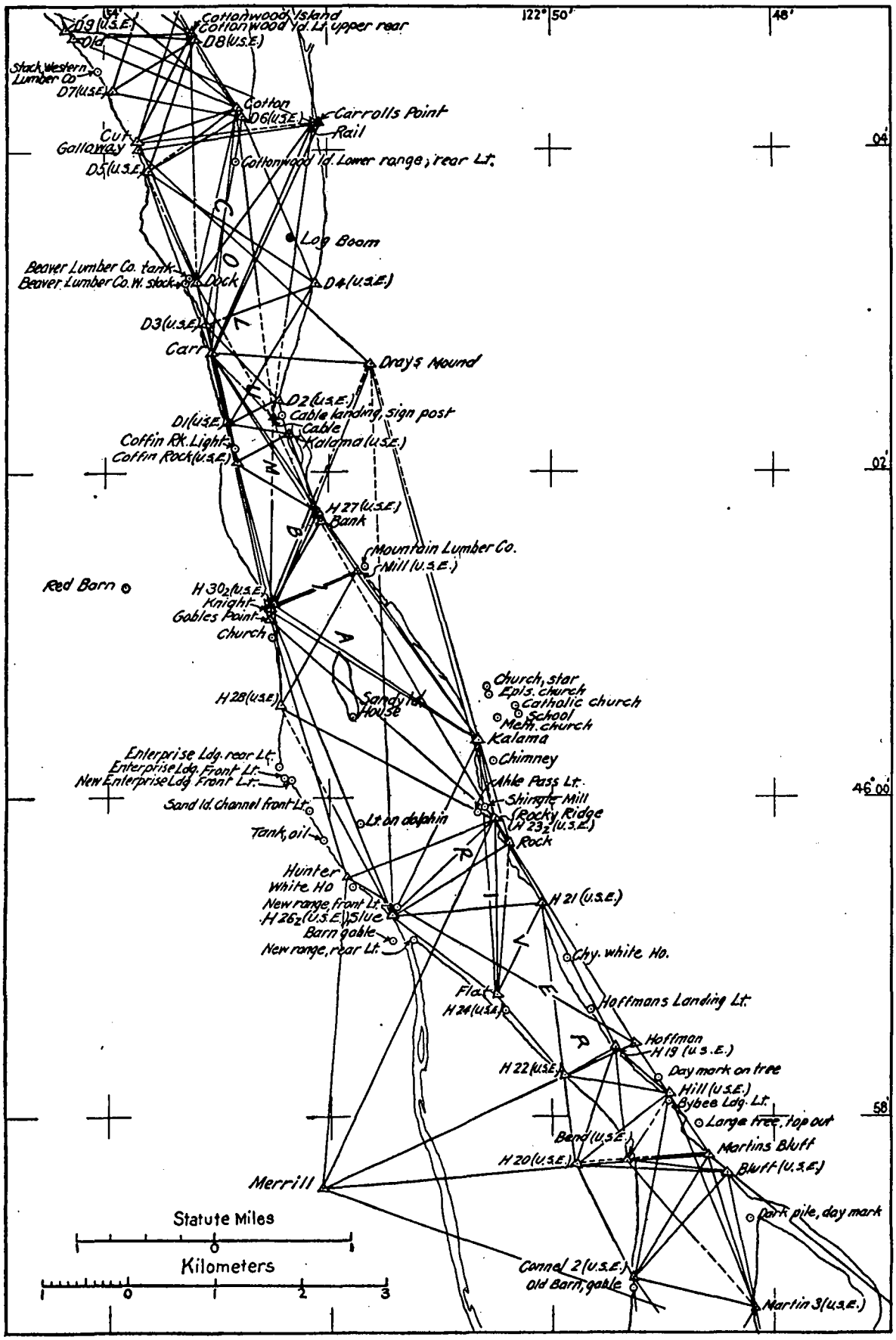


FIG. 16.—TRIANGULATION, COLUMBIA RIVER, COTTONWOOD ISLAND TO MARTIN ISLAND.

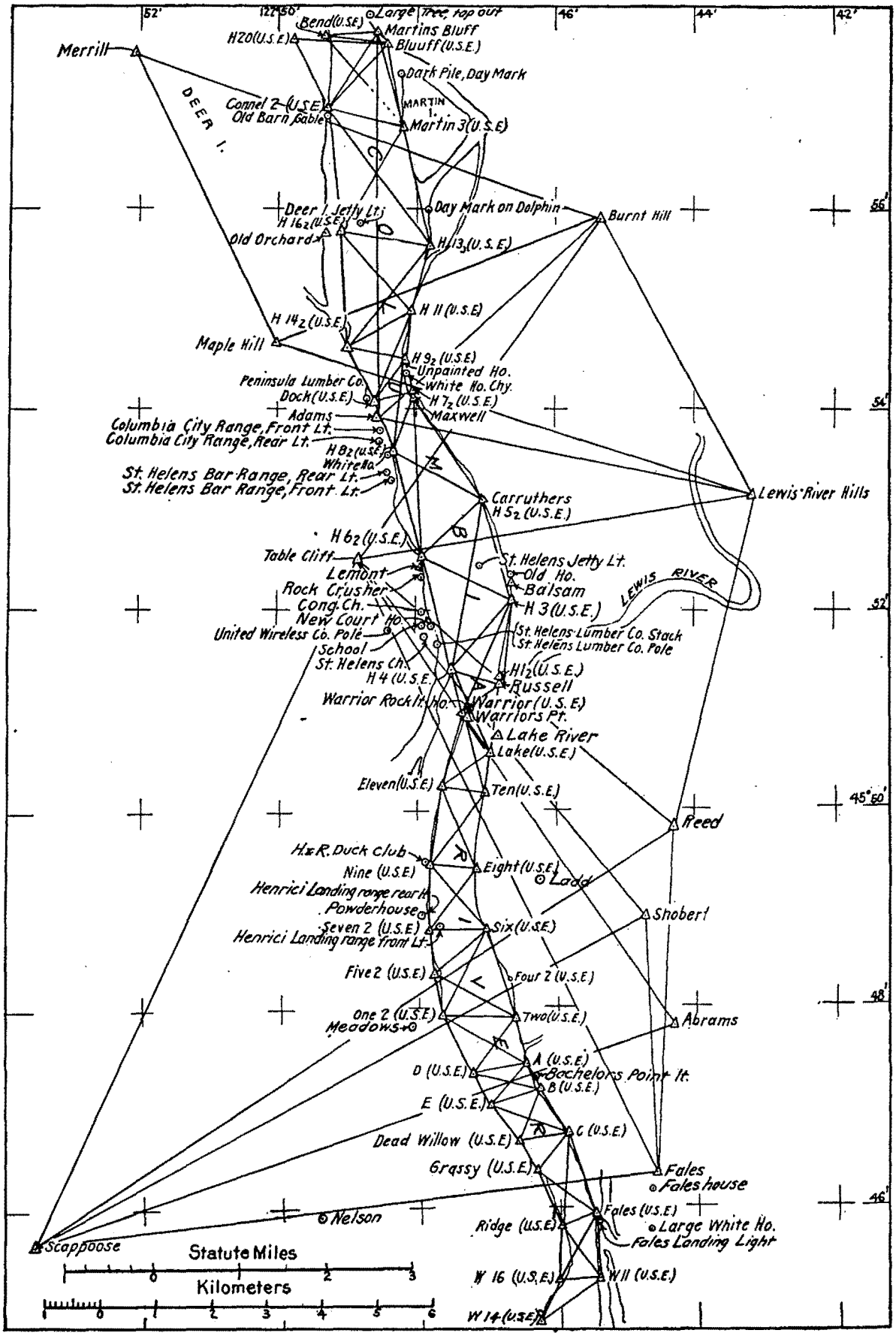


FIG. 17.—TRIANGULATION, COLUMBIA RIVER, MARTIN ISLAND TO FALES LANDING.

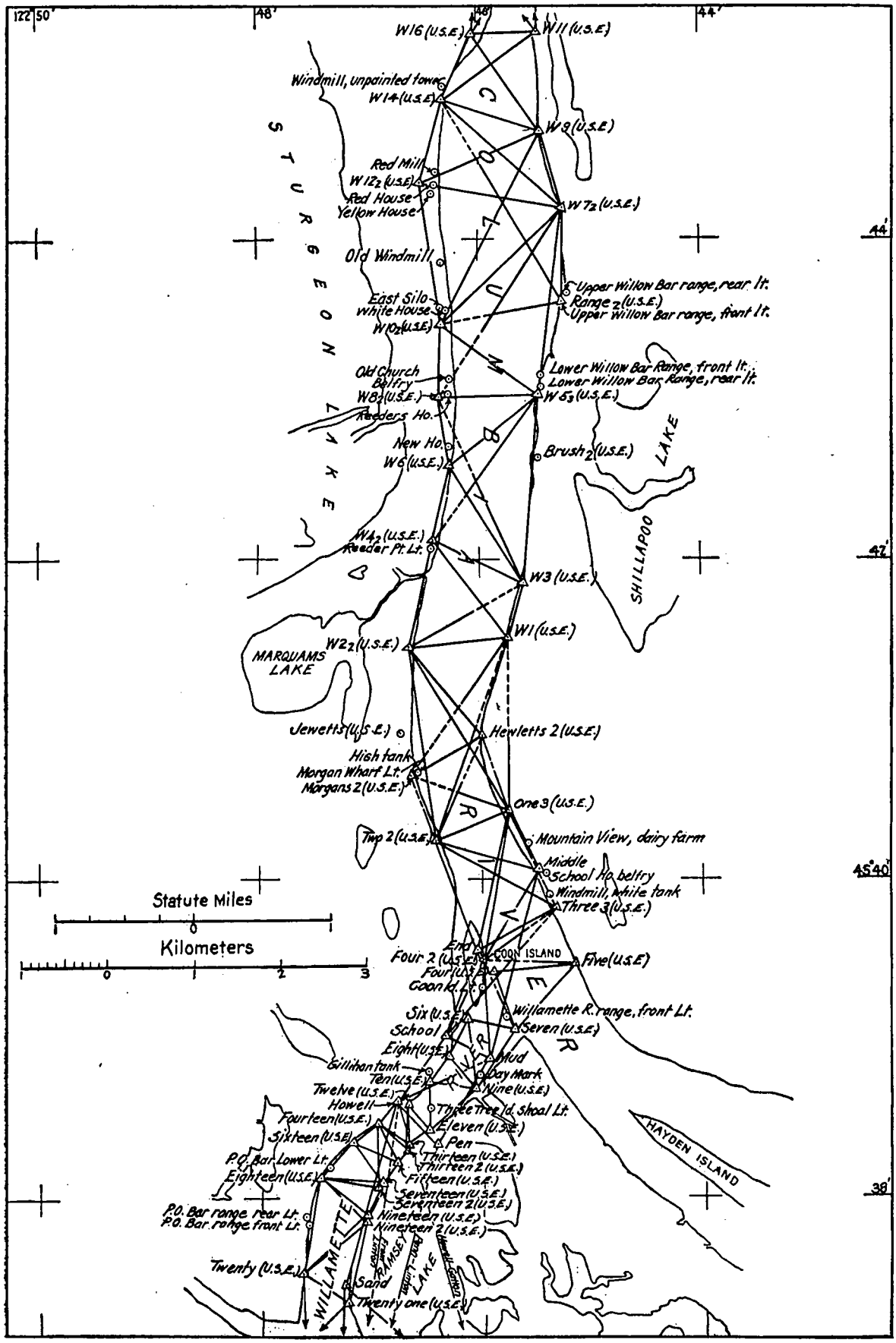


FIG. 18.—TRIANGULATION, COLUMBIA RIVER, FALES LANDING TO WILLAMETTE RIVER.

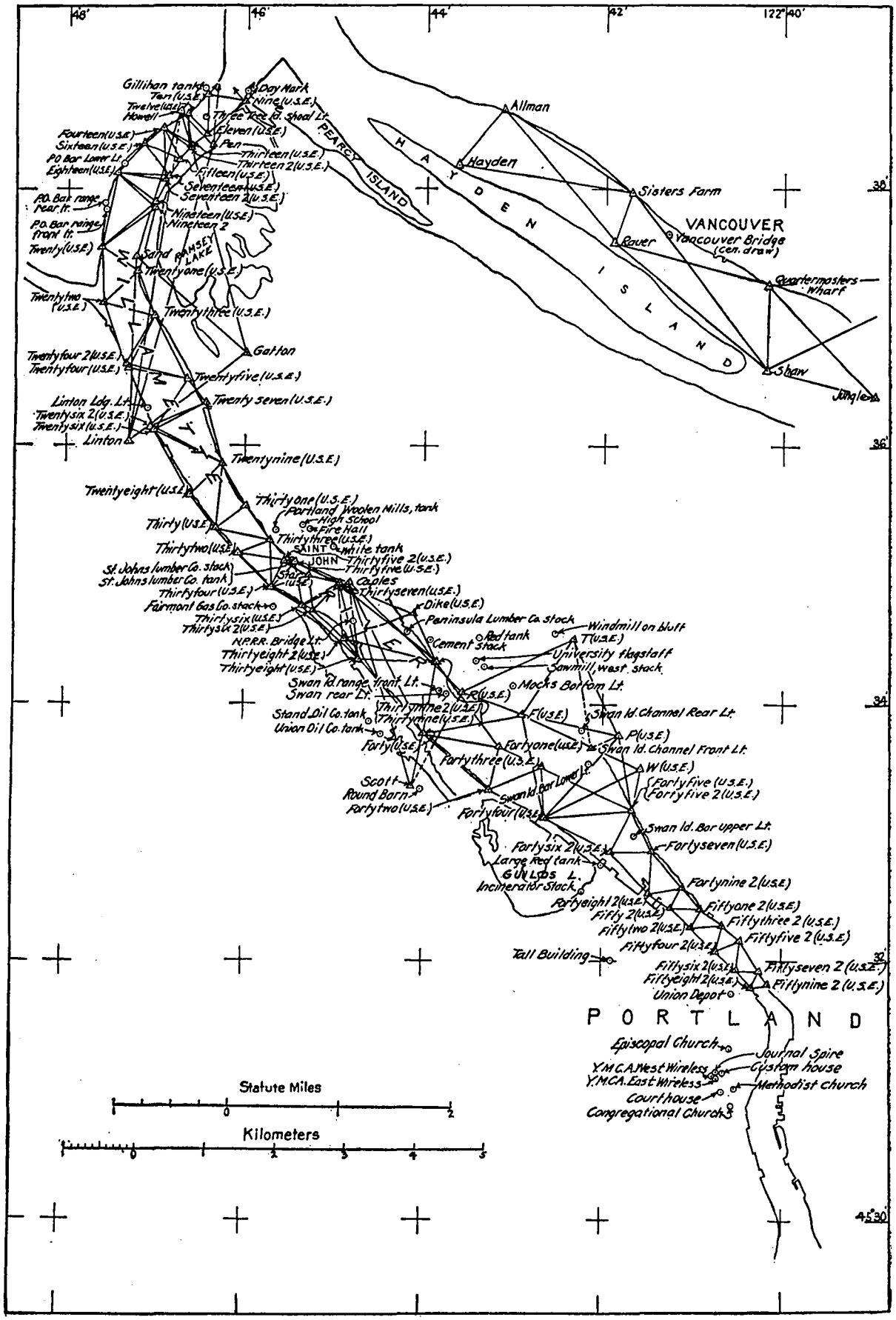


FIG. 19.—TRIANGULATION, MOUTH OF THE WILLAMETTE RIVER TO PORTLAND.

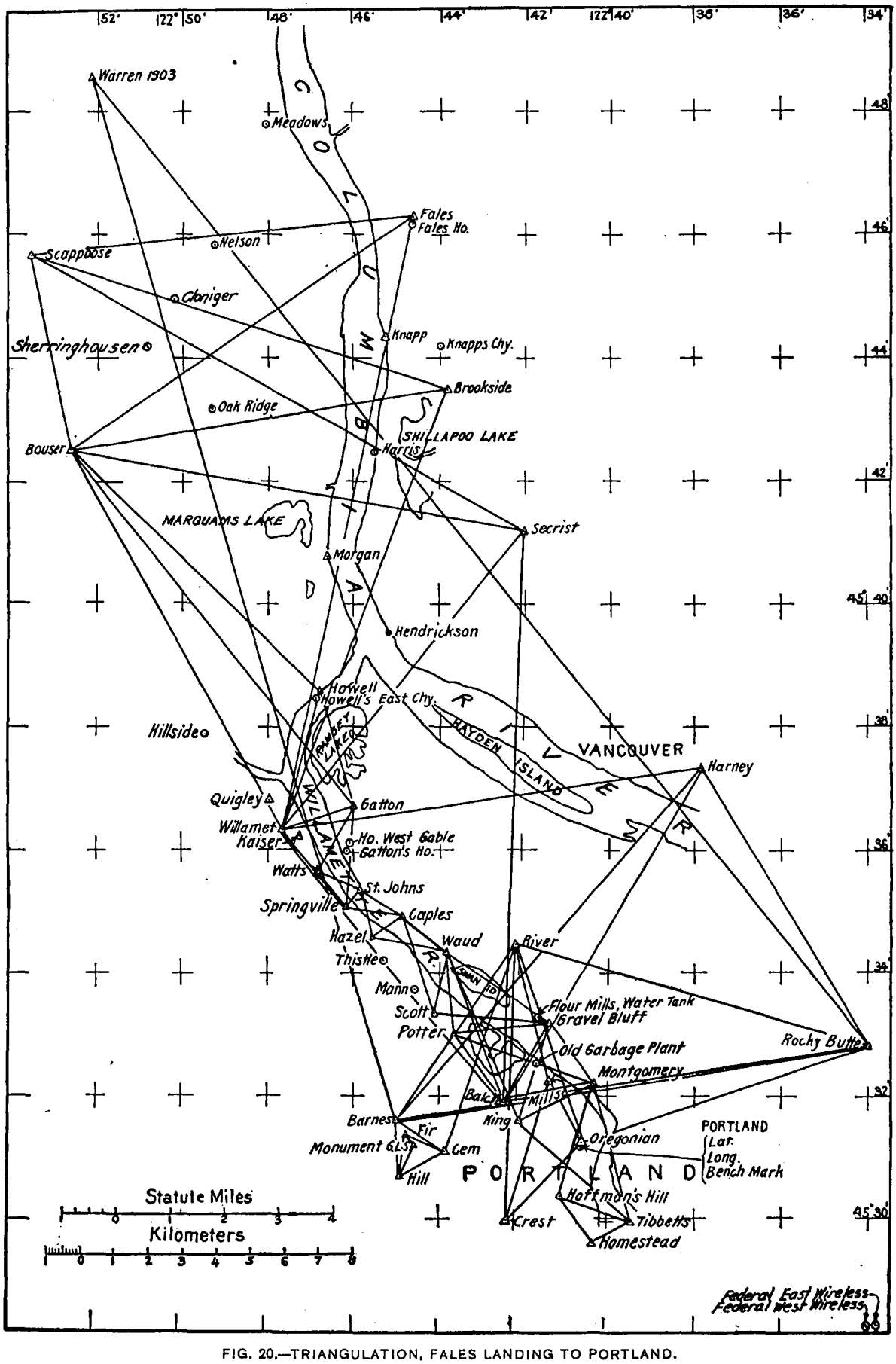


FIG. 20.—TRIANGULATION, FALES LANDING TO PORTLAND.

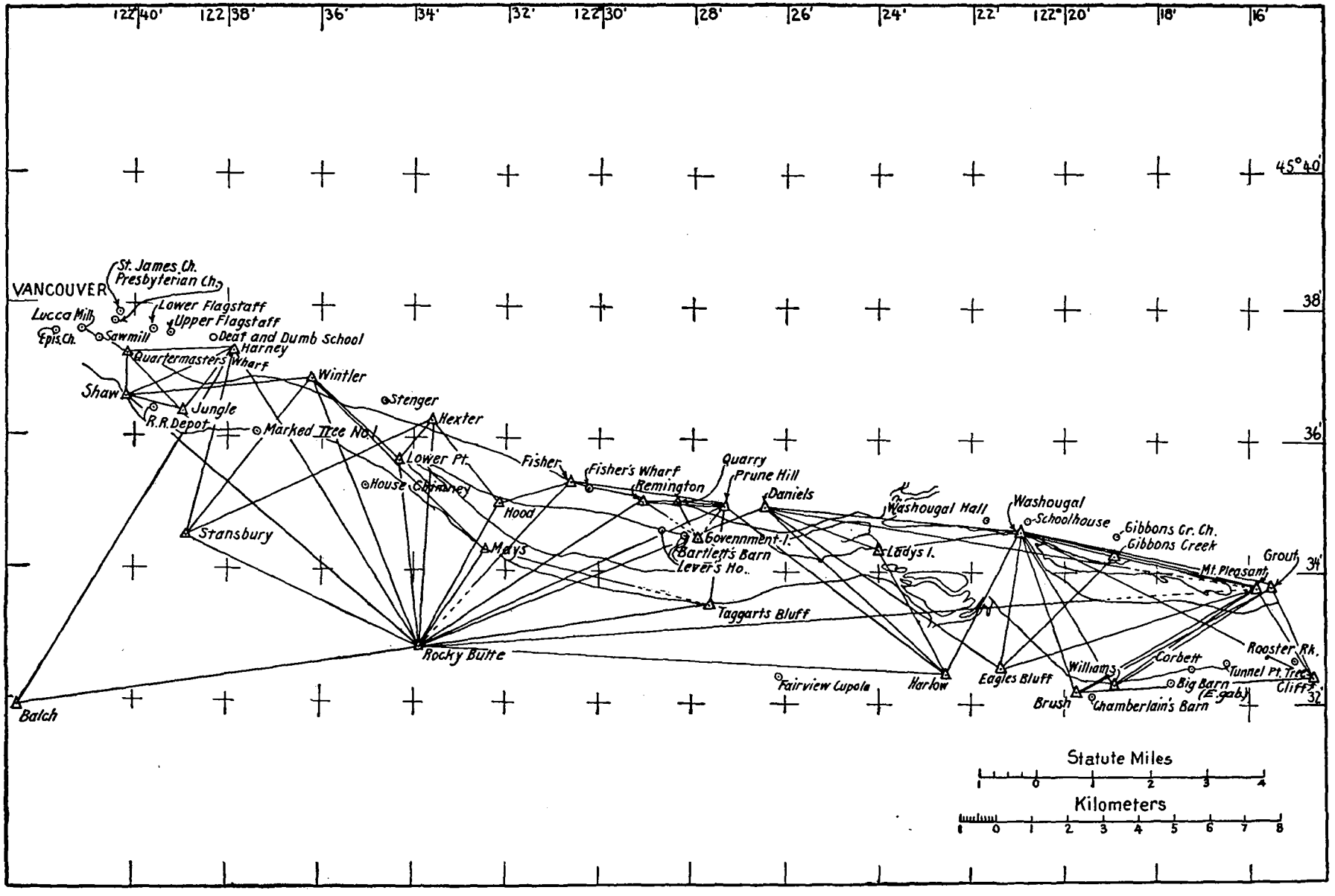


FIG. 21.—TRIANGULATION, COLUMBIA RIVER, VANCOUVER TO MOUNT PLEASANT.

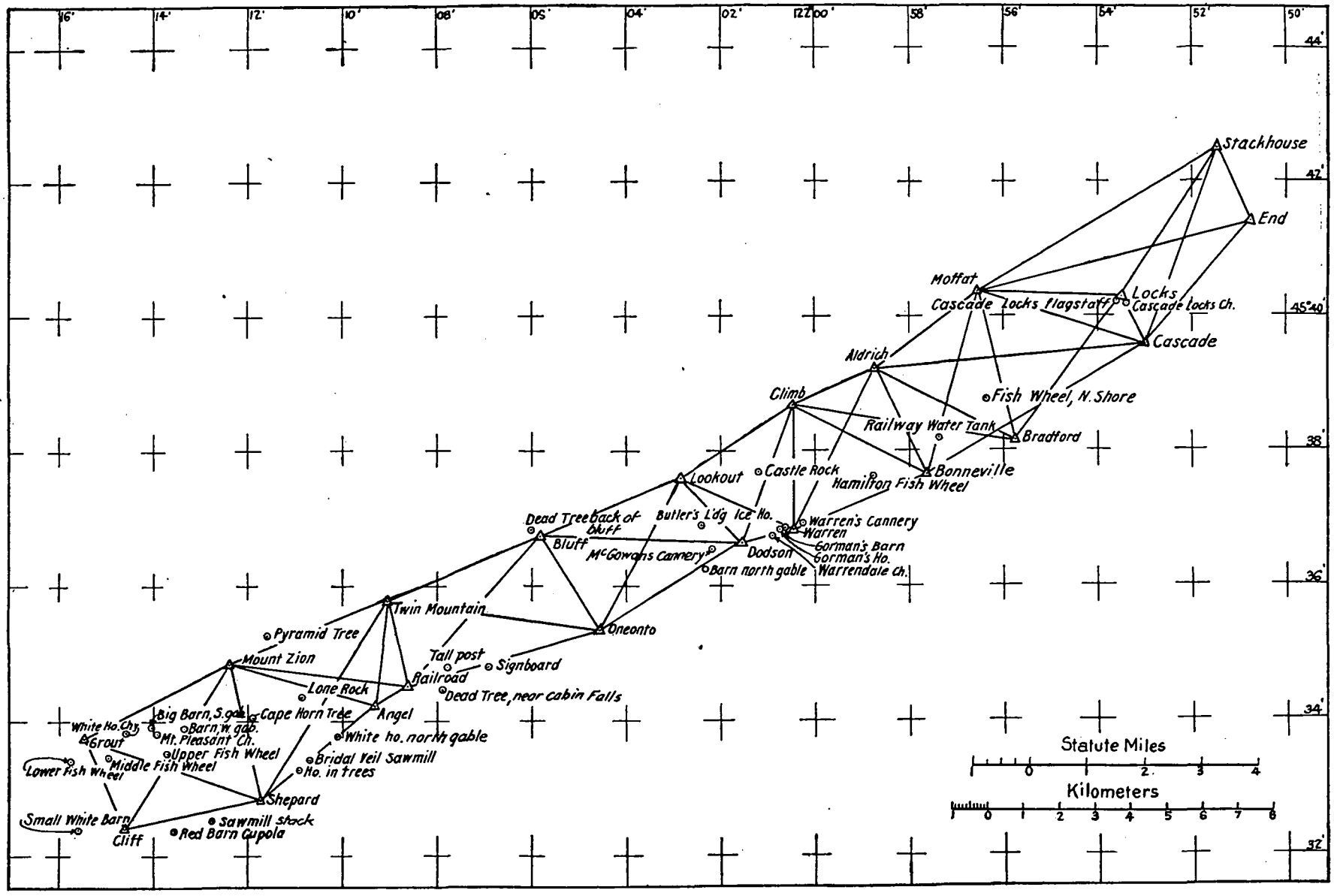


FIG. 22.—TRIANGULATION, COLUMBIA RIVER, MOUNT PLEASANT TO CASCADE LOCKS.

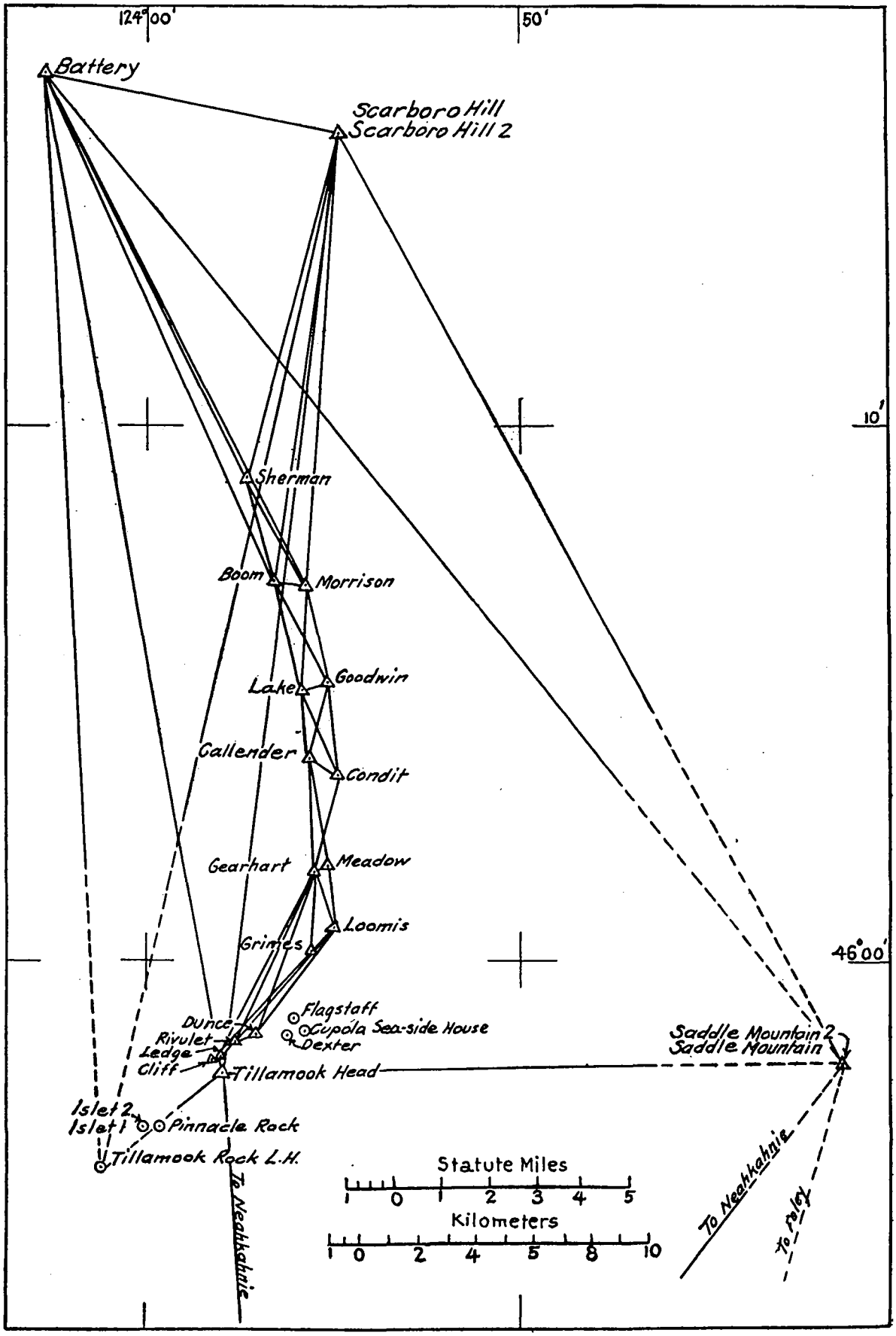


FIG. 23.—TRIANGULATION, MOUTH OF THE COLUMBIA RIVER TO TILLAMOOK LIGHTHOUSE.

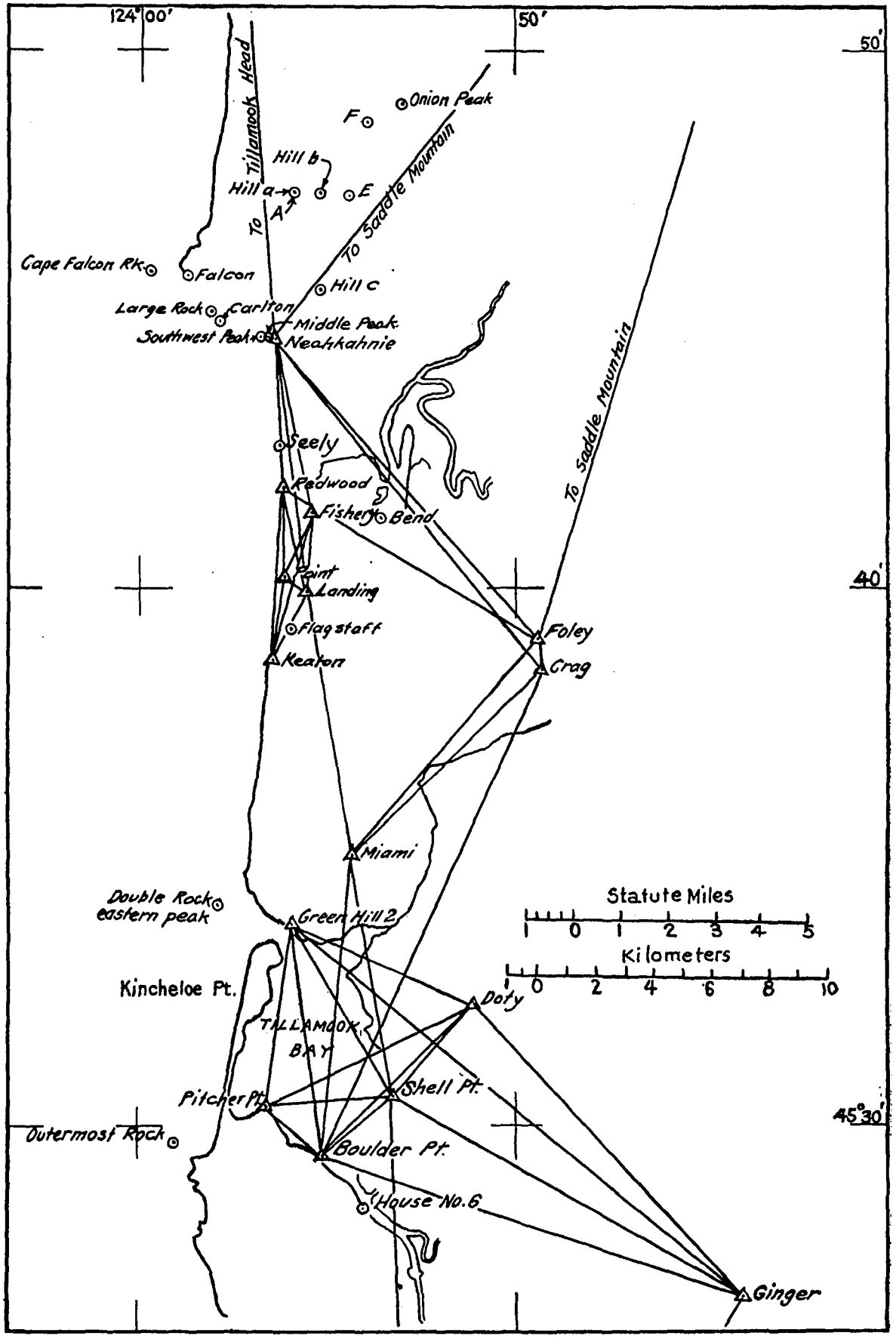


FIG. 24.—TRIANGULATION, TILLAMOOK LIGHTHOUSE TO TILLAMOOK BAY.

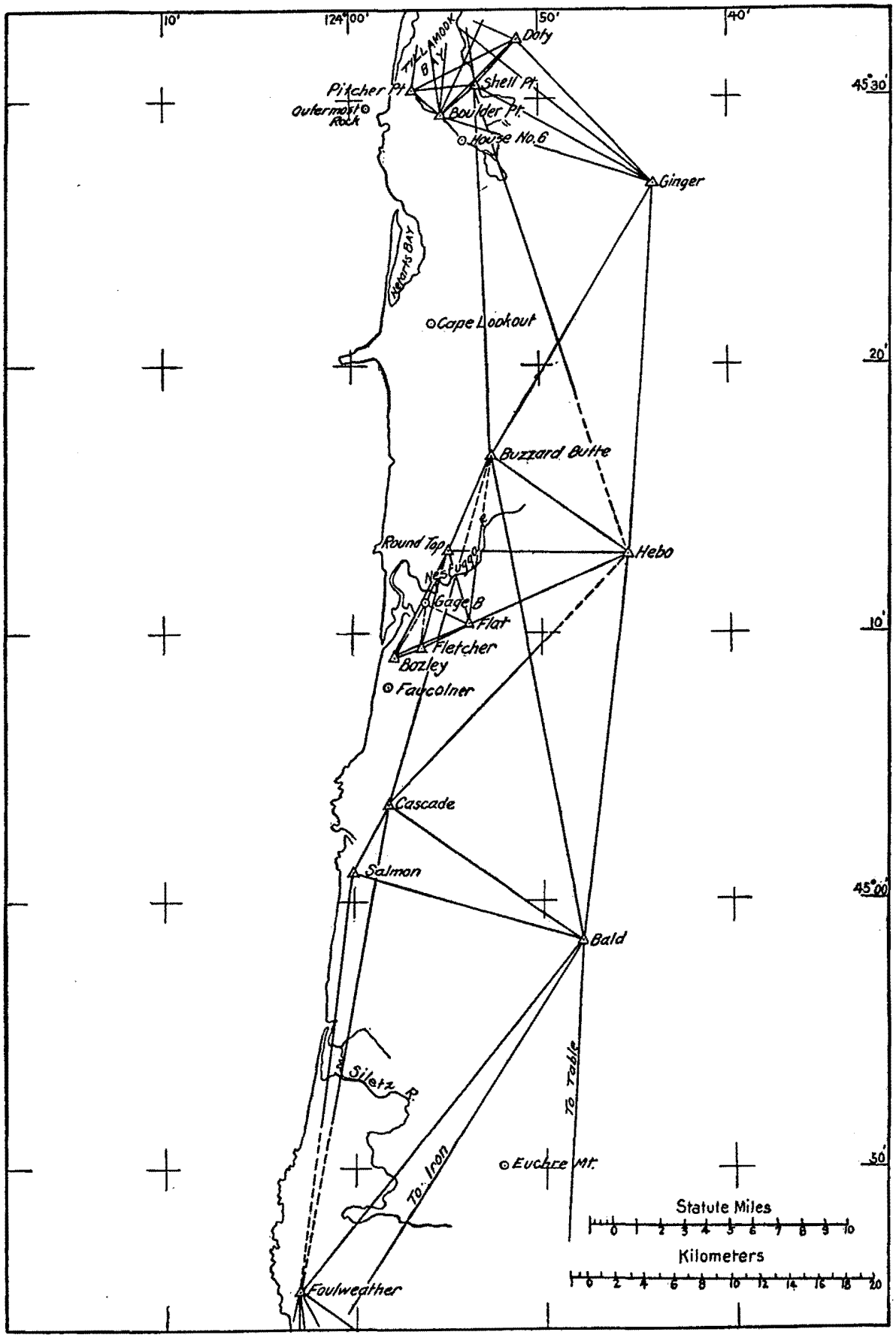


FIG. 25.—TRIANGULATION, TILLAMOOK BAY TO SILETZ RIVER.

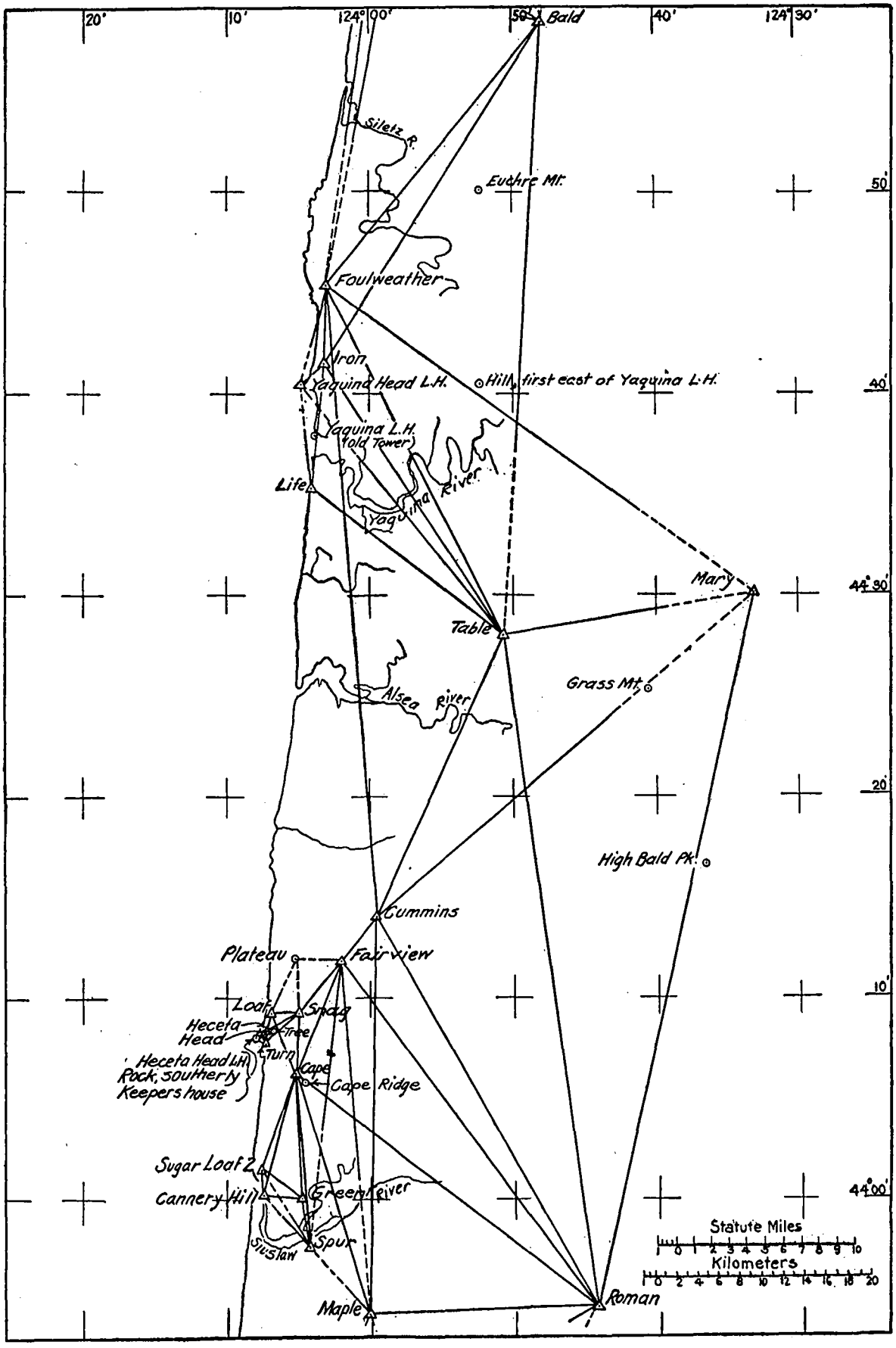


FIG. 26.—TRIANGULATION, SILETZ RIVER TO SIUSLAW RIVER.

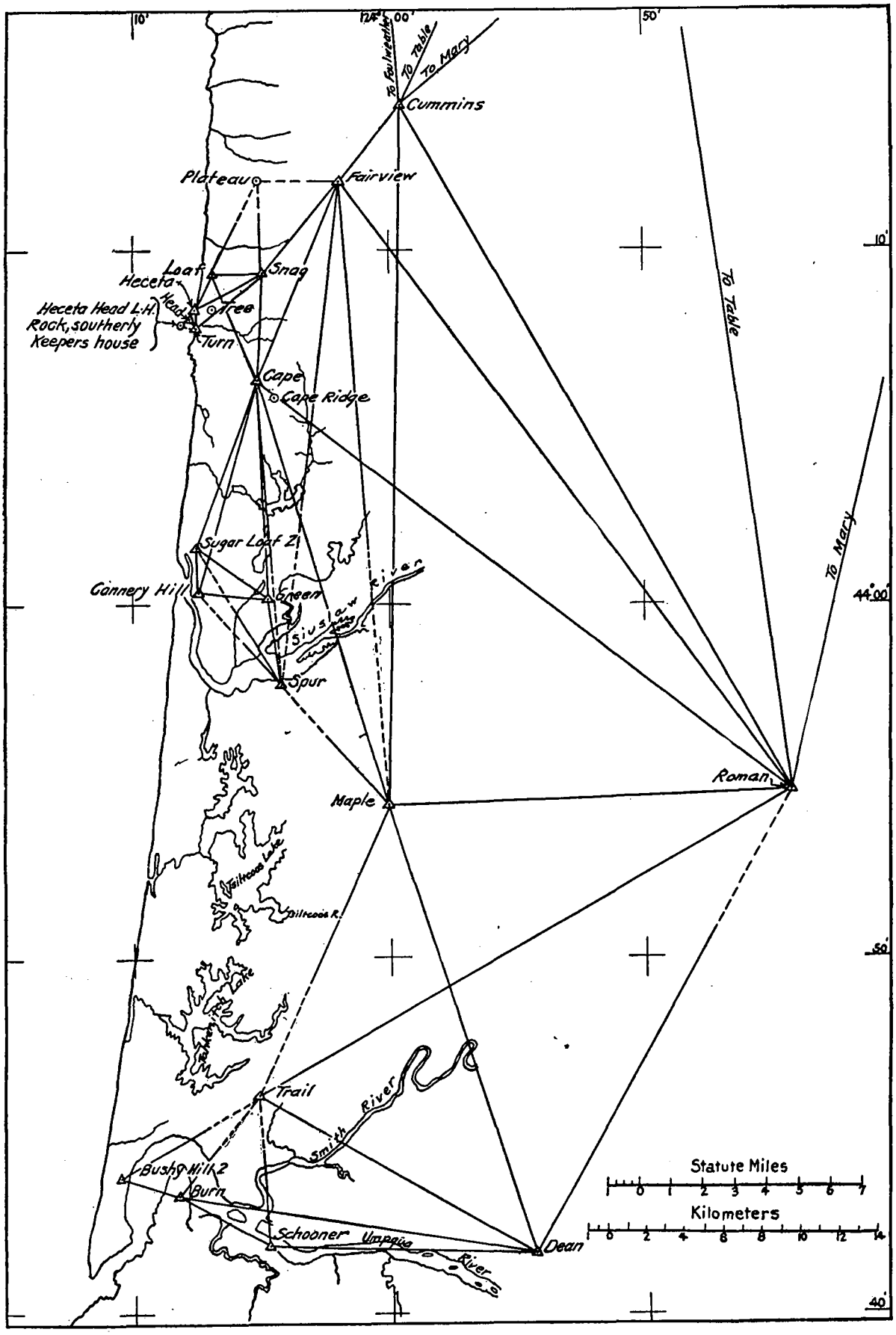


FIG. 27.—TRIANGULATION, HECETA HEAD TO UMPQUA RIVER.

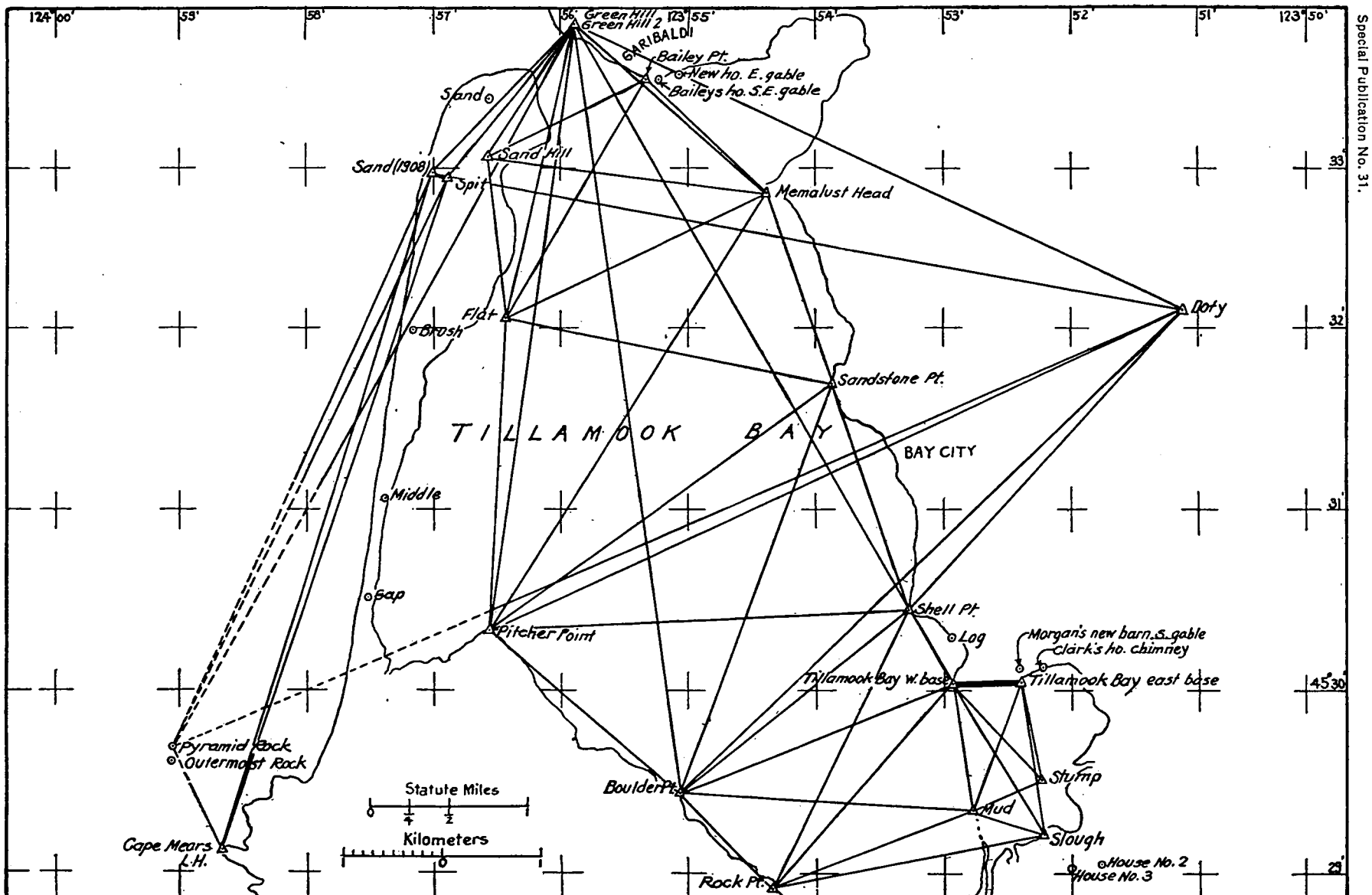


FIG. 28.—TRIANGULATION, TILLAMOOK BAY.

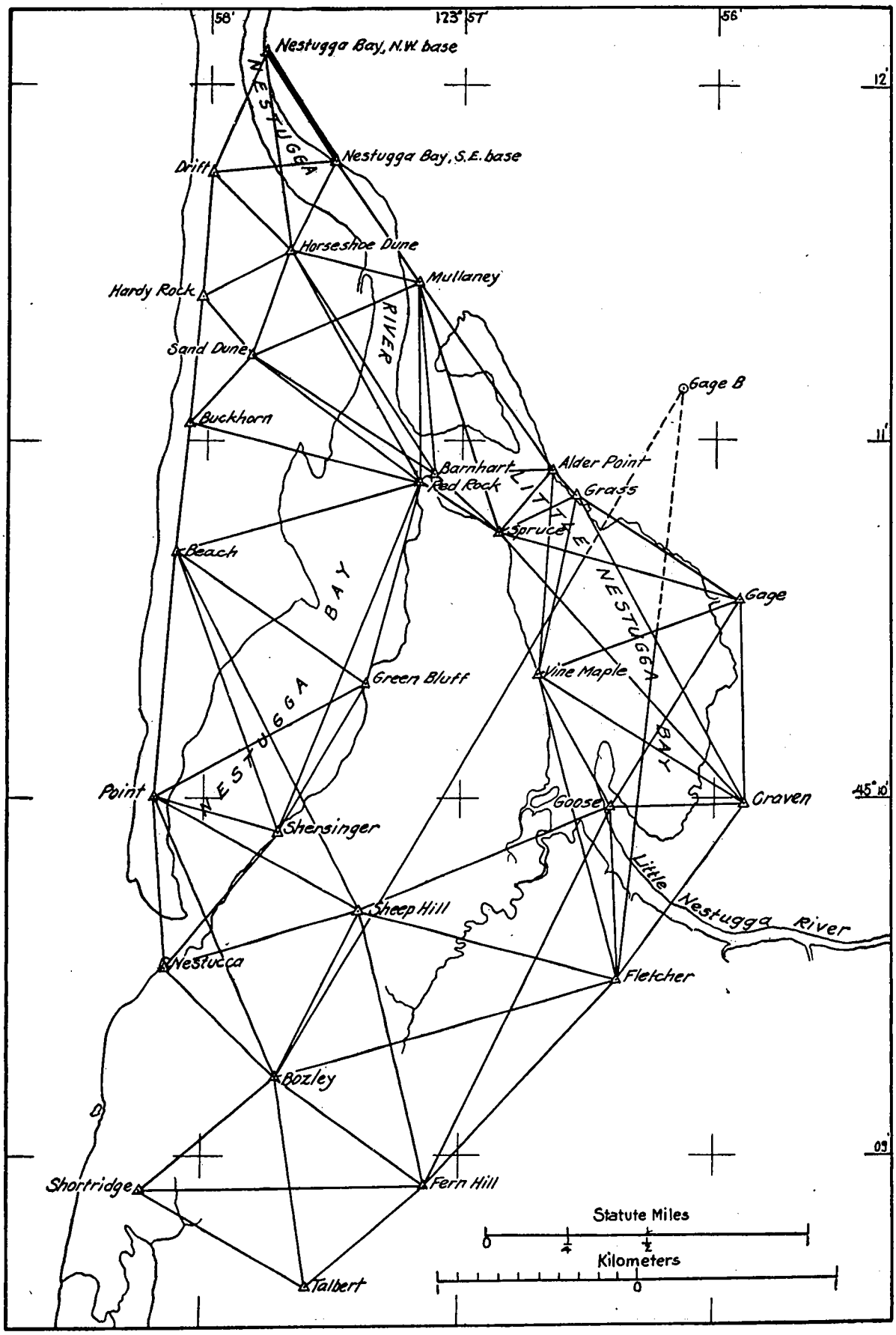


FIG. 29.—TRIANGULATION, NESTUGGA BAY.

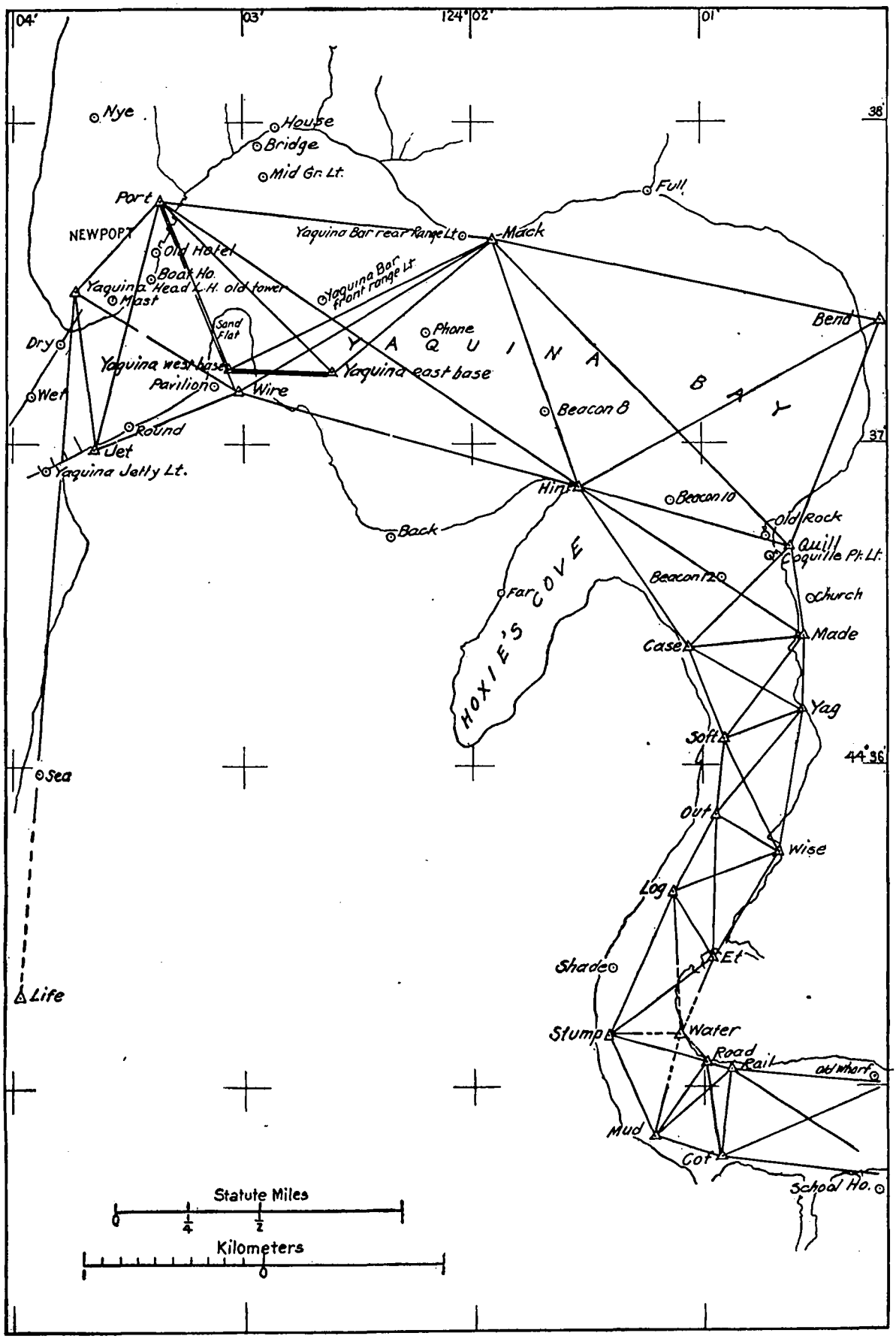


FIG. 30.—TRIANGULATION, YAQUINA RIVER FROM THE MOUTH TO THE LINE CAF-RAIL.

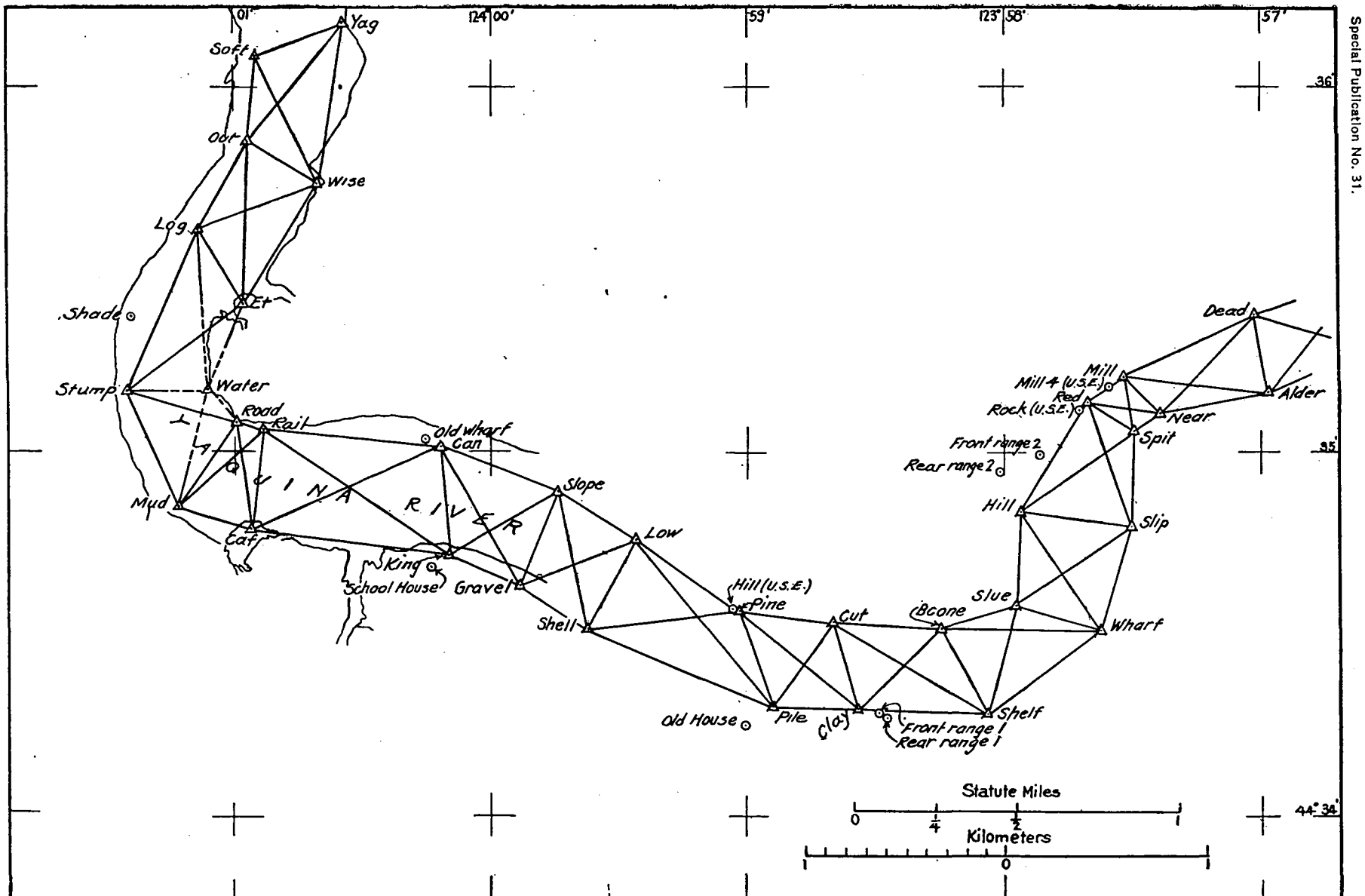


FIG. 31.—TRIANGULATION, YAQUINA RIVER, FROM THE LINE SOFT-YAQ TO THE LINE DEAD-ALDER.

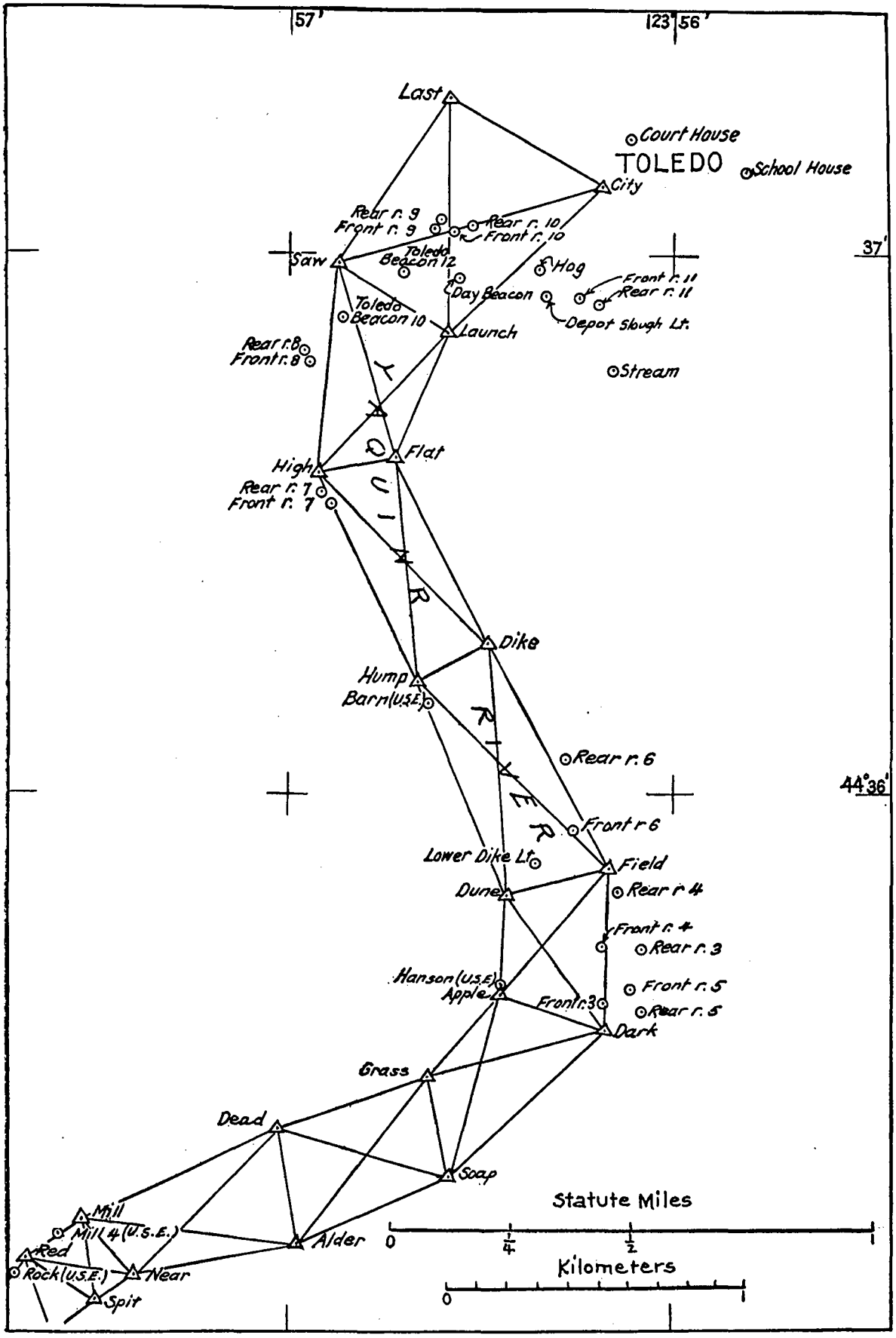


FIG. 32.—TRIANGULATION, YAQUINA RIVER, FROM THE LINE SPIT-RED TO TOLEDO.

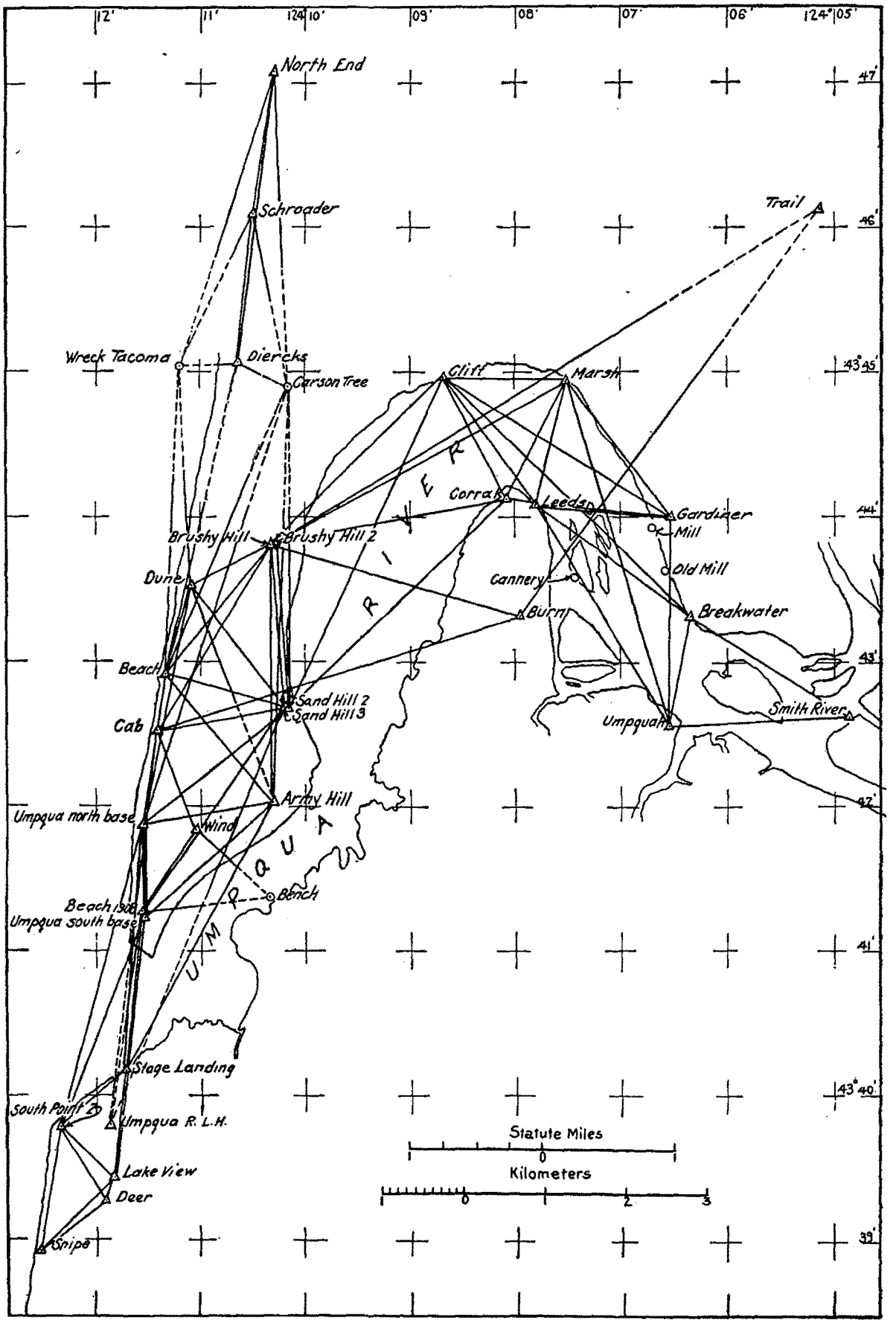


FIG. 33.—TRIANGULATION, UMPQUA RIVER.

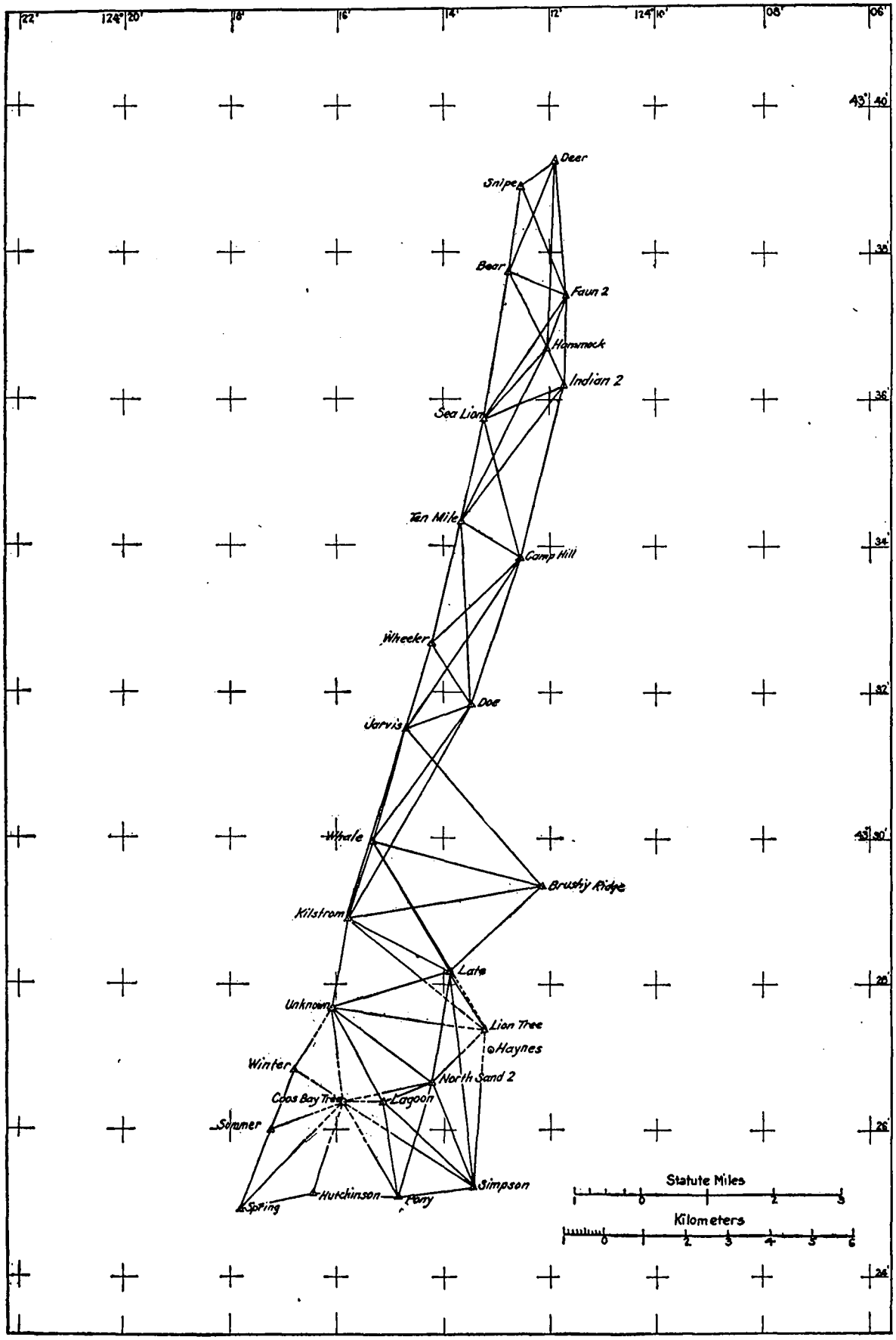


FIG. 34.—TRIANGULATION, UMPQUA RIVER TO COOS BAY.

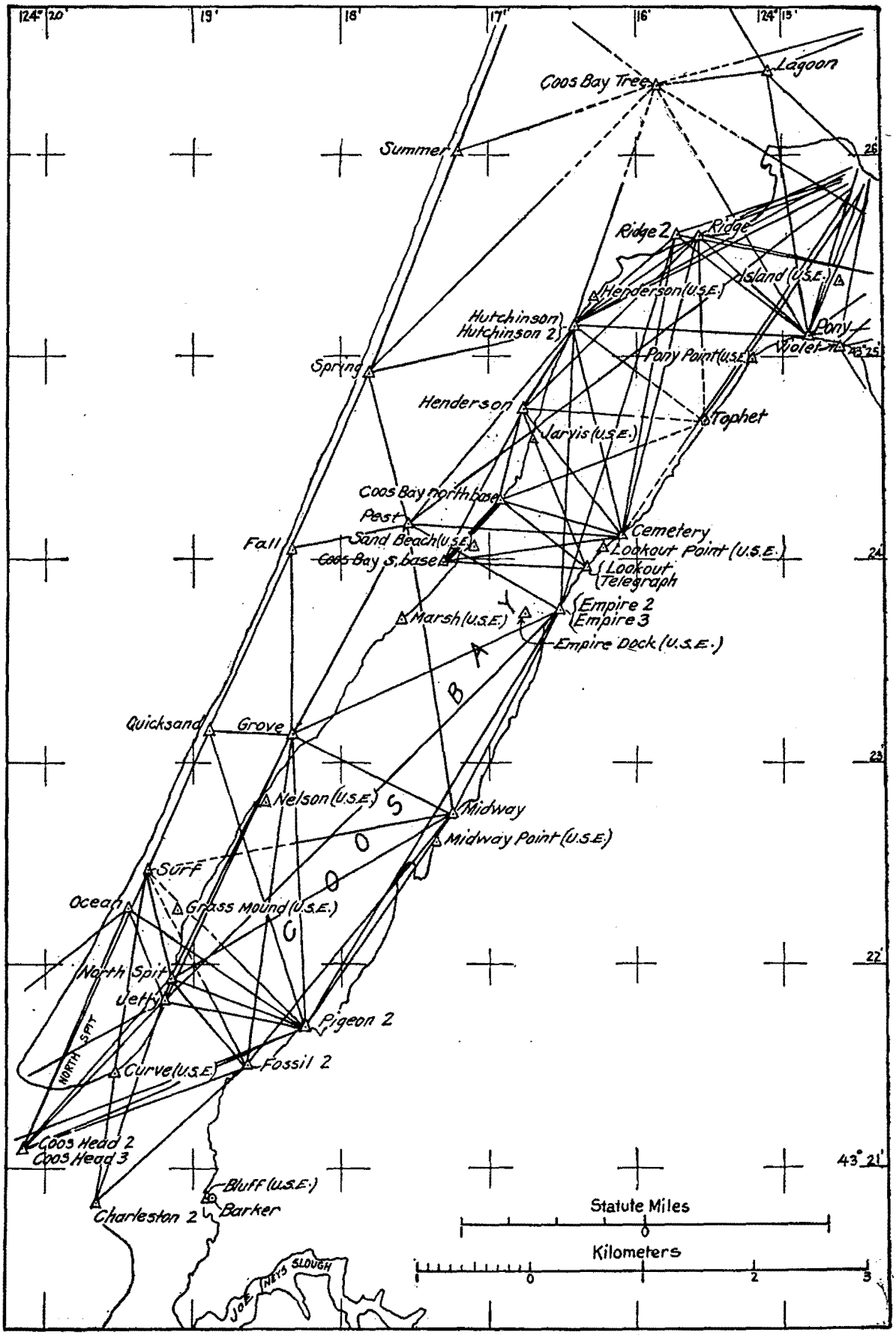


FIG. 35.—TRIANGULATION, COOS BAY, WESTERN HALF.

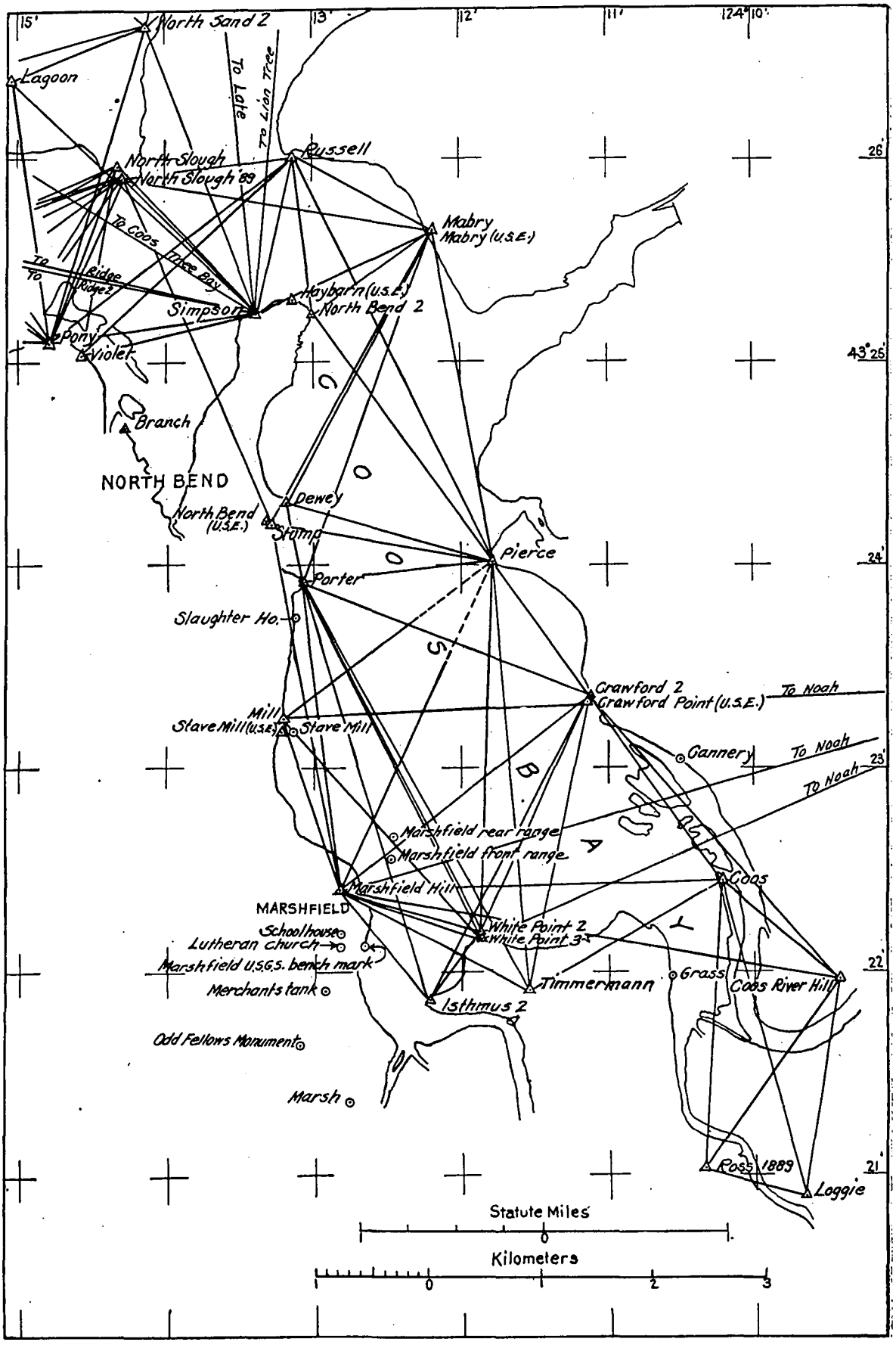


FIG. 36.—TRIANGULATION, COOS BAY, EASTERN HALF.

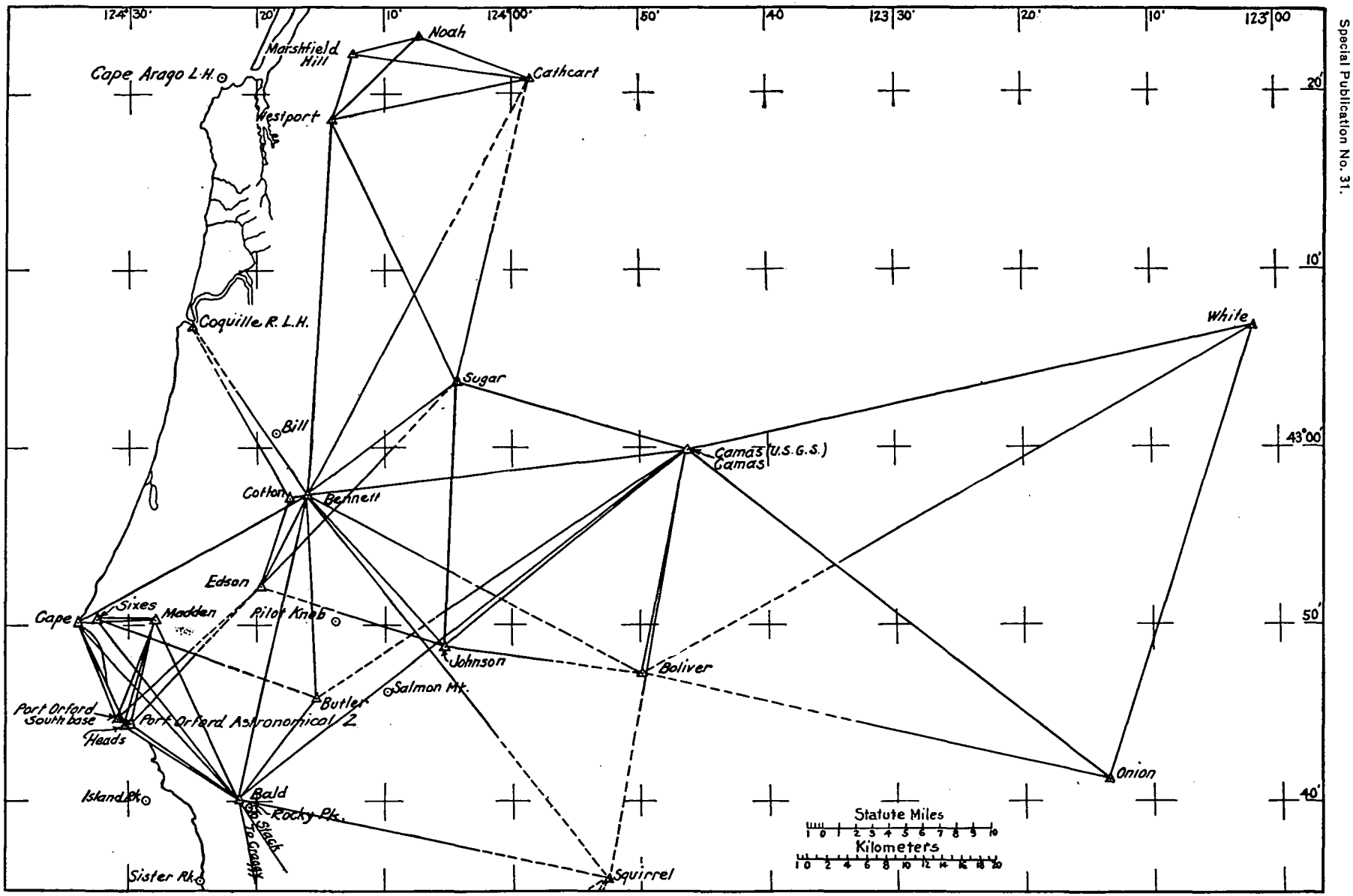


FIG. 37.—TRIANGULATION, COOS BAY TO PORT ORFORD, SHOWING CONNECTION TO THE PRIMARY TRIANGULATION.

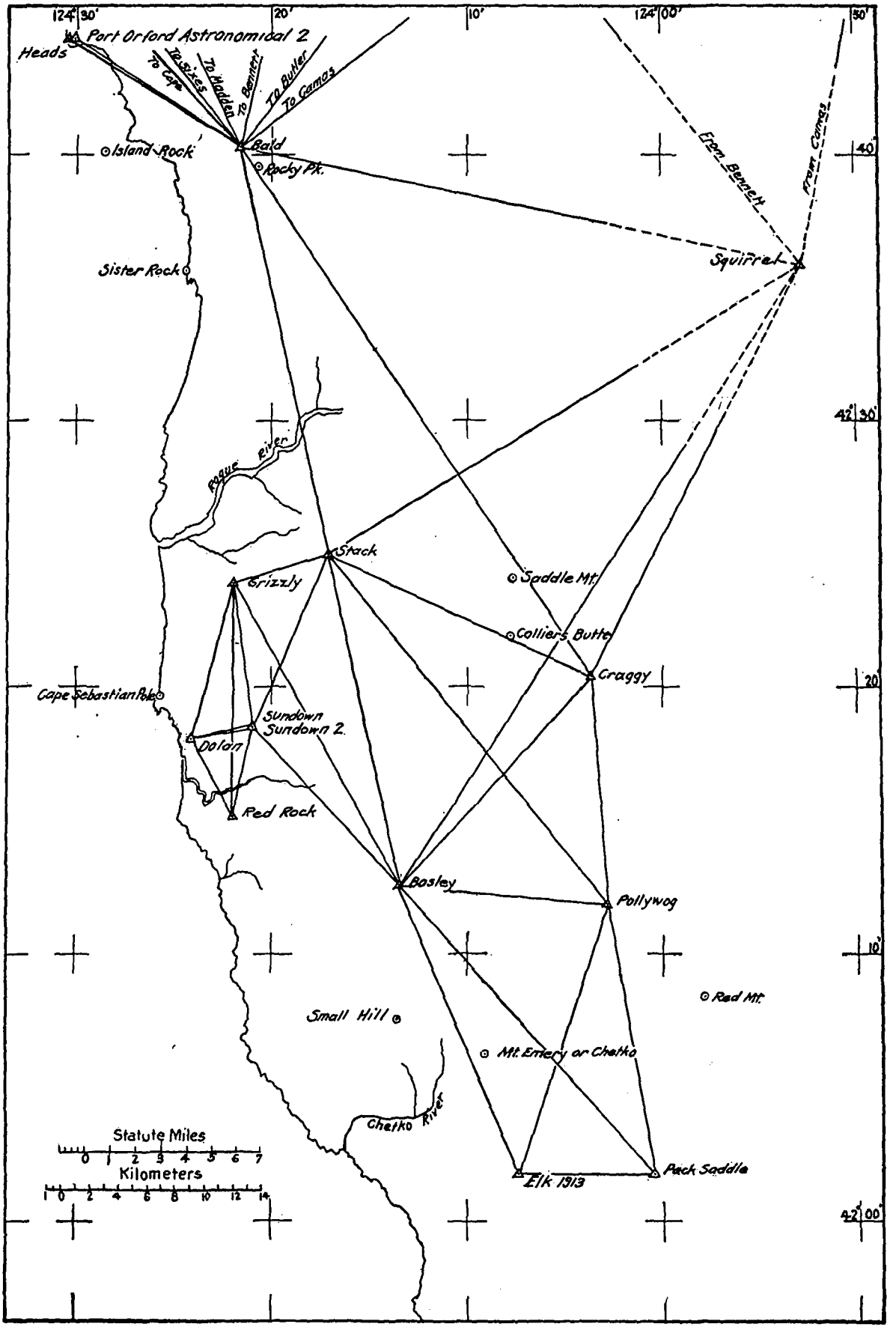


FIG. 38.—TRIANGULATION, PORT ORFORD TO CHETKO RIVER.

State Bdy.

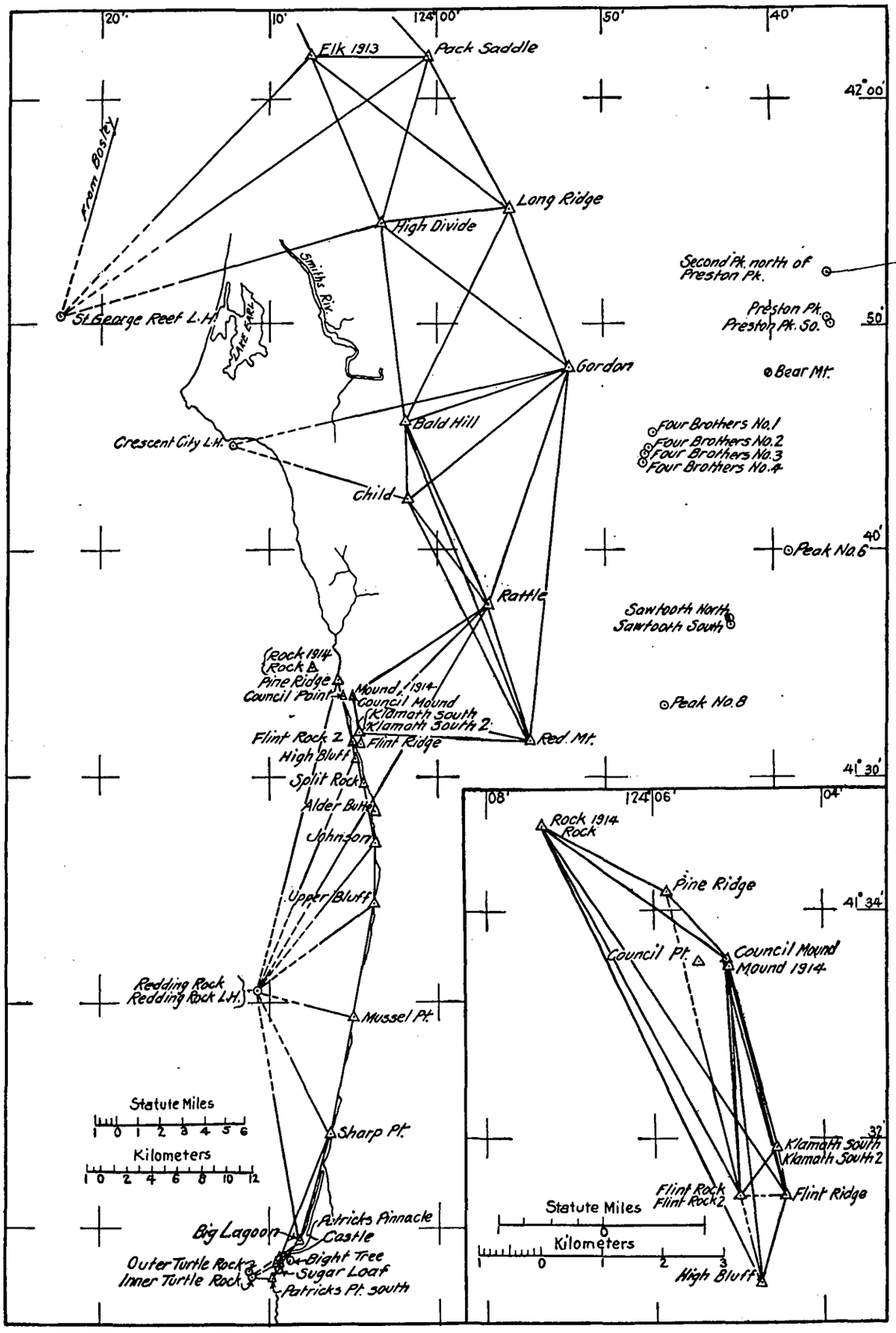


FIG. 39.—TRIANGULATION, CHETKO RIVER TO TRINIDAD HEAD.

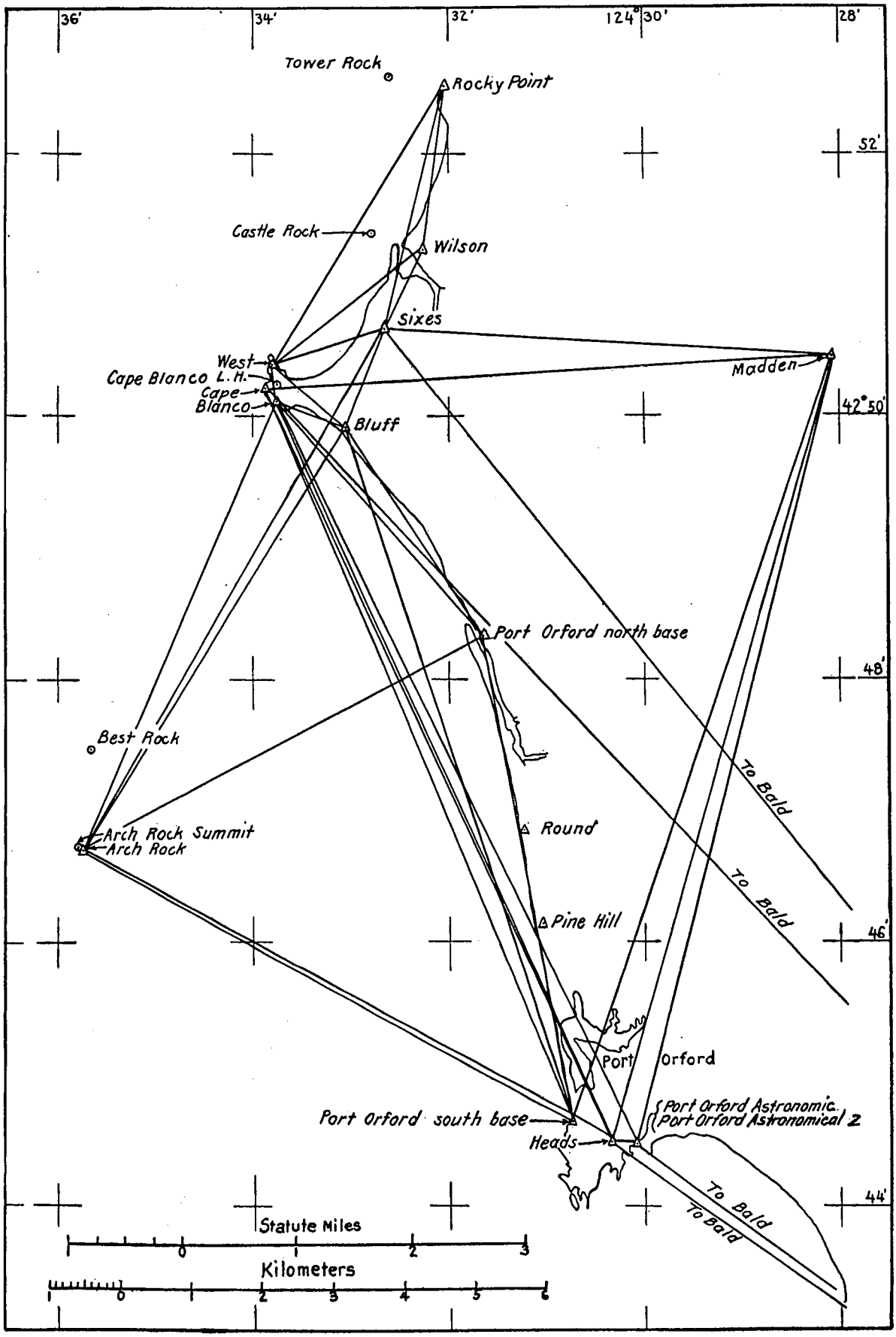


FIG. 40.—TRIANGULATION, CAPE BLANCO TO PORT ORFORD.

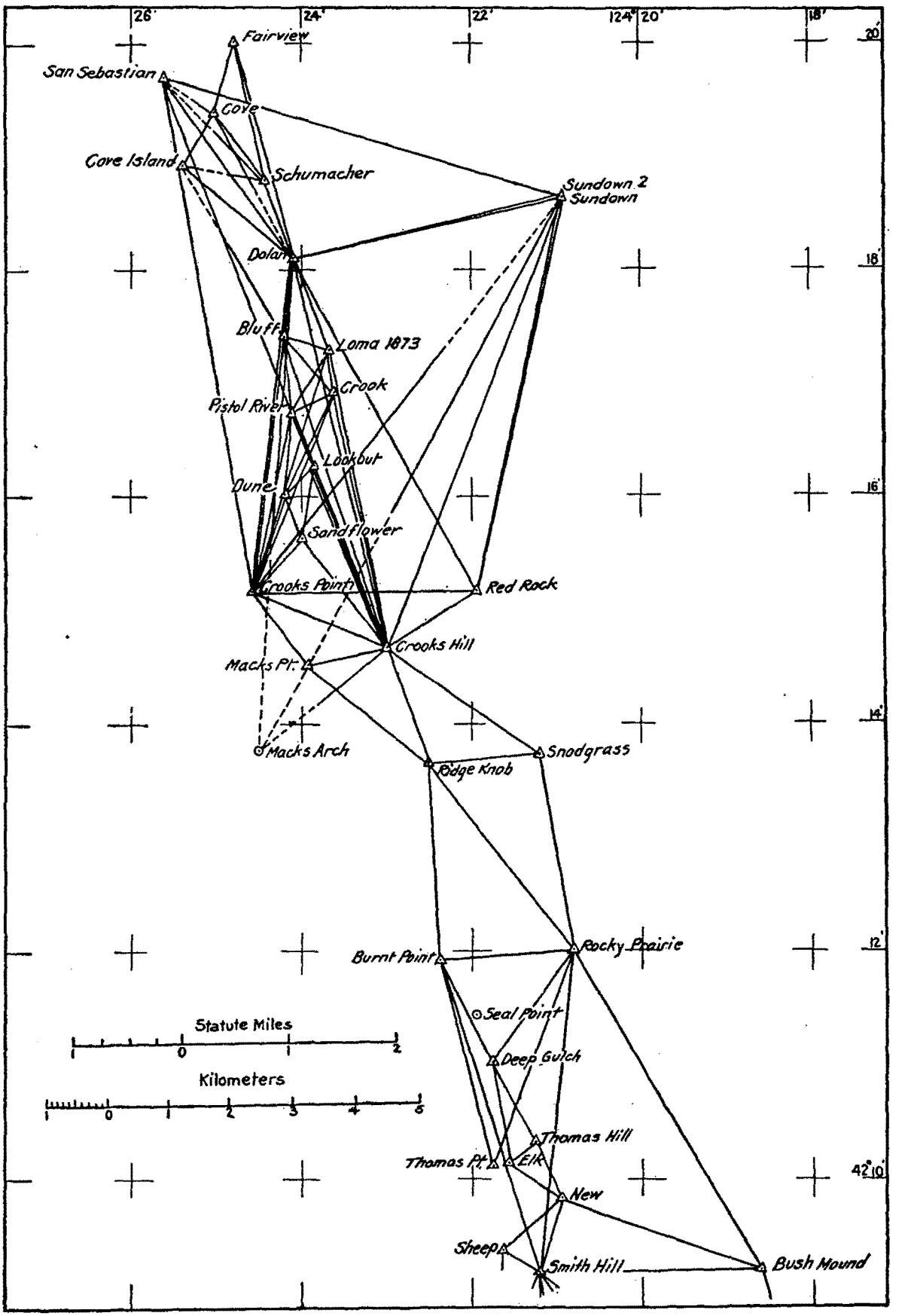


FIG. 41.—TRIANGULATION, SAN SEBASTIAN TO CAPE FERRELO.

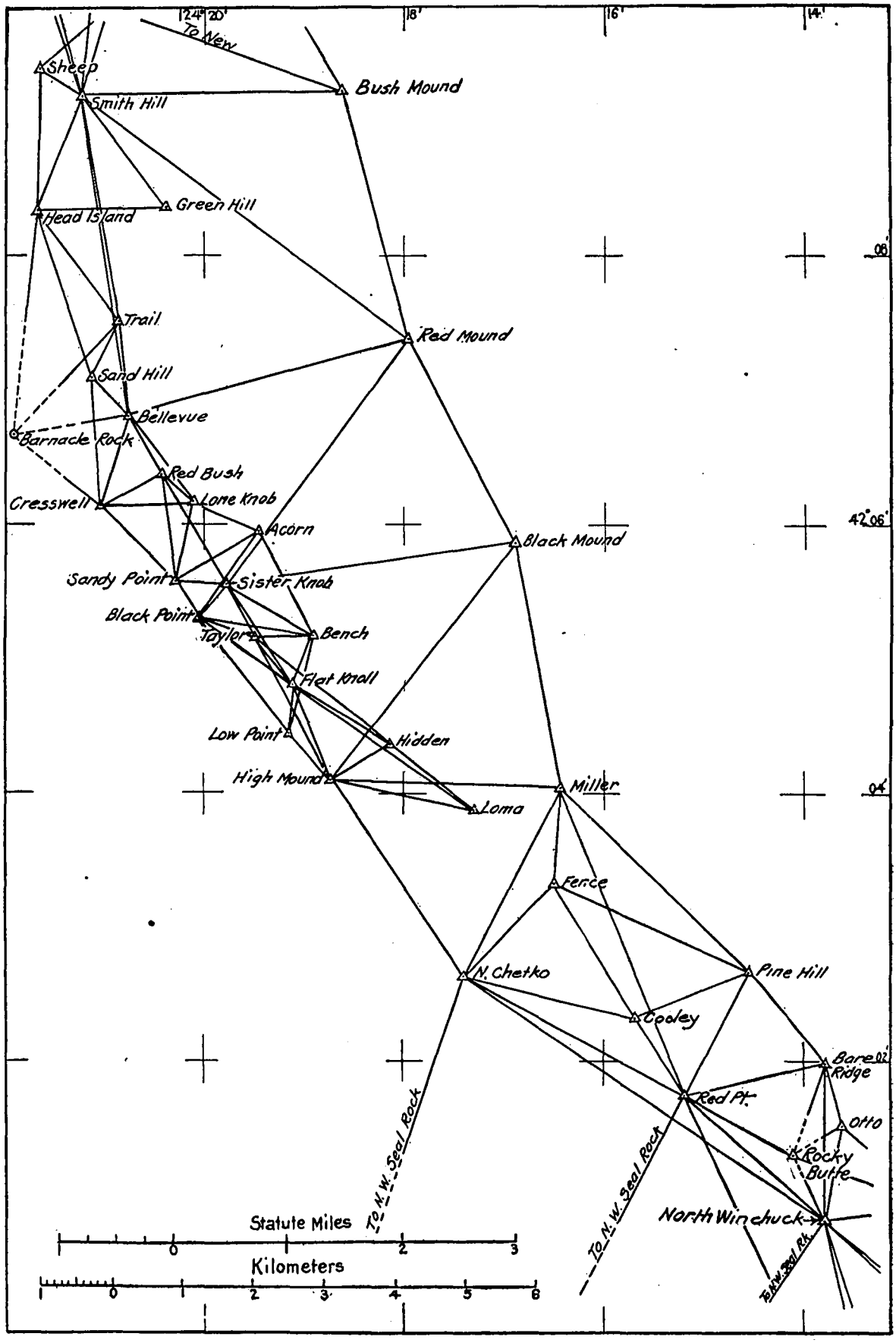


FIG. 42.—TRIANGULATION, CAPE FERRELO TO WINCHUCK RIVER.

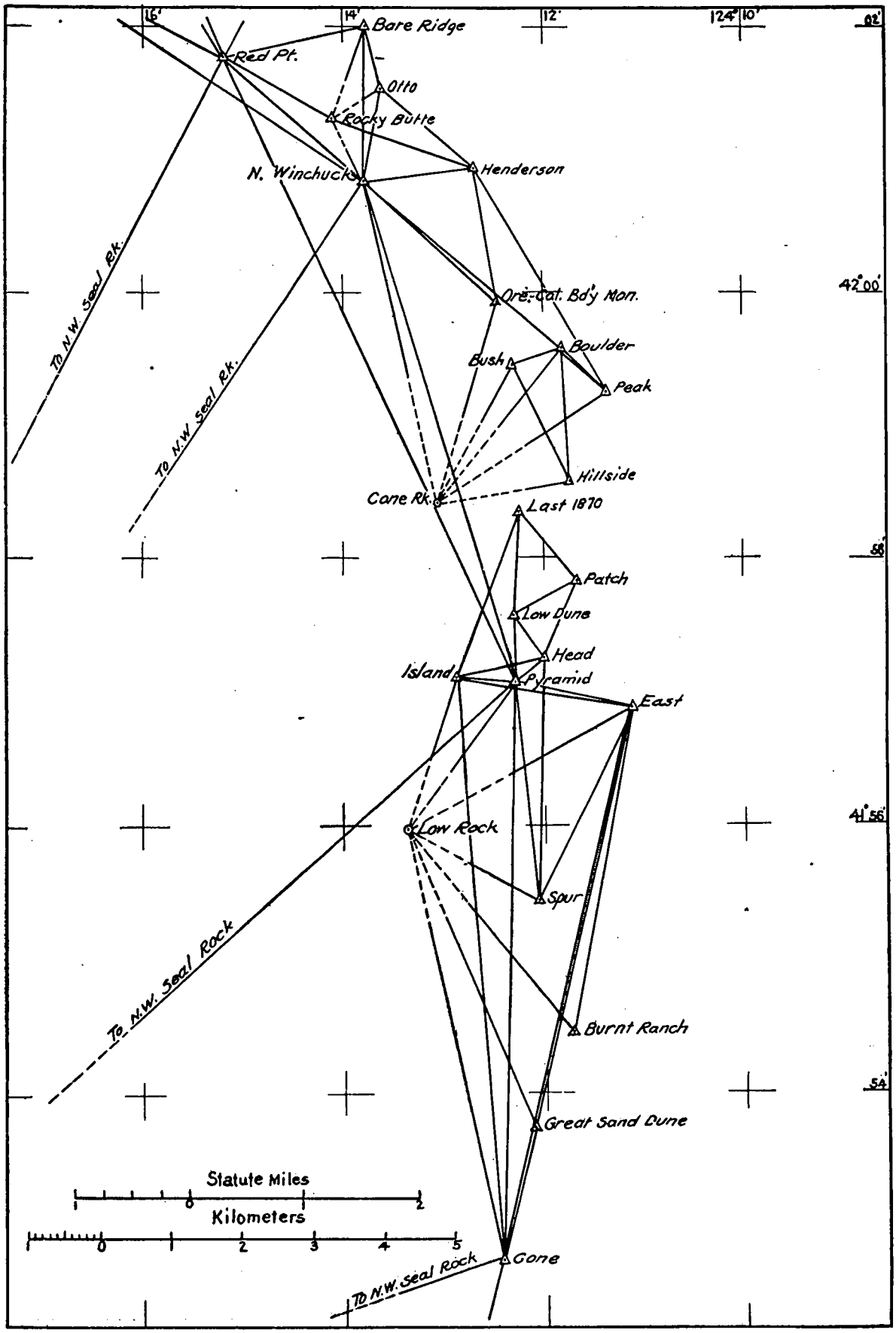


FIG. 43.—TRIANGULATION, WINCHUCK RIVER TO LAKE EARL.

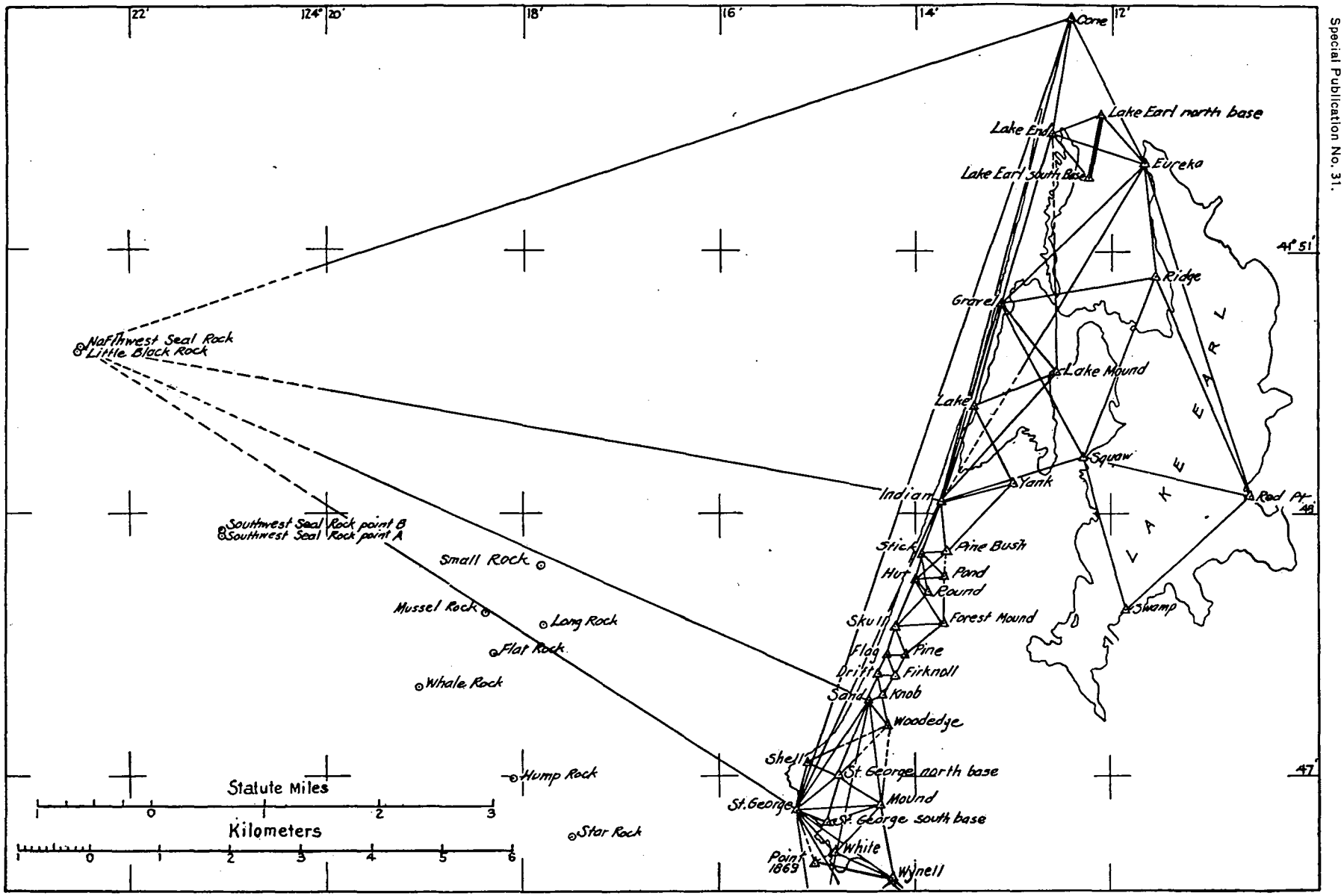


FIG. 44.—TRIANGULATION. LAKE EARL TO POINT ST. GEORGE.

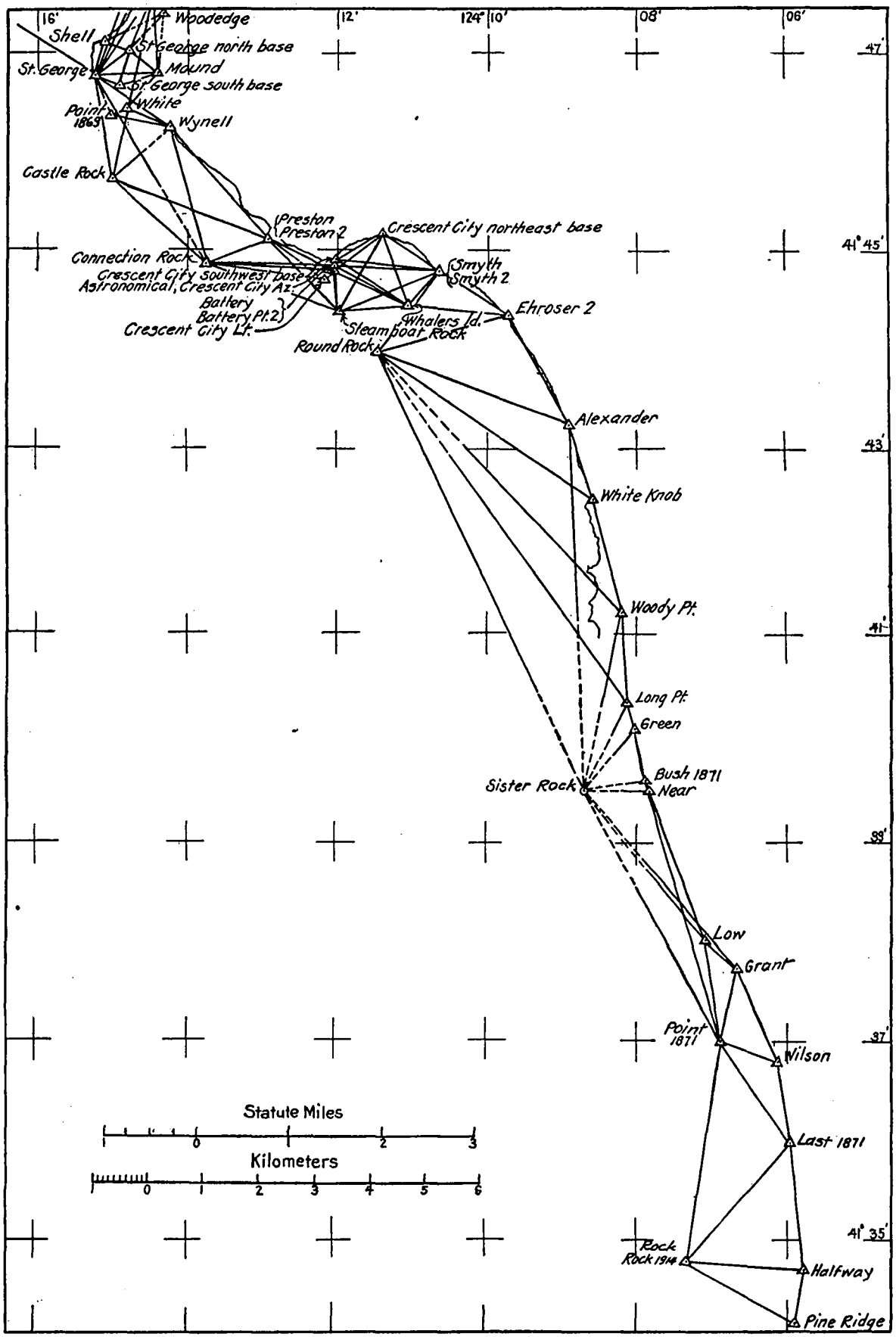


FIG. 45.—TRIANGULATION, POINT ST. GEORGE TO KLAMATH RIVER.

# INDEX.


| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| A | 55 | | | 24 |
| A (U. S. E.) | 25 | 93 | | 17 |
| A (U. S. E.) reference mark | 25 | | | |
| A 2 (U. S. E.) | 21 | 88 | | 15 |
| Abernathy | 17 | 84 | | 14 |
| Abrams | 41 | 100 | | 17 |
| Acorn | 72 | 125 | | 42 |
| Adair School cupola, Astoria | 32 | | | 12 |
| Adams | 40 | 99 | | 17 |
| Ahle Point light | 38 | | | 16 |
| Ahles | 80 | | | |
| Alamicut Point | 34 | 98 | | 13 |
| Alder (Coos County) | 78 | | | |
| Alder (Lincoln County) | 59 | 118 | | 31,32 |
| Alder Bluff | 36 | 99 | | 14 |
| Alderbrook (U. S. E.) | 33 | 98 | | 12,13 |
| Alderbrook School cupola | 33 | | | 12,13 |
| Alder Butte | 77 | 131 | | 39 |
| Alder Point | 57 | 115 | | 29 |
| Aldrich (Clatsop County) | 17 | 83 | | 13 |
| Aldrich (Skamania County) | 46 | 104 | | 22 |
| Alexander | 76 | 130 | | 45 |
| Allman | 45 | 102 | | 19 |
| Altoona Cannery main building, south gable | 34 | | | 13 |
| Anderson | 17 | 84 | | 14 |
| Angel | 46 | 103 | | 22 |
| Apple | 60 | 118 | | 32 |
| Arch Rock | 70 | 123 | 133 | 40 |
| Arch Rock Summit | 70 | 123 | | 40 |
| Army Hill | 64 | | | 33 |
| Astoria (U. S. E.) | 33 | 98 | | |
| Astoria: | | | | |
| Adair School cupola | 32 | | | 12 |
| Courthouse dome | 32 | | | 12 |
| Finnish Lutheran Church spire | 33 | | | 12 |
| Marconi northeast wireless | 33 | | | 12 |
| Marconi southwest wireless | 33 | | | 12 |
| Range, front light | 33 | | | 12 |
| Range, rear light | 33 | | | 12 |
| St. Mary's Hospital cross | 16 | | | 12 |
| Smith Point iron chimney | 32 | | | 12 |
| Taylor School cupola | 32 | | | 12 |
| Weather Bureau Tower flagpole | 33 | | | 12 |
| Astor Point | 16 | 83 | | 12 |
| Astronomical | 76 | 130 | | 45 |
| B (U. S. E.) | 25 | 93 | | 17 |
| B (U. S. E.) reference mark | 25 | | | |
| Bachelors Island | 80 | | | |
| Bachelors Point light | 41 | | | 17 |
| Back | 61 | | | 30 |
| Bailey Point | 56 | 113 | | 28 |
| Bailey's house, southeast gable | 56 | | | 28 |
| Baker east base | 16 | 83 | | 12 |
| Baker (new) | 19 | | | 12 |
| Bakers Bay | 80 | | | |
| Baker west base | 16 | 83 | | 12 |
| Balch | 19 | 87 | | 20,21 |
| Bald (Curry County) | 50 | 109 | 133 | 37,38 |
| Bald (Lincoln County) | 49 | 106 | 132 | 25,26 |
| Bald Hill | 51 | 110 | 133 | 39 |
| Balsam | 40 | 99 | | 17 |
| Bank | 21 | 90 | | 16 |
| Bank reference mark | 22 | | | |
| Bare Ridge | 73 | 126 | | 42,43 |
| Barker | 69 | 123 | | 35 |
| Barlow | 20 | 88 | | 14,15 |
| Barlow Point range front light | 36 | | | 14,15 |
| Barlow Point range rear light | 36 | | | 14,15 |
| Barlow reference mark No. 1 | 20 | | | |
| Barlow reference mark No. 2 | 20 | | | |
| Barn (U. S. E.) | 62 | | | 32 |
| Barnacle Rock | 72 | 125 | | 42 |
| Barnes | 19 | 86 | | 20 |
| Barn, gable | 38 | | | 16 |
| Barnhart | 57 | 115 | | 29 |
| Barn near McGowans, north gable | 48 | | | 22 |
| Barn, north gable | 80 | | | |
| Barn, west gable | 48 | | | 22 |
| Bartletts barn, north gable | 47 | 105 | | 21 |
| Battery (Del Norte County, Cal.) | 76 | 130 | | 45 |
| Battery (Pacific County, Wash.) | 16 | 82 | 133 | 12,23 |
| Battery Point 2 | 76 | 129 | | 45 |
| Bay | 79 | | | |
| Bay View light | 35 | | | 13,14 |
| Bay View light, new | 35 | | | 13,14 |
| Beach (Coos County) | 78 | | | |
| Beach, 1885 (Douglas County, Umpqua River) | 64 | | 132 | 33 |
| Beach, 1908 (Douglas County) | 64 | 120 | | 33 |
| Beach (Tillamook County, Nestugga Bay) | 57 | 114 | | 29 |
| Beach (Tillamook County, Tillamook Bay) | 80 | | | |
| Beach 2 (U. S. E.) | 21 | 88 | | 15 |
| Beacon | 80 | | | |
| Beacon 8 | 61 | | | 30 |
| Beacon 10 | 61 | | | 30 |
| Beacon 12 | 61 | | | 30 |
| Beacon No. 1 | 34 | | | 12,13 |
| Beacon No. 2 | 34 | | | 13 |
| Beacon No. 4 | 34 | | | 13 |
| Bear | 66 | | | 34 |
| Bear (U. S. E.) | 33 | 98 | | 13 |
| Bear Mountain | 52 | 111 | 133 | 39 |
| Beaver | 78 | | | |
| Beaver Dock building, north gable | 37 | | | 15 |
| Beaver Lumber Co. tank | 38 | | | 16 |
| Beaver Lumber Co. west stack | 38 | | | 16 |
| Bellevue | 72 | 124 | | 42 |
| Bench (Curry County) | 73 | 125 | | 42 |
| Bench (Douglas County) | 64 | 119 | 132 | 33 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Bend (Lincoln County) | 58 | 116 | | 30 |
| Bend (Tillamook County) | 55 | 113 | | 24 |
| Bend (U. S. E.) | 39 | 99 | | 16, 17 |
| Bennett | 50 | 108 | 133 | 37 |
| Best Rock | 70 | 123 | | 40 |
| Big Barn, east gable | 47 | | | 21 |
| Big Barn, south gable | 47 | | | 22 |
| Bight | 78 | | | |
| Bight tree | 77 | 131 | | 39 |
| Big Lagoon | 77 | 131 | | 39 |
| Bill | 52 | 111 | 133 | 37 |
| Birnie | 17 | 83 | | 14 |
| Birnie house, northwest gable | 35 | | | 14 |
| Black Mound | 72 | 124 | | 42 |
| Black Point | 72 | 125 | | 42 |
| Blanco | 70 | 123 | | 40 |
| Bluff (Coos County) | 78 | | | |
| Bluff (Curry County) | 71 | 124 | | 41 |
| Bluff (Curry County, near Cape Blanco) | 70 | 123 | | 40 |
| Bluff (Skamania County, Wash.) | 46 | 104 | | 22 |
| Bluff (U. S. E.) (Columbia County) | 21 | 89 | | 15 |
| Bluff (U. S. E.) (Coos County) | 68 | 122 | | 35 |
| Bluff (U. S. E.) (Cowlitz County, Wash.) | 39 | 99 | | 16, 17 |
| Bluff (U. S. E.), (Pacific County, Wash.) | 19 | | | 12 |
| Boathouse, east gable | 60 | | | 30 |
| Boliver | 50 | 108 | 133 | 37 |
| Bonneville | 46 | 104 | | 22 |
| Boom | 53 | 111 | | 23 |
| Boone | 59 | 117 | | 31 |
| Bosley | 51 | 109 | 133 | 38 |
| Boulder | 73 | 126 | | 43 |
| Boulder Point | 50 | 107 | 132 | 24, 25, 28 |
| Bourne (U. S. E.) | 21 | 88 | | 15 |
| Bourne's house, west gable | 37 | | | 15 |
| Bouser | 18 | 86 | | 20 |
| Bozley | 56 | 114 | 132 | 25, 29 |
| Bradbury | 17 | 84 | | 14 |
| Bradford | 46 | 105 | | 22 |
| Branch | 68 | 122 | | 36 |
| Breakwater | 65 | | | 33 |
| Bridal Veil sawmill | 48 | | | 22 |
| Bridge, center of draw, Vancouver | 43 | | | 19 |
| Bridge, Yaquina Bay | 60 | | | 30 |
| Brookfield cannery | 35 | | | 13 |
| Brookside | 41 | 100 | | 20 |
| Brush (Multnomah County) | 45 | 103 | | 21 |
| Brush (Tillamook County) | 56 | 113 | | 28 |
| Brush 2 (U. S. E.) | 26 | | | 18 |
| Brushy Hill | 64 | | | 33 |
| Brushy Hill 2 | 64 | 119 | 132 | 27, 33 |
| Brushy Ridge | 65 | | | 34 |
| Buckhorn | 57 | 115 | | 29 |
| Bugby Hole Eccentric | 36 | 98 | | 14 |
| Bugby Hole Eccentric reference mark | 36 | | | |
| Bugby Hole light | 36 | | | 14 |
| Buoy Depot, flag | 33 | | | 12 |
| Burn | 49 | 106 | 132 | 27, 33 |
| Burnt Hill | 18 | 85 | | 17 |
| Burnt Point | 72 | 124 | | 41 |
| Burnt Ranch | 74 | 127 | | 43 |
| Burroughs | 36 | 98 | | 14 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Bush (Del Norte County, Cal.) | 74 | 126 | | 43 |
| Bush, 1871 (Del Norte County, Cal.) | 76 | 130 | | 45 |
| Bushes Dock, front gable | 37 | | | 15 |
| Bush Mound | 72 | 124 | | 41, 42 |
| Butler | 50 | 109 | 133 | 37 |
| Butlers Landing ice house | 48 | | | 22 |
| Buzzard Butte | 50 | 107 | 132 | 25 |
| Bybee Landing light | 39 | | | 16 |
| C (U. S. E.) | 25 | 93 | | 17 |
| C (U. S. E.) reference mark | 25 | | | |
| Cab | 64 | 120 | 132 | 33 |
| Cable | 22 | | | 16 |
| Cable Landing, north side signpost | 38 | | | 16 |
| Caf | 59 | 116 | | 30, 31 |
| Callender | 54 | 112 | | 23 |
| Camas | 50 | 108 | 133 | 37 |
| Camas U. S. G. S | 52 | 111 | | 37 |
| Camp Hill | 66 | | | 34 |
| Can | 59 | 117 | | 31 |
| Cannery Hill | 63 | 119 | 132 | 26, 27 |
| Cannery, Marshfield | 69 | | | 36 |
| Cannery smokestack | 65 | | | 33 |
| Cape (Curry County) | 50 | 108 | 133 | 37, 40 |
| Cape (Lane County) | 49 | 106 | 132 | 26, 27 |
| Cape Arago lighthouse | 67 | | | 37 |
| Cape Blanco lighthouse | 70 | | | 40 |
| Cape Disappointment | 16 | 83 | | 12 |
| Cape Disappointment astronomic | 31 | | | 12 |
| Cape Disappointment lighthouse | 16 | | | 12 |
| Cape Falcon Rock | 54 | | | 24 |
| Cape Horn | 17 | 84 | | 14 |
| Cape Horn Tree | 48 | | | 22 |
| Cape Lookout summit | 52 | | 132 | 25 |
| Cape Mears lighthouse | 55 | | | 28 |
| Cape Ridge | 63 | | | 26, 27 |
| Cape Sebastian pole | 71 | | | 38 |
| Caples | 28 | 95 | | 19, 20 |
| Caples reference mark | 28 | | | |
| Carlton | 53 | 111 | | 24 |
| Carolls Point | 18 | 85 | | 15, 16 |
| Carr | 18 | 85 | | 16 |
| Carr reference mark | 18 | | | |
| Carruthers | 40 | 99 | | 17 |
| Carson tree | 64 | | | 33 |
| Cascade (Hood River County) | 46 | 104 | | 22 |
| Cascade (Tillamook County) | 49 | 107 | 132 | 25 |
| Cascade Locks Church | 49 | | | 22 |
| Cascade Locks flagstaff | 49 | | | 22 |
| Case | 58 | 110 | | 30 |
| Castle | 77 | 131 | | 39 |
| Castle Rock (Curry County) | 70 | | | 40 |
| Castle Rock (Del Norte County) | 75 | 129 | | 45 |
| Castle Rock (Multnomah County) | 48 | | | 22 |
| Cathcart | 50 | 108 | 133 | 37 |
| Cathlamet light | 36 | | | 14 |
| Cathlamet Point | 17 | 83 | | 13 |
| Catholic Church cross, Kalama | 38 | | | 16 |
| Cem | 19 | | 133 | 20 |
| Cement stack | 43 | | | 19 |
| Cemetery | 67 | 121 | | 35 |
| Chamberlain's barn | 47 | | | 21 |
| Channel | 80 | | | |
| Charleston | 78 | | | |
| Charleston 2 | 68 | 122 | | 35 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Child | 51 | 110 | 133 | 39 |
| Chimney, house | 36 | | | 13,14 |
| Chimney, house, south end of Tenasillihee Island | 36 | | | 14 |
| Chimney, near white house | 38 | | | 16 |
| Chimney, white house | 39 | | | 16 |
| Chinook (U. S. E.) | 19 | | | 12 |
| Chinook Church spire | 32 | | | 12 |
| Church, flagstaff | 61 | | | 30 |
| Church, Goble | 38 | | | 16 |
| Church, Kalama, star | 38 | | | 16 |
| Church, St. Helens | 40 | | | 17 |
| Church spire, Chinook | 32 | | | 12 |
| Church steeple, Rainier | 37 | | | 15 |
| City | 60 | 118 | | 32 |
| Clark's house, chimney | 56 | | | 28 |
| Clatskanie | 17 | 84 | | 14 |
| Clay | 59 | 117 | | 31 |
| Cliff (Clatsop County) | 54 | 112 | | 23 |
| Cliff (Douglas County) | 65 | | | 33 |
| Cliff (Multnomah County) | 45 | 103 | | 21,22 |
| Cliff Point | 80 | | | |
| Climb | 46 | 104 | | 22 |
| Cloniger | 41 | 100 | | 20 |
| Coal Bank | 78 | | | |
| Coal Bank tree | 79 | | | |
| Coal Creek Ridge | 17 | 84 | | 14 |
| Coffin Rock (U. S. E.) | 21 | 89 | | 16 |
| Coffin Rock light | 38 | | | 16 |
| Colliers Butte | 52 | | 133 | 38 |
| Columbia City range front light | 39 | | | 17 |
| Columbia City range rear light | 39 | | | 17 |
| Columbia Flour Mill, water tank | 44 | | | 20 |
| Columbia River Door Co. Dock, water tank | 37 | | | 15 |
| Columbia River entrance range front light | 32 | | | 12 |
| Columbia River entrance range rear light | 32 | | | 12 |
| Condit | 54 | 112 | | 23 |
| Cone | 74 | 127 | | 43,44 |
| Cone Rock | 73 | 126 | | 43 |
| Congregational Church, St. Helens | 40 | | | 17 |
| Congregational Church spire, Portland | 42 | | | 19 |
| Connection Rock | 75 | 129 | | 45 |
| Connel 2 (U. S. E.) | 23 | 91 | | 16,17 |
| Connel 2 (U. S. E.) reference mark | 23 | | | |
| Cooley | 73 | 126 | | 42 |
| Coon Island light | 43 | | | 18 |
| Cooper (Coos County) | 78 | | | |
| Cooper (Wahkiakum County, Wash.) | 17 | 84 | | 14 |
| Coos | 68 | 122 | | 36 |
| Coos Bay north base | 67 | 121 | | 35 |
| Coos Bay south base | 67 | 121 | | 35 |
| Coos Bay tree | 65 | | | 34,35 |
| Coos Head | 78 | | | |
| Coos Head 2 | 67 | 121 | | 35 |
| Coos Head 3 | 67 | 121 | | 35 |
| Coos River Hill | 68 | 122 | | 36 |
| Coquille Point light | 61 | | | 30 |
| Coquille River lighthouse | 52 | | | 37 |
| Corbett | 47 | 105 | | 21 |
| Corral | 64 | | | 33 |
| Cotton (Coos County) | 52 | 111 | 133 | 37 |
| Cotton (Cowlitz County, Wash.) | 22 | 90 | | 15,16 |
| Cotton reference mark No. 1 (Cowlitz County) | 22 | | | |
| Cotton reference mark No. 2 (Cowlitz County) | 22 | | | |
| Cottonwood Island | 36 | 99 | | 15 |
| Cottonwood Island, 1913 | 22 | 90 | | 15,16 |
| Cottonwood Island lower range rear light | 37 | | | 15,16 |
| Cottonwood Island lower and upper ranges front light | 37 | | | 15 |
| Cottonwood Island, 1913, reference mark No. 1 | 22 | | | |
| Cottonwood Island, 1913, reference mark No. 2 | 22 | | | |
| Cottonwood Island upper range rear light | 37 | | | 15,16 |
| Council Mound | 77 | 130 | | 39 |
| Council Point | 77 | 130 | | 39 |
| Courthouse dome, Astoria | 32 | | | 12 |
| Courthouse dome, Portland | 42 | | | 19 |
| Courthouse flagstaff, Toledo | 63 | | | 32 |
| Cove | 71 | 124 | | 41 |
| Cove Island | 71 | 124 | | 41 |
| Coweman | 17 | 84 | | 15 |
| Cowlitz | 36 | 99 | | 15 |
| Cowlitz 2 (U. S. E.) | 21 | 89 | | 15 |
| Cowlitz River light | 37 | | | 15 |
| Crag | 50 | 107 | | 24 |
| Craggy | 51 | 109 | 133 | 38 |
| Craven | 57 | 114 | | 29 |
| Crawford | 78 | | | |
| Crawford 2 | 68 | 121 | | 36 |
| Crawford Point (U. S. E.) | 69 | 122 | | 36 |
| Crescent City azimuth | 76 | 129 | | 45 |
| Crescent City lighthouse | 76 | | | 39,45 |
| Crescent City northeast base | 76 | 130 | | 45 |
| Crescent City southwest base | 76 | 130 | | 45 |
| Cresswell | 72 | 125 | | 42 |
| Crest | 44 | 101 | | 20 |
| Crib No. 1 | 37 | | | 15 |
| Crib No. 4 | 37 | | | 15 |
| Crib No. 8 | 37 | | | 15 |
| Crib No. 11 | 37 | | | 15 |
| Crook | 71 | 124 | | 41 |
| Crooks Hill | 71 | 124 | | 41 |
| Crooks Point | 71 | 123 | | 41 |
| Cross, priest's house | 80 | | | |
| Cummins | 49 | 106 | 132 | 26,27 |
| Cupola, Seaside house | 54 | 112 | | 23 |
| Cupola, Vancouver | 80 | | | |
| Curve (U. S. E.), (Columbia County) | 20 | 88 | | 15 |
| Curve (U. S. E.), (Coos County) | 68 | 122 | | 35 |
| Customhouse dome, Portland | 41 | | | 19 |
| Cut (Columbia County) | 22 | 90 | | 15,16 |
| Cut (Lincoln County) | 59 | 117 | | 31 |
| Cut reference mark (Columbia County) | 22 | | | |
| D (U. S. E.) | 25 | 92 | | 17 |
| D (U. S. E.) reference mark | 25 | | | |
| D 1 (U. S. E.) | 21 | 89 | | 16 |
| D 2 (U. S. E.) | 21 | 89 | | 16 |
| D 3 (U. S. E.) | 21 | 89 | | 16 |
| D 4 (U. S. E.) | 21 | 89 | | 16 |
| D 5 (U. S. E.) | 21 | 89 | | 15,16 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| D 6 (U. S. E.) | 21 | 89 | | 15, 16 |
| D 7 (U. S. E.) | 21 | 89 | | 15, 16 |
| D 8 (U. S. E.) | 21 | 89 | | 15, 16 |
| D 9 (U. S. E.) | 21 | 89 | | 15, 16 |
| D 10 (U. S. E.) | 21 | 89 | | 15 |
| Daniels | 45 | 102 | | 21 |
| Dann | 80 | | | |
| Dann's house, north gable | 80 | | | |
| Dark | 60 | 118 | | 32 |
| Dark pile, day mark | 39 | | | 16, 17 |
| Dash | 79 | | | |
| Day beacon | 62 | | | 32 |
| Day mark | 43 | | | 18, 19 |
| Day mark on dolphin | 39 | | | 17 |
| Day mark on tree, Bybee Landing | 39 | | | 16 |
| Dead | 59 | 118 | | 31, 32 |
| Dead tree | 80 | | | |
| Dead tree back of bluff | 48 | | | 22 |
| Dead tree near Cabin Falls | 48 | | | 22 |
| Dead Willow (U. S. E.) | 25 | 93 | | 17 |
| Dead Willow (U.S.E.) reference mark | 25 | | | |
| Deaf and Dumb School | 47 | | | 21 |
| Dean | 49 | 106 | 132 | 27 |
| Deep Gulch | 72 | 125 | | 41 |
| Deer | 64 | | | 33, 34 |
| Deer Island | 80 | | | |
| Deer Island Jetty light | 39 | | | 17 |
| Dennis | 78 | | | |
| Depot Slough light | 62 | | | 32 |
| Desdemona Sands lighthouse | 16 | | | 12 |
| Dewey | 66 | 120 | | 36 |
| Dexter | 54 | 112 | | 23 |
| Diercks | 64 | | | 33 |
| Dike (Lincoln County) | 60 | 118 | | 32 |
| Dike (U. S. E.) | 28 | 96 | | 19 |
| Dike (Wahkiakum County) | 20 | 88 | | 14 |
| Dike reference mark (Wahkiakum County) | 20 | | | |
| Dillion's house, north gable | 80 | | | |
| Dock | 22 | 90 | | 16 |
| Dock (U. S. E.), (Columbia County, Columbia City) | 23 | 91 | | 17 |
| Dock (U. S. E.), (Columbia County, Rainier) | 21 | 89 | | 15 |
| Dodson | 46 | 104 | | 22 |
| Doe | 65 | | | 34 |
| Dolan | 71 | 123 | 133 | 38, 41 |
| Dot (U. S. E.) | 33 | 98 | | 12 |
| Doty | 55 | 113 | 132 | 24, 25, 28 |
| Double Rock, eastern peak | 54 | | | 24 |
| Drays Mound | 18 | 85 | | 16 |
| Drift (Del Norte County, Cal.) | 75 | 128 | | 44 |
| Drift (Tillamook County) | 58 | 115 | | 29 |
| Dry | 60 | | | 30 |
| Duke | 79 | | | |
| Dunce | 54 | 112 | | 23 |
| Dune (Curry County) | 71 | 124 | | 41 |
| Dune (Douglas County) | 64 | | | 33 |
| Dune (Lincoln County) | 60 | 118 | | 32 |
| E | 55 | | | 24 |
| E (U. S. E.) | 25 | 93 | | 17 |
| E (U. S. E.) reference mark | 25 | | | |
| Eagle Cliff | 36 | 99 | | 14 |
| Eagles Bluff | 45 | 103 | | 21 |
| East | 74 | 127 | | 43 |
| East Battery | 16 | 82 | | 12 |
| East Battery reference mark No. 1 | 16 | | | |
| East Battery reference mark No. 2 | 16 | | | |
| East Battery reference mark No. 3 | 16 | | | |
| East Silo | 42 | | | 18 |
| Edson | 52 | 111 | 133 | 37 |
| Ehroser 2 | 76 | 129 | | 45 |
| Eight (U. S. E.), (Clarke County) | 24 | 92 | | 17 |
| Eight (U.S.E.), (Multnomah County) | 30 | 97 | | 18 |
| Eighteen (U. S. E.) | 30 | 97 | | 18, 19 |
| Eleven (U. S. E.), (Columbia County) | 24 | 92 | | 17 |
| Eleven (U. S. E.), (Multnomah County) | 30 | 97 | | 18, 19 |
| Eleven (U. S. E.) reference mark (Columbia County) | 24 | | | |
| Elk | 72 | 125 | | 41 |
| Elk 1913 | 51 | 110 | 133 | 38, 39 |
| Elliott (U. S. E.) | 33 | 97 | | 13 |
| Elliott Point light | 35 | | | 13 |
| Empire | 79 | | | |
| Empire 2 | 67 | 121 | | 35 |
| Empire 3 | 67 | 121 | | 35 |
| Empire Dock (U. S. E.) | 68 | 122 | | 35 |
| Empire Mill | 79 | | | |
| End (Hood River County) | 46 | 104 | | 22 |
| End (Multnomah County) | 27 | 95 | | 18 |
| End reference mark (Multnomah County) | 27 | | | |
| Enterprise Landing range front light | 38 | | | 16 |
| Enterprise Landing range rear light | 37 | | | 16 |
| Episcopal Church cross, Kalama | 36 | | | 16 |
| Episcopal Church spire, Portland | 41 | | | 19 |
| Episcopal Church, Vancouver | 46 | | | 21 |
| Et | 58 | 116 | | 30, 31 |
| Euchre Mountain | 51 | | 132 | 25, 26 |
| Eureka | 74 | 127 | | 44 |
| Eversole | 80 | | | |
| F | 55 | | | 24 |
| F (U. S. E.) | 29 | 96 | | 19 |
| Fairmont Gas Co.'s stack | 43 | | | 19 |
| Fairview (Curry County) | 71 | 124 | | 41 |
| Fairview (Lane County) | 49 | 106 | 132 | 26, 27 |
| Fairview cupola | 47 | | | 21 |
| Falcon | 55 | 112 | | 24 |
| Fales | 18 | 86 | | 17, 20 |
| Fales (U. S. E.) | 25 | 93 | | 17 |
| Fales House, red chimney | 41 | 100 | | 17, 20 |
| Fales Landing light | 42 | | | 17 |
| Fales (U. S. E.) reference mark | 25 | | | |
| Fall | 69 | | | 35 |
| Far | 61 | | | 30 |
| Faulconer | 57 | 115 | | 25 |
| Faun 2 | 66 | | | 34 |
| Federal east wireless | 44 | 101 | | 20 |
| Federal west wireless | 44 | 101 | | 20 |
| Fence | 73 | 126 | | 42 |
| Fern Hill | 57 | 114 | | 29 |
| Field | 60 | 118 | | 32 |
| Fifteen (U. S. E.) | 30 | 97 | | 18, 19 |
| Fifty 2 (U. S. E.) | 29 | 96 | | 19 |
| Fifty-eight 2 (U. S. E.) | 29 | 96 | | 19 |
| Fifty-five 2 (U. S. E.) | 29 | 96 | | 19 |
| Fifty-four 2 (U. S. E.) | 29 | 96 | | 19 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Fifty-nine 2 (U. S. E.) | 30 | 96 | | 19 |
| Fifty-one 2 (U. S. E.) | 29 | 96 | | 19 |
| Fifty-seven 2 (U. S. E.) | 29 | 96 | | 19 |
| Fifty-six 2 (U. S. E.) | 29 | 96 | | 19 |
| Fifty-three 2 (U. S. E.) | 29 | 96 | | 19 |
| Fifty-two 2 (U. S. E.) | 29 | 96 | | 19 |
| Finnish Lutheran Church spire, Astoria | 33 | | | 12 |
| Fir | 19 | | 133 | 20 |
| Fire Hall flagstaff, St. Johns | 44 | | | 19 |
| Firknoll | 75 | 128 | | 44 |
| Fisher | 45 | 102 | | 21 |
| Fisher Wharf, southeast pile | 47 | 105 | | 21 |
| Fishery | 53 | 111 | | 24 |
| Fish house, leaning stack | 34 | | | 13 |
| Fish house, stack | 35 | | | 13 |
| Fish house, west barrel | 34 | | | 13 |
| Fish wheel on north shore | 49 | | | 22 |
| Five (U. S. E.) | 31 | 97 | | 18 |
| Five 2 (U. S. E.) | 25 | 92 | | 17 |
| Five 2 (U. S. E.) reference mark No. 1 | 25 | | | |
| Five 2 (U. S. E.) reference mark No. 2 | 25 | | | |
| Flag | 75 | 128 | | 44 |
| Flagpole | 37 | | | 15 |
| Flagstaff (Clatsop County) | 54 | 112 | | 23 |
| Flagstaff (Tillamook County) | 54 | | | 24 |
| Flat (Columbia County) | 22 | 90 | | 16 |
| Flat (Lincoln County) | 60 | 118 | | 32 |
| Flat (Tillamook County, Tillamook Bay) | 56 | 113 | | 28 |
| Flat (Tillamook County, Nestugga Bay) | 56 | 114 | 132 | 25 |
| Flat Knoll | 73 | 125 | | 42 |
| Flat reference mark No. 1 (Columbia County) | 22 | | | |
| Flat reference mark No. 2 (Columbia County) | 23 | | | |
| Flat Rock | 78 | | | 44 |
| Flavels Wharf post light | 32 | | | 12 |
| Fletcher | 56 | 114 | 132 | 25, 29 |
| Flint Ridge | 51 | 110 | | 39 |
| Flint Rock | 77 | 130 | | 39 |
| Flint Rock 2 | 51 | 110 | | 39 |
| Foley | 50 | 107 | | 24 |
| Forest Mound | 75 | 128 | | 44 |
| Fort Columbia Wharf light | 31 | | | 12 |
| Fort Stevens highest water tank | 32 | | | 12 |
| Fort Stevens longitude | 16 | 82 | | 12 |
| Fort Stevens Wharf light | 16 | | | 12 |
| Fort Stevens wireless, north pole | 32 | | | 12 |
| Forty (U. S. E.) | 28 | 96 | | 19 |
| Forty-eight 2 (U. S. E.) | 29 | 96 | | 19 |
| Forty-five (U. S. E.) | 29 | 96 | | 19 |
| Forty-five 2 (U. S. E.) | 29 | 96 | | 19 |
| Forty-four (U. S. E.) | 29 | 96 | | 19 |
| Forty-four (U. S. E.) reference mark | 29 | | | |
| Forty-nine 2 (U. S. E.) | 29 | 96 | | 19 |
| Forty-one (U. S. E.) | 29 | 96 | | 19 |
| Forty (U. S. E.) reference mark | 28 | | | |
| Forty-seven (U. S. E.) | 29 | 96 | | 19 |
| Forty-six 2 (U. S. E.) | 29 | 96 | | 19 |
| Forty-three (U. S. E.) | 29 | 96 | | 19 |
| Forty-two (U. S. E.) | 29 | 96 | | 19 |
| Fossil | 79 | | | |
| Fossil 2 | 67 | 121 | | 35 |
| Foulweather | 49 | 106 | 132 | 25, 26 |
| Four (U. S. E.) | 31 | 97 | | 18 |
| Four 2 (U. S. E.), (Clarke County) | 41 | 100 | | 17 |
| Four 2 (U. S. E.), (Multnomah County) | 27 | 94 | | 18 |
| Four 2 (U. S. E.), reference mark (Multnomah County) | 27 | | | |
| Four Brothers No. 1 | 53 | 111 | 133 | 39 |
| Four Brothers No. 2 | 53 | 111 | 133 | 39 |
| Four Brothers No. 3 | 53 | 111 | 133 | 39 |
| Four Brothers No. 4 | 53 | 111 | 133 | 39 |
| Fourteen (U. S. E.) | 30 | 97 | | 18, 19 |
| Fridlund | 79 | | | |
| Front range 1 | 61 | | | 31 |
| Front range 2 | 61 | | | 31 |
| Front range 3 | 62 | | | 32 |
| Front range 4 | 62 | | | 32 |
| Front range 5 | 62 | | | 32 |
| Front range 6 | 62 | | | 32 |
| Front range 7 | 62 | | | 32 |
| Front range 8 | 62 | | | 32 |
| Front range 9 | 62 | | | 32 |
| Front range 10 | 63 | | | 32 |
| Front range 11 | 63 | | | 32 |
| Full | 61 | | | 30 |
| Gage | 57 | 114 | | 29 |
| Gage B | 56 | 114 | 132 | 25, 29 |
| Galloway | 18 | 85 | | 15, 16 |
| Gap | 56 | 113 | | 28 |
| Garden | 79 | | | |
| Gardiner | 65 | | | 33 |
| Gatton | 28 | 95 | | 19, 20 |
| Gatton House chimney | 41 | | | 20 |
| Gatton reference mark No. 1 | 28 | | | |
| Gatton reference mark No. 2 | 28 | | | |
| Gauge pile | 33 | | | 12, 13 |
| Gearhart | 54 | 112 | | 23 |
| G. Hume's house, chimney | 36 | | | 14 |
| Gibbons Creek | 47 | 105 | | 21 |
| Gibbons Creek Church | 47 | | | 21 |
| Gillihan tank, white | 43 | | | 18, 19 |
| Ginger | 50 | 107 | 132 | 24, 25 |
| Gobles Point | 18 | 85 | | 16 |
| Goodwin | 53 | 111 | | 23 |
| Goose | 57 | 114 | | 29 |
| Gordon | 51 | 110 | 133 | 39 |
| Gorman's barn | 48 | | | 22 |
| Gorman's house | 48 | | | 22 |
| Government Island | 45 | 103 | | 21 |
| Grant | 76 | 130 | | 45 |
| Grass (Coos County) | 68 | 122 | | 36 |
| Grass (Lincoln County) | 60 | 118 | | 32 |
| Grass (Tillamook County) | 57 | 114 | | 29 |
| Grass Mound (U. S. E.) | 68 | 122 | | 35 |
| Grass Mountain | 52 | | | 26 |
| Grassy (U. S. E.) | 25 | 93 | | 17 |
| Grassy (U. S. E.) reference mark | 25 | | | |
| Gravel (Del Norte County) | 74 | 127 | | 44 |
| Gravel (Lincoln County) | 59 | 117 | | 31 |
| Gravel Bluff | 28 | 95 | | 20 |
| Grays (U. S. E.) | 20 | 87 | | 12, 13 |
| Grays Bay | 34 | 98 | | 12, 13 |
| Grays Bay light | 34 | | | 12, 13 |
| Grays Point | 17 | 83 | | 12, 13 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Grays Point light | 32 | | | 12, 13 |
| Grays River | 34 | 98 | | 13 |
| Great Sand Dune | 74 | 127 | | 43 |
| Green (Del Norte County, Cal.) | 76 | 130 | | 45 |
| Green (Lane County) | 63 | 119 | 132 | 26, 27 |
| Green Bluff | 57 | 114 | | 20 |
| Green Hill (Curry County) | 72 | 125 | | 42 |
| Green Hill (Tillamook County) | 56 | 113 | | 28 |
| Green Hill 2 | 55 | 113 | 132 | 24, 28 |
| Greens Point | 17 | 84 | | 14 |
| Gregory | 79 | | | |
| Grimes | 54 | 112 | | 23 |
| Grizzly | 51 | 109 | 133 | 38 |
| Grout | 45 | 103 | | 21, 22 |
| Grove | 67 | 121 | | 35 |
| Gruber | 36 | 98 | | 14 |
| Gun (U. S. E.) | 33 | 97 | | 12 |
| H (U. S. E.) | 19 | | | 12 |
| H $1_2$ (U. S. E.) | 24 | 92 | | 17 |
| H $1_2$ (U. S. E.) reference mark | 24 | | | |
| H 3 (U. S. E.) | 24 | 92 | | 17 |
| H 3 (U. S. E.) reference mark | 24 | | | |
| H 4 (U. S. E.) | 24 | 92 | | 17 |
| H 4 (U. S. E.) reference mark | 24 | | | |
| H $5_2$ (U. S. E.) | 24 | 91 | | 17 |
| H $5_2$ (U. S. E.) reference mark | 24 | | | |
| H $6_2$ (U. S. E.) | 24 | 92 | | 17 |
| H $6_2$ (U. S. E.) reference mark | 24 | | | |
| H $7_2$ (U. S. E.) | 24 | 91 | | 17 |
| H $7_2$ (U. S. E.) reference mark | 24 | | | |
| H $8_2$ (U. S. E.) | 24 | 91 | | 17 |
| H $8_2$ (U. S. E.) reference mark | 24 | | | |
| H $9_2$ (U. S. E.) | 23 | 91 | | 17 |
| H $9_2$ (U. S. E) reference mark | 23 | | | |
| H 11 (U. S. E.) | 23 | 91 | | 17 |
| H 11 (U. S. E.) reference mark | 23 | | | |
| H $13_2$ (U. S. E.) | 23 | 91 | | 17 |
| H $13_2$ (U. S. E.) reference mark | 23 | | | |
| H $14_2$ (U. S. E.) | 23 | 91 | | 17 |
| H $14_2$ (U. S. E.) reference mark | 23 | | | |
| H $16_2$ (U. S. E.) | 23 | 91 | | 17 |
| H 19 (U. S. E.) | 23 | 91 | | 16 |
| H 19 (U. S. E.) reference mark | 23 | | | |
| H 20 (U. S. E.) | 23 | 91 | | 16, 17 |
| H 20 (U. S. E.) reference mark | 23 | | | |
| H 21 (U. S. E.) | 23 | 90 | | 16 |
| H 21 (U. S. E.) reference mark | 23 | | | |
| H 22 (U. S. E.) | 23 | 91 | | 16 |
| H 22 (U. S. E.) reference mark | 23 | | | |
| H $23_2$ (U. S. E.) | 23 | 91 | | 16 |
| H $23_2$ (U. S. E.) reference mark | 23 | | | |
| H 24 (U. S. E.) | 39 | 99 | | 16 |
| H $26_2$ (U. S. E.) | 22 | 90 | | 16 |
| H 27 (U. S. E.) | 21 | 89 | | 16 |
| H 28 (U. S. E.) | 21 | 90 | | 16 |
| H $30_2$ (U. S. E.) | 21 | 89 | | 16 |
| H. & R. Duck Club, white house, front chimney | 39 | | | 17 |
| Hagglund | 79 | | | |
| Halfway | 77 | 130 | | 45 |
| Hamilton fish wheel | 48 | | | 22 |
| Hammock | 66 | | | 34 |
| Hanson (U. S. E.) | 62 | | | 32 |
| Hapgood House chimney | 36 | | | 14 |
| Hardy Rock | 58 | 115 | | 29 |
| Hardys wharf | 79 | | | |
| Harlow | 45 | 102 | | 21 |
| Harney | 19 | 86 | | 20, 21 |
| Harrington (U. S. E.) | 19 | 87 | | 13 |
| Harrington Point range rear light | 34 | | | 13 |
| Harrington (U. S. E.) reference mark | 19 | | | |
| Harris | 41 | 100 | | 20 |
| Hay Barn | 79 | | | |
| Hay Barn (U. S. E.) | 69 | 122 | | 36 |
| Hayden | 45 | 102 | | 19 |
| Haynes | 68 | 122 | | 34 |
| Haystack Rock | 57 | | | |
| Hazel | 28 | 95 | | 20 |
| Head (Del Norte County, Cal.) | 74 | 127 | | 43 |
| Head (Lane County) | 63 | 119 | 132 | 26, 27 |
| Head Island | 72 | 125 | | 42 |
| Heads | 50 | 109 | 133 | 37, 38, 40 |
| Hebe | 50 | 107 | 132 | 25 |
| Heceta | 63 | 119 | 132 | 26, 27 |
| Heceta Head lighthouse | 63 | | 132 | 26, 27 |
| Henderson (Coos County) | 67 | 121 | | 35 |
| Henderson (Curry County) | 73 | 126 | | 43 |
| Henderson (U. S. E.) | 69 | 122 | | 35 |
| Hendrickson | 41 | 101 | | 20 |
| Henrici | 80 | | | |
| Henrici Landing range front light | 40 | | | 17 |
| Henrici Landing range rear light | 40 | | | 17 |
| Hewletts 2 (U. S. E.) | 26 | 94 | | 18 |
| Hexter | 45 | 102 | | 21 |
| Hidden | 73 | 125 | | 42 |
| High | 60 | 118 | | 32 |
| High Bald Peak | 63 | | | 26 |
| High Bluff | 51 | 110 | | 39 |
| High Divide | 51 | 110 | 133 | 39 |
| High Mound | 72 | 124 | | 42 |
| High School, St. Johns | 44 | | | 19 |
| High tank, remains of windmill | 42 | | | 18 |
| Hill (Lincoln County) | 59 | 117 | | 31 |
| Hill (Multnomah County) | 19 | | 133 | 20 |
| Hill (U. S. E.), (Cowlitz County) | 23 | 91 | | 16 |
| Hill (U. S. E.), (Lincoln County) | 61 | | | 31 |
| Hill a | 55 | | | 24 |
| Hill b | 55 | | | 24 |
| Hill c | 55 | | | 24 |
| Hill, first east of Yaquina lighthouse | 51 | | | 26 |
| Hill (U. S. E.) reference mark (Cowlitz County) | 23 | | | |
| Hillside (Del Norte County, Cal.) | 74 | 127 | | 43 |
| Hillside (Multnomah County) | 41 | 101 | | 20 |
| Hint | 58 | 116 | | 30 |
| Hoffman | 18 | 85 | | 16 |
| Hoffman Landing light | 39 | | | 16 |
| Hoffman Hill | 28 | 96 | | 20 |
| Hog | 62 | | | 32 |
| Holland | 36 | 99 | | 14 |
| Homestead | 42 | 101 | | 20 |
| Hood | 45 | 102 | | 21 |
| Horseshoe Dune | 57 | 115 | | 29 |
| House, chimney | 47 | | | 21 |
| House in trees, cupola | 48 | | | 22 |
| House, large green cupola | 61 | | | 30 |
| House No. 1, south gable | 80 | | | |
| House No. 2, north gable | 56 | | | 28 |
| House No. 3, south gable | 56 | | | 28 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| House No. 4, east gable | 80 | | | |
| House No. 5, north gable | 80 | | | |
| House No. 6 | 56 | | | 24, 25 |
| House, west gable | 41 | | | 20 |
| Howell | 27 | 95 | | 18, 19, 20 |
| Howell house, east chimney | 41 | 101 | | 20 |
| Howell reference mark No. 1 | 27 | | | |
| Howell reference mark No. 2 | 27 | | | |
| Hulet | 78 | | | |
| Hump | 60 | 118 | | 32 |
| Hump Rock | 78 | | | 44 |
| Hunter | 18 | 85 | | 16 |
| Hunting Island range rear light | 35 | | | 14 |
| Huntington | 17 | 84 | | 15 |
| Hunts Mill Point | 17 | 83 | | 14 |
| Hut | 75 | 128 | | 44 |
| Hut (U. S. E.) | 21 | 88 | | 15 |
| Hutchinson | 66 | 120 | | 34, 35 |
| Hutchinson 2 | 67 | 121 | | 35 |
| I (U. S. E.) | 19 | | | 12 |
| Incinerator stack | 43 | | | 19 |
| Indian | 74 | 127 | | 44 |
| Indian 2 | 66 | | | 34 |
| Indian Point | 17 | 83 | | 13 |
| Inner Turtle Rock | 77 | 131 | | 39 |
| Iron | 49 | 106 | 132 | 26 |
| Island (Coos County) | 78 | | | |
| Island (Del Norte County) | 74 | 127 | | 43 |
| Island (U. S. E.), (Coos County) | 69 | 122 | | 35 |
| Island (U. S. E.), (Pacific County) | 16 | 82 | | 12 |
| Island (U. S. E.) reference mark (Pacific County) | 16 | | | |
| Island Rock | 52 | | | 37, 38 |
| Islet 1 | 54 | 112 | | 23 |
| Islet 2 | 54 | 112 | | 23 |
| Isthmus | 78 | | | |
| Isthmus 2 | 68 | 122 | | 36 |
| Isthmus tree | 79 | | | |
| Jarvis | 65 | | | 34 |
| Jarvis (U. S. E.) | 69 | 122 | | 35 |
| Jet | 58 | 115 | | 30 |
| Jetty | 67 | 121 | | 35 |
| Jetty A | 31 | 97 | | 12 |
| Jetty B | 31 | 97 | | 12 |
| Jetty C | 31 | 97 | | 12 |
| Jetty D | 31 | 97 | | 12 |
| Jetty E | 31 | 97 | | 12 |
| Jetty F | 31 | 97 | | 12 |
| Jetty Sands range front light | 31 | | | 12 |
| Jetty Sands range rear light | 31 | | | 12 |
| Jewetts (U. S. E.) | 26 | 94 | | 18 |
| Jim Crow (U. S. E.) | 20 | 88 | | 13 |
| Jim Crow Point | 17 | 83 | | 13 |
| Jim Crow Point light | 35 | | | 13 |
| John Day Point | 34 | 98 | | 12, 13 |
| Johnson (Coos County) | 50 | 108 | 133 | 37 |
| Johnson (Coos County, Coos Bay) | 79 | | | |
| Johnson (Humboldt County, Cal.) | 77 | 131 | | 39 |
| Journal spire, Portland | 44 | | | 19 |
| Jungle | 45 | 102 | | 19, 21 |
| Kaiser | 28 | 95 | | 20 |
| Kalama | 22 | 90 | | 16 |
| Kalama (U. S. E.) | 21 | 89 | | 16 |
| Kalama astronomic | 80 | | | |
| Kalama Azimuth | 80 | | | |
| Kalama Catholic Church cross | 38 | | | 16 |
| Kalama Church star | 38 | | | 16 |
| Kalama reference mark | 22 | | | |
| Keaton | 53 | 111 | | 24 |
| Keeper's house, chimney | 63 | | | 26, 27 |
| Kelso School | 37 | | | 15 |
| Kelso square tower | 37 | | | 15 |
| Kelso white church, red spire | 37 | | | 15 |
| Kenny | 79 | | | |
| Kilstrom | 65 | | | 34 |
| King | 28 | 96 | | 20 |
| King (Lincoln County) | 59 | 117 | | 31 |
| Kitchen | 78 | | | |
| Klamath South | 77 | 130 | | 39 |
| Klamath South 2 | 51 | 110 | 133 | 39 |
| Klevenhausen store, flagpole | 34 | | | 13 |
| Knapp | 41 | 100 | | 20 |
| Knapp's chimney | 41 | | | 20 |
| Knappton Channel light | 32 | | | 12 |
| Knappton sawmill cupola, flagstaff | 32 | | | 12 |
| Knight | 22 | 90 | | 16 |
| Knight reference mark No. 1 | 22 | | | |
| Knight reference mark No. 2 | 22 | | | |
| Knob | 75 | 128 | | 44 |
| Ladd | 40 | 100 | | 17 |
| La Du light | 37 | | | 15 |
| Ladys Island | 45 | 103 | | 21 |
| Lagoon | 65 | | | 34, 35, 36 |
| Lake (Clatsop County) | 53 | 112 | | 23 |
| Lake (Del Norte County, Cal.) | 74 | 128 | | 44 |
| Lake (U. S. E.) | 24 | 92 | | 17 |
| Lake Earl north base | 74 | 127 | | 44 |
| Lake Earl south base | 74 | 127 | | 44 |
| Lake End | 74 | 127 | | 44 |
| Lake Mound | 74 | 128 | | 44 |
| Lake (U. S. E.) reference mark | 24 | | | |
| Lake River | 40 | 100 | | 17 |
| Lake View | 64 | | | 33 |
| Lancaster | 80 | | | |
| Landing | 53 | 111 | | 24 |
| Large red tank with pole | 44 | | | 19 |
| Large Rock off Carleton | 55 | | | 24 |
| Large tree, top out | 38 | | | 16, 17 |
| Large white house, chimney | 42 | | | 17 |
| Last (Lincoln County) | 60 | 118 | | 32 |
| Last, 1870 (Del Norte County, Cal.) | 74 | 127 | | 43 |
| Last, 1871 (Del Norte County, Cal.) | 76 | 130 | | 45 |
| Late | 65 | | | 34 |
| Launch | 60 | 118 | | 32 |
| Ledge | 54 | 112 | | 23 |
| Leeds | 65 | | | 33 |
| Lemont | 40 | 99 | | 17 |
| Lever's house, east gable | 47 | | | 21 |
| Lewis and Clarke River | 80 | | | |
| Lewis River Hills | 18 | 85 | | 17 |
| Life | 51 | 110 | 132 | 26, 30 |
| Light on dolphin | 38 | | | 16 |
| Linton | 27 | 95 | | 19 |
| Linton Landing light | 43 | | | 19 |
| Linton reference mark | 27 | | | |
| Lion Tree | 65 | | | 34 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Little Black Rock | 78 | | | 44 |
| Loaf | 63 | 119 | 132 | 26,27 |
| Locks | 46 | 105 | | 22 |
| Lodge | 79 | | | |
| Log (Lincoln County) | 58 | 116 | | 30,31 |
| Log (Tillamook County) | 56 | 113 | | 28 |
| Log boom, last pile | 37 | | | 16 |
| Loggie | 68 | 122 | | 36 |
| Lokamin | 17 | 83 | | 14 |
| Loma (Curry County) | 73 | 125 | | 42 |
| Loma, 1873 (Curry County) | 71 | 124 | | 41 |
| Lone Knob | 72 | 125 | | 42 |
| Lone Rock | 48 | | | 22 |
| Long Point | 76 | 130 | | 45 |
| Long Ridge | 51 | 110 | 133 | 39 |
| Long Rock | 77 | | | 44 |
| Lookout (Coos County) | 70 | | | 35 |
| Lookout (Curry County) | 71 | 124 | | 41 |
| Lookout (Skamania County) | 46 | 104 | | 22 |
| Lookout Point (U. S. E.) | 69 | 122 | | 35 |
| Loomis | 54 | 112 | | 23 |
| Low (Del Norte County, Cal.) | 76 | 130 | | 45 |
| Low (Lincoln County) | 59 | 117 | | 31 |
| Low Dune | 74 | 127 | | 43 |
| Lower Dike light | 62 | | | 32 |
| Lower fish wheel | 47 | | | 22 |
| Lower flagstaff, Vancouver | 46 | 105 | | 21 |
| Lower gauge pile light | 33 | | | 12,13 |
| Lower Point | 45 | 102 | | 21 |
| Lower Sands light | 32 | | | 12 |
| Lower Skumaquea light | 20 | | | 13,14 |
| Lower Willow Bar range front light | 42 | | | 18 |
| Lower Willow Bar range rear light | 42 | | | 18 |
| Low Point | 73 | 125 | | 42 |
| Low Rock | 74 | 127 | | 43 |
| Lucca Mill, pipe | 46 | | | 21 |
| Lutheran Church, spire | 69 | | | 36 |
| McClures school cupola, flagstaff | 33 | | | 12 |
| McGowan's cannery | 48 | | | 22 |
| Mabry | 66 | 120 | | 36 |
| Mabry (U. S. E.) | 69 | 122 | | 36 |
| Mack | 58 | 115 | | 30 |
| Macks Arch, highest point | 71 | | | 41 |
| Macks Point | 71 | 124 | | 41 |
| Madden | 50 | 109 | 133 | 37,40 |
| Made | 58 | 116 | | 30 |
| Mann | 41 | 101 | | 20 |
| Maple | 49 | 106 | 132 | 26,27 |
| Maple Hill | 18 | 85 | | 17 |
| Marconi northeast wireless, tallest pole, Astoria | 33 | | | 12 |
| Marconi southwest wireless, Astoria | 33 | | | 12 |
| Marked tree A | 79 | | | |
| Marked tree Anderson | 79 | | | |
| Marked tree B | 79 | | | |
| Marked tree Government Island | 80 | | | |
| Marked tree Mosman | 79 | | | |
| Marked tree No. 1 (Columbia River) | 47 | | | 21 |
| Marked tree No. 1 (Coos Bay) | 78 | | | |
| Marked tree No. 1 (Tillamook Bay) | 80 | | | |
| Marked tree No. 2 (Coos Bay) | 78 | | | |
| Marked tree No. 2 (Tillamook Bay) | 80 | | | |
| Marked tree No. 3 (Coos Bay) | 78 | | | |
| Marked tree No. 3 (Tillamook Bay) | 80 | | | |
| Marked tree No. 4 (Coos Bay) | 78 | | | |
| Marked tree No. 4 (Tillamook Bay) | 80 | | | |
| Marked tree No. 5 (Coos Bay) | 78 | | | |
| Marked tree No. 6 (Coos Bay) | 78 | | | |
| Marked tree No. 7 (Coos Bay) | 78 | | | |
| Marked tree No. 8 (Coos Bay) | 79 | | | |
| Marked tree No. 10 (Coos Bay) | 79 | | | |
| Marked tree No. 11 (Coos Bay) | 79 | | | |
| Marked tree No. 12 (Coos Bay) | 79 | | | |
| Marked tree No. 13 (Coos Bay) | 79 | | | |
| Marked tree No. 14 (Coos Bay) | 79 | | | |
| Marked tree No. 15 (Coos Bay) | 79 | | | |
| Marked tree No. 16 (Coos Bay) | 79 | | | |
| Marked tree No. 17 (Coos Bay) | 79 | | | |
| Marked tree No. 22 (Coos Bay) | 79 | | | |
| Marked tree No. 24 (Coos Bay) | 79 | | | |
| Marsh (Coos County) | 68 | 122 | | 36 |
| Marsh (Douglas County) | 65 | | | 33 |
| Marsh (U. S. E.), (Clatsop County) | 33 | 97 | | 13 |
| Marsh (U. S. E.), (Coos County) | 68 | 122 | | 35 |
| Marshfield | 79 | | | |
| Marshfield cannery | 69 | | | 36 |
| Marshfield front range | 69 | | | 36 |
| Marshfield Hill | 50 | 108 | 133 | 36,37 |
| Marshfield rear range | 69 | | | 36 |
| Marshfield U. S. G. S. bench mark | 69 | | 133 | 36 |
| Marsh Point 1 | 80 | | | |
| Marsh Point 2 | 80 | | | |
| Martin | 79 | | | |
| Martin 3 (U. S. E.) | 23 | 91 | | 16,17 |
| Martin 3 (U. S. E.) reference mark | 23 | | | |
| Martins Bluff | 18 | 85 | | 16,17 |
| Martins Bluff reference mark | 18 | | | |
| Martins Island | 80 | | | |
| Mary | 49 | 105 | | 26 |
| Mast | 60 | | | 30 |
| Maxwell | 39 | 99 | | 17 |
| Mays | 45 | 102 | | 21 |
| Meadow | 54 | 112 | | 23 |
| Meadows | 40 | 100 | | 17,20 |
| Megler's fish house, south gable, flag | 34 | | | 13 |
| Megler's water tank, spindle | 32 | | | 12 |
| Memalust Head | 56 | 113 | | 28 |
| Merchant | 79 | | | |
| Merchant's tank | 69 | | | 36 |
| Merrill | 18 | 85 | | 16,17 |
| Methodist Church spire, Kalama | 36 | | | 16 |
| Methodist Church spire, Portland | 41 | | | 19 |
| Miami | 50 | 107 | | 24 |
| Middle (Clarke County, Wash.) | 27 | 94 | | 18 |
| Middle (Tillamook County) | 56 | 113 | | 28 |
| Middle fish wheel | 47 | | | 22 |
| Middle Ground light | 61 | | | 30 |
| Middle Peak Neahkahnie | 54 | | | 24 |
| Middle reference mark (Clarke County, Wash.) | 27 | | | |
| Midway | 67 | 121 | | 35 |
| Midway Point (U. S. E.) | 68 | 122 | | 35 |
| Mill (Coos County) | 79 | | | |
| Mill (Coos County, Coos Bay) | 66 | 120 | 133 | 36 |
| Mill (Lincoln County) | 59 | 117 | | 31,32 |
| Mill (U. S. E.), (Columbia County) | 21 | 88 | | 15 |
| Mill (U. S. E.), (Cowlitz County) | 21 | 90 | | 16 |
| Mill 4 (U. S. E.) | 62 | | | 31,32 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Miller | 72 | 125 | | 42 |
| Miller Sands fish house flagpole | 34 | | | 13 |
| Mills | 44 | 101 | | 20 |
| Mill, smokestack | 65 | | | 33 |
| Mineral soap factory, Rainier | 37 | | | 15 |
| Mocks Bottom light | 43 | | | 19 |
| Moffat | 46 | 104 | | 22 |
| Montgomery | 28 | 96 | | 20 |
| Monticello | 36 | 99 | | 15 |
| Monument, General Land Survey | 19 | 87 | 133 | 20 |
| Morgan | 41 | 100 | | 20 |
| Morgans 2 (U. S. E.) | 26 | 94 | | 18 |
| Morgans 2 (U. S. E.) reference mark | 27 | | | |
| Morgan's dwelling | 80 | | | |
| Morgan's new barn, south gable | 56 | | | 28 |
| Morgan's Wharf light | 42 | | | 18 |
| Morrison | 53 | 111 | | 23 |
| Mound (Coos County) | 79 | | | |
| Mound (Del Norte County, Cal.) | 75 | 129 | | 44,45 |
| Mound, 1914 (Del Norte County, Cal.) | 51 | 110 | 133 | 39 |
| Mountain Lumber Co. stack | 38 | | | 16 |
| Mountain top, back of Westport | 36 | | | 14 |
| Mountain View dairy farm windmill | 42 | | | 18 |
| Mount Chetko or Mount Emery | 52 | | 133 | 38 |
| Mount Coffin | 18 | 84 | | 15 |
| Mount Coffin light | 37 | | | 15 |
| Mount Coffin reference mark | 18 | | | |
| Mount Emery or Mount Chetko | 52 | | 133 | 38 |
| Mount Pleasant | 45 | 103 | | 21 |
| Mount Pleasant Church | 47 | | | 22 |
| Mount Solo | 17 | 84 | | 14,15 |
| Mount Zion | 46 | 103 | | 22 |
| Mouth | 36 | 98 | | 14 |
| Mud (Lincoln County) | 59 | 116 | | 30,31 |
| Mud (Multnomah County) | 27 | 94 | | 18 |
| Mud (Tillamook County) | 55 | 113 | | 28 |
| Mud (Wahkiakum County) | 20 | 88 | | 14 |
| Mud reference mark No. 1 (Multnomah County) | 27 | | | |
| Mud reference mark No. 2 (Multnomah County) | 27 | | | |
| Mullaney | 57 | 115 | | 29 |
| Mussel Point | 77 | 131 | | 39 |
| Mussel Rock | 78 | | | 44 |
| Navy east wireless, Astoria | 31 | | | 12 |
| Navy west wireless, Astoria | 33 | | | 12 |
| Neahkahnie | 49 | 107 | | 24 |
| Near (Del Norte County, Cal.) | 76 | 130 | | 45 |
| Near (Lincoln County) | 59 | 117 | | 31,32 |
| Nelson | 41 | 100 | | 17,20 |
| Nelson (U. S. E.) | 68 | 122 | | 35 |
| Nequally | 17 | 84 | | 14 |
| Nestugga | 57 | 114 | | 29 |
| Nestugga Bay northwest base | 58 | 115 | | 29 |
| Nestugga Bay southeast base | 58 | 115 | | 29 |
| Net 2 (U. S. E.) | 21 | 89 | | 15 |
| New | 72 | 125 | | 41 |
| New courthouse dome, St. Helens | 40 | | | 17 |
| New Enterprise Landing, front light | 38 | | | 16 |
| New house, chimney | 42 | | | 18 |
| New house near Bailey's, east gable | 56 | | | 28 |
| New range, front light | 38 | | | 16 |
| New range, rear light | 38 | | | 16 |
| Nine (U. S. E.) (Columbia County) | 24 | 92 | | 17 |
| Nine (U. S. E.) (Multnomah County) | 30 | 97 | | 18,19 |
| Nine (U. S. E.) reference mark (Columbia County) | 24 | | | |
| Nineteen (U. S. E.) | 30 | 97 | | 18,19 |
| Nineteen 2 (U. S. E.) | 31 | 90 | | 18,19 |
| Noah | 50 | 108 | 133 | 37 |
| North base, Coos Bay | 67 | 121 | | 35 |
| North Bend | 78 | | | |
| North Bend (U. S. E.) | 69 | 122 | | 36 |
| North Bend 2 | 66 | 120 | | 36 |
| North Chetko | 73 | 126 | | 42 |
| North End | 64 | | | 33 |
| North Head lighthouse | 16 | | | 12 |
| North Sand 2 | 65 | | | 34,36 |
| North Sands | 78 | | | |
| North Slough | 66 | 120 | | 36 |
| North Slough 89 | 66 | 120 | | 36 |
| North Spit | 67 | 121 | | 35 |
| Northwest Seal Rock | 73 | 126 | | 44 |
| North Winchuck | 73 | 126 | | 42,43 |
| N. P. R. R. bridge light, center of draw | 44 | | | 19 |
| Nusom's house, west gable | 37 | | | 15 |
| Nye | 60 | 118 | | 30 |
| Oak Ridge | 41 | 100 | | 20 |
| Ocean | 67 | 121 | | 35 |
| Odd Fellows Monument | 69 | | | 36 |
| Oil works stack | 35 | | | 12 |
| Old | 22 | 90 | | 15,16 |
| Old barn, gable | 39 | | | 16,17 |
| Old church belfry, front spindle | 42 | | | 18 |
| Old garbage plant, chimney | 44 | | | 20 |
| Old hotel, northeast corner | 60 | | | 30 |
| Old house (Lincoln County) | 61 | | | 31 |
| Old house, yellow terra cotta chimney | 39 | | | 17 |
| Old Jim Crow (U. S. E.) | 33 | 98 | | 13 |
| Old mill smokestack | 65 | | | 33 |
| Old orchard | 39 | 99 | | 17 |
| Old Point Ellice (U. S. E.) | 33 | 97 | | 12 |
| Old Rock | 61 | | | 30 |
| Old Tongue (U. S. E.) | 33 | 98 | | 12,13 |
| Old Wharf | 61 | | | 30,31 |
| Old windmill, high tank | 42 | | | 18 |
| One 2 (U. S. E.) | 25 | 92 | | 17 |
| One 2 (U. S. E.) reference mark | 25 | | | |
| One 3 (U. S. E.) | 27 | 94 | | 18 |
| One 3 (U. S. E.) reference mark | 27 | | | |
| Oneonta | 46 | 104 | | 22 |
| Onion | 50 | 108 | | 37 |
| Onion Peak | 54 | | | 24 |
| Oregon-California Boundary Monument | 73 | 126 | | 43 |
| Oregonian | 19 | 87 | 133 | 20 |
| Otto | 73 | 126 | | 42,43 |
| Out | 58 | 116 | | 30,31 |
| Outermost Rock Tillamook Bay | 54 | | | 24,25,28 |
| Outer Turtle Rock | 77 | | | 39 |
| P (U. S. E.) | 20 | 96 | | 19 |
| P (U. S. E.) reference mark | 29 | | | |
| Pack Saddle | 51 | 110 | 133 | 38,39 |
| Patch | 74 | 127 | | 43 |
| Patricks Pinnacle | 77 | 131 | | 39 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Patricks Point south | 77 | 131 | | 39 |
| Pavilion | 60 | | | 30 |
| Peacock Spit range front light | 32 | | | 12 |
| Peacock Spit range rear light | 32 | | | 12 |
| Peak | 73 | 126 | | 43 |
| Peak No. 6 | 53 | | 133 | 39 |
| Peak No. 8 | 53 | | 133 | 39 |
| Pen | 27 | 95 | | 18,19 |
| Peninsula Lumber Co., black tank | 39 | | | 17 |
| Peninsula Lumber Co., stack | 43 | | | 19 |
| Pen reference mark | 27 | | | |
| Pest | 67 | 121 | | 35 |
| Phone | 61 | | | 30 |
| Pierce | 66 | 120 | 133 | 36 |
| Pigeon 2 | 67 | 121 | | 35 |
| Pigeon astronomic | 79 | | | |
| Pile (Grays Bay) | 34 | | | 13 |
| Pile (Lincoln County) | 59 | 117 | | 31 |
| Pillar Hill Tree | 80 | | | |
| Pillar Rock | 35 | | | 13 |
| Pillar Rock cannery flagpole | 35 | | | 13 |
| Pillar Rock Channel range front light | 35 | | | 13 |
| Pillar Rock Channel range rear light | 35 | | | 13 |
| Pilot Knob | 52 | | | 37 |
| Pine (Coos County) | 79 | | | |
| Pine (Del Norte County, Cal.) | 75 | 128 | | 44 |
| Pine (Lincoln County) | 59 | 117 | | 31 |
| Pine (Tillamook County) | 80 | | | |
| Pine Bush | 75 | 128 | | 44 |
| Pine Hill (Curry County) | 73 | 126 | | 42 |
| Pine Hill (Curry County, near Port Orford) | 70 | 123 | | 40 |
| Pine Ridge | 77 | 130 | | 39,45 |
| Pinnacle Rock | 54 | 112 | | 23 |
| Pistol River | 71 | 124 | | 41 |
| Pitcher Point | 55 | 113 | | 24,25,28 |
| Plateau | 63 | 119 | 132 | 26,27 |
| Point (Tillamook County, Tillamook Bay) | 53 | 111 | | 24 |
| Point (Tillamook County, Nestugga Bay) | 57 | 114 | | 29 |
| Point, 1869 (Del Norte County, Cal.) | 75 | 129 | | 44,45 |
| Point, 1871 (Del Norte County, Cal.) | 76 | 130 | | 45 |
| Point (U. S. E.) | 19 | | | 12 |
| Point Adams | 16 | 83 | | 12 |
| Point Adams life-saving station | 32 | | | 12 |
| Point Adams unused lighthouse | 16 | | | 12 |
| Point Basalt | 35 | 98 | | 14 |
| Point Ellice | 16 | 83 | | 12 |
| Point Ellice (U. S. E.) | 19 | 87 | | 12 |
| Point Ellice (U. S. E.) reference mark No. 1 | 19 | | | |
| Point Ellice (U. S. E.) reference mark No. 2 | 19 | | | |
| Pole | 35 | 98 | | 14 |
| Pole No. 1 (Tillamook Bay) | 80 | | | |
| Pole No. 2 (Tillamook Bay) | 80 | | | |
| Pole No. 3 (Tillamook Bay) | 80 | | | |
| Pole No. 4 (Tillamook Bay) | 80 | | | |
| Pollywog | 51 | 110 | 133 | 38 |
| Pond | 75 | 128 | | 44 |
| Pony | 66 | 120 | | 34,35,36 |
| Pony Point (U. S. E.) | 69 | 122 | | 35 |
| Port | 58 | 115 | | 30 |
| Porter | 66 | 120 | 133 | 36 |
| Portland: | | | | |
| Bench mark U. S. G. S | 19 | | | 20 |
| Congregational Church spire | 42 | | | 19 |
| Courthouse dome | 42 | | | 19 |
| Customhouse dome | 41 | | | 19 |
| Episcopal Church spire | 41 | | | 19 |
| Journal spire | 44 | | | 19 |
| Latitude | 19 | 87 | | 20 |
| Longitude | 19 | 87 | | 20 |
| Methodist Church spire | 41 | | | 19 |
| Tall building, weathervane | 44 | | | 19 |
| Union Depot (U. S. E.) | 30 | | | 19 |
| Waterworks pumping tower | 42 | | | |
| Y. M. C. A. east wireless | 44 | 101 | | 19 |
| Y. M. C. A. west wireless | 44 | 101 | | 19 |
| Portland woolen mills, red tank | 44 | | | 19 |
| Port Orford: | | | | |
| Astronomic | 70 | 123 | | 40 |
| Astronomical 2 | 50 | 109 | 133 | 37,38,40 |
| North base | 70 | 123 | | 40 |
| South base | 70 | 123 | | 37,40 |
| Post light, Sand Island | 33 | | | 12 |
| Post Office Bar lower light | 43 | | | 18,19 |
| Post Office Bar range front light | 43 | | | 18,19 |
| Post Office Bar range rear light | 43 | | | 18,19 |
| Potter | 28 | 95 | | 20 |
| Powder house, low stack | 40 | | | 17 |
| Presbyterian Church, Vancouver | 46 | | | 21 |
| Preston | 76 | 130 | | 45 |
| Preston 2 | 75 | 129 | | 45 |
| Preston Peak | 52 | 111 | 133 | 39 |
| Preston Peak, south | 52 | | 133 | 39 |
| Prune Hill | 45 | 102 | | 21 |
| Pugot | 35 | 98 | | 14 |
| Pulliam's fish house, southeast corner | 34 | | | 12,13 |
| Pyramid | 73 | 126 | | 43 |
| Pyramid Rock | 55 | 113 | | 28 |
| Pyramid tree | 48 | | | 22 |
| Quarry | 45 | 103 | | 21 |
| Quarry (U. S. E.) | 20 | 88 | | 15 |
| Quartermasters Wharf | 45 | 102 | | 19,21 |
| Quicksand | 69 | | | 35 |
| Quigley | 41 | 101 | | 20 |
| Quill | 58 | 116 | | 30 |
| Quinn | 17 | 83 | | 13,14 |
| R (U. S. E.) | 28 | 96 | | 19 |
| R (U. S. E.) reference mark | 28 | | | |
| Rail (Cowlitz County) | 22 | 90 | | 15,16 |
| Rail (Lincoln County) | 59 | 117 | | 30,31 |
| Railroad | 46 | 103 | | 22 |
| Railroad depot, northwest gable | 46 | | | 21 |
| Railway water tank | 49 | | | 22 |
| Rainier | 17 | 84 | | 15 |
| Rainier 2 (U. S. E.) | 21 | 89 | | 15 |
| Rainier: | | | | |
| Church steeple | 37 | | | 15 |
| Mineral soap factory | 37 | | | 15 |
| Range 2 (U. S. E.) | 26 | 94 | | 18 |
| Range 2 (U. S. E.) reference mark | 26 | | | |
| Raspberry (U. S. E.) | 20 | 88 | | 13 |
| Rattle | 51 | 110 | 133 | 39 |
| Rauer | 45 | 102 | | 19 |
| Rear range 1 | 61 | | | 31 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Rear range 2 | 61 | | | 31 |
| Rear range 3 | 62 | | | 32 |
| Rear range 4 | 62 | | | 32 |
| Rear range 5 | 62 | | | 32 |
| Rear range 6 | 62 | | | 32 |
| Rear range 7 | 62 | | | 32 |
| Rear range 8 | 62 | | | 32 |
| Rear range 9 | 62 | | | 32 |
| Rear range 10 | 63 | | | 32 |
| Rear range 11 | 63 | | | 32 |
| Red | 59 | 117 | | 31,32 |
| Red barn, cupola (Columbia County) | 38 | | | 16 |
| Red barn, cupola (Multnomah County) | 48 | | | 22 |
| Red Bush | 72 | 125 | | 42 |
| Redding Rock | 77 | 130 | 133 | 39 |
| Redding Rock lighthouse | 53 | | | 39 |
| Red house, chimney | 42 | | | 18 |
| Red mill, spindle | 42 | | | 18 |
| Red Mound | 72 | 124 | | 42 |
| Red Mountain (Curry County) | 52 | | | 38 |
| Red Mountain (Del Norte County, Cal.) | 51 | 110 | 133 | 39 |
| Red Point (Curry County) | 73 | 126 | | 42,43 |
| Red Point (Del Norte County, Cal.) | 74 | 128 | | 44 |
| Red Rock (Curry County) | 71 | 123 | 133 | 38,41 |
| Red Rock (Tillamook County) | 57 | 115 | | 29 |
| Red tank on bluff, spindle | 44 | | | 19 |
| Redwood | 53 | 111 | | 24 |
| Reed (Clarke County, Wash.) | 18 | 86 | | 17 |
| Reed (Coos County) | 79 | | | |
| Reeder's house, north chimney | 42 | | | 18 |
| Reeders Point light | 42 | | | 18 |
| Relief | 79 | | | |
| Remington | 45 | 103 | | 21 |
| Republic Spit range front light | 32 | | | 12 |
| Republic Spit range rear light | 32 | | | 12 |
| Ridge (Coose County) | 66 | 120 | | 35 |
| Ridge (Del Norte County, Cal.) | 74 | 127 | | 44 |
| Ridge 2 | 67 | 121 | | 35 |
| Ridge (U. S. E.) | 25 | 93 | | 17 |
| Ridge Knob | 71 | 124 | | 41 |
| Ridge (U. S. E.) reference mark | 25 | | | |
| Rinearson | 17 | 84 | | 14,15 |
| River | 19 | 87 | 133 | 20 |
| Rivulet | 54 | 112 | | 23 |
| Road | 59 | 116 | | 30,31 |
| Rock (Cowlitz County) | 22 | 90 | | 16 |
| Rock (Del Norte County, Cal.) | 76 | 130 | | 39,45 |
| Rock, 1914 (Del Norte County, Cal.) | 53 | | | 39,45 |
| Rock (U. S. E.) | 61 | | | 31,32 |
| Rock crusher, southeast stack | 40 | | | 17 |
| Rock Knoll | 80 | | | |
| Rock off Cape Mears | 80 | | | |
| Rock Point | 55 | 113 | | 28 |
| Rock reference mark No. 1 (Cowlitz County) | 22 | | | |
| Rock reference mark No. 2 (Cowlitz County) | 22 | | | |
| Rock, southerly of two south of lighthouse | 63 | | | 26,27 |
| Rocky Butte (Curry County) | 73 | 126 | | 42,43 |
| Rocky Butte (Multnomah County) | 19 | 86 | 133 | 20,21 |
| Rocky Peak | 52 | | 133 | 37,38 |
| Rocky Point (Curry County) | 70 | 123 | | 40 |
| Rocky Point (Wahkiakum County) | 17 | 83 | | 13 |
| Rocky Point 2 | 20 | 87 | | 13 |
| Rocky Point 2 reference mark | 20 | | | |
| Rocky Point light | 34 | | | 12,13 |
| Rocky Prairie | 71 | 124 | | 41 |
| Rocky Ridge | 18 | 85 | | 16 |
| Roman | 49 | 105 | | 26,27 |
| Rooster Rock | 47 | | | 21 |
| Ross (Coos County) | 79 | | | |
| Ross, 1889 (Coos County) | 68 | 122 | | 36 |
| Round (Curry County) | 70 | 123 | | 40 |
| Round (Del Norte County, Cal.) | 75 | 128 | | 44 |
| Round (Lincoln County) | 60 | | | 30 |
| Round barn | 44 | | | 19 |
| Round Point | 80 | | | |
| Round Rock | 76 | 130 | | 45 |
| Round Top | 56 | 114 | 132 | 25 |
| Russell (Coos County) | 66 | 120 | | 36 |
| Russell (Cowlitz County) | 40 | 99 | | 17 |
| S (U. S. E.) | 19 | | | 12 |
| Saddle Mountain (Clatsop County) | 49 | 107 | | 23 |
| Saddle Mountain (Curry County) | 52 | | 133 | 38 |
| Saddle Mountain 2 | 49 | | 133 | 23 |
| St. George | 75 | 128 | | 44,45 |
| St. George: | | | | |
| North base | 75 | 128 | | 44,45 |
| Reef lighthouse | 52 | | | 39 |
| South base | 75 | 129 | | 44,45 |
| St. Helens: | | | | |
| Bar range front light | 39 | | | 17 |
| Bar range rear light | 39 | | | 17 |
| Church | 40 | | | 17 |
| Congregational Church | 40 | | | 17 |
| Jetty light | 40 | | | 17 |
| Lumber Co. north stack | 40 | | | 17 |
| Lumber Co. pole near gable | 40 | | | 17 |
| New courthouse dome | 40 | | | 17 |
| School, small cupola | 40 | | | 17 |
| St. James Church, Vancouver | 46 | | | 21 |
| St. John | 28 | 95 | | 20 |
| St. Johns: | | | | |
| Fire Hall flagstaff | 44 | | | 19 |
| High School | 44 | | | 19 |
| Lumber Co. inshore stack | 44 | | | 19 |
| Lumber Co. tank | 44 | | | 19 |
| St. Marys Church, McGowans | 31 | | | 12 |
| St. Marys Hospital cross, Astoria | 16 | | | 12 |
| Sallal | 79 | | | |
| Salmon | 49 | 107 | 132 | 25 |
| Salmon Mountain | 52 | | 133 | 37 |
| Sand (Del Norte County, Cal.) | 75 | 128 | | 44 |
| Sand (Multnomah County) | 27 | 95 | | 18,19 |
| Sand (Tillamook County) | 56 | 113 | | 28 |
| Sand, 1908 (Tillamook County) | 55 | 113 | | 28 |
| Sand Beach (U. S. E.) | 68 | 122 | | 35 |
| Sand Dune | 57 | 115 | | 29 |
| Sand Flower | 71 | 124 | | 41 |
| Sand Hill (Curry County) | 72 | 125 | | 42 |
| Sand Hill (Tillamook County) | 56 | 113 | | 28 |
| Sand Hill 2 | 64 | 120 | 132 | 33 |
| Sand Hill 3 | 64 | | | 33 |
| Sand Hill tree | 80 | | | |
| Sand Island light | 32 | | | 12 |
| Sand Island post light | 33 | | | 12 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Sand reference mark (Multnomah County) | 27 | | | |
| Sands | 19 | 87 | | 12 |
| Sandstone Point | 55 | 113 | | 28 |
| Sandy Beach | 80 | | | |
| Sandy Island Channel range front light | 38 | | | 16 |
| Sandy Island House pipe | 38 | | | 16 |
| Sandy Point (Curry County) | 72 | 125 | | 42 |
| Sandy Point (Wahkiakum County) | 36 | 98 | | 14 |
| San Sebastian | 71 | 123 | | 41 |
| Sauvies Island | 80 | | | |
| Saw | 60 | 118 | | 32 |
| Sawmill, pipe | 46 | | | 21 |
| Sawmill, stack | 48 | | | 22 |
| Sawmill, west stack | 43 | | | 19 |
| Sawtooth, North | 53 | | 133 | 39 |
| Sawtooth, South | 53 | | 133 | 39 |
| Scappoose | 18 | 86 | | 17,20 |
| Scappose Johnson fish house, flag northwest gable | 34 | | | 13 |
| Scarboro Hill | 16 | 83 | | 12,23 |
| Scarboro Hill 2 | 16 | 82 | 133 | 12,23 |
| School | 27 | 94 | | 18 |
| Schoolhouse, belfry (Clarke County, Wash.) | 42 | | | 18 |
| Schoolhouse, chimney (Lincoln County) | 61 | | | 30,31 |
| Schoolhouse, cupola (Lincoln County, Toledo) | 63 | | | 32 |
| Schoolhouse, cupola (Marshfield) | 69 | | | 36 |
| Schoolhouse, flagpole, Rainier | 37 | | | 15 |
| Schoolhouse, Washougal | 47 | | | 21 |
| School, Kalama | 38 | | | 16 |
| School reference mark | 27 | | | |
| School, small cupola, St. Helens | 40 | | | 17 |
| Schooner | 49 | 106 | | 27 |
| Schroader | 64 | | | 33 |
| Schumacher | 71 | 124 | | 41 |
| Scott | 28 | 95 | | 19,20 |
| Scott reference mark | 28 | | | |
| Sea | 60 | 118 | | 30 |
| Seal (U. S. E.) | 33 | 97 | | 13 |
| Sea Lion | 66 | | | 34 |
| Seal Point | 72 | 125 | | 41 |
| Seaside House cupola | 54 | 112 | | 23 |
| Second Peak north of Preston Peak | 52 | 111 | 133 | 39 |
| Secrist | 18 | 86 | | 20 |
| Seely | 53 | 111 | | 24 |
| Settlers Point | 34 | 98 | | 13 |
| Seven (U. S. E.) | 31 | 97 | | 18 |
| Seven 2 (U. S. E.) | 24 | 92 | | 17 |
| Seven 2 (U. S. E.) reference mark | 24 | | | |
| Seventeen (U. S. E.) | 30 | 97 | | 18,19 |
| Seventeen 2 (U. S. E.) | 31 | 90 | | 18,19 |
| Shade | 61 | 118 | | 30,31 |
| Sharp Point | 77 | 131 | | 39 |
| Shaw | 45 | 101 | | 19,21 |
| Sheep | 72 | | | 41,42 |
| Sheep Hill | 57 | 114 | 132 | 29 |
| Shelf | 59 | 117 | | 31 |
| Shell (Del Norte County, Cal.) | 75 | 129 | | 44,45 |
| Shell (Lincoln County) | 59 | 117 | | 31 |
| Shell Point | 50 | 107 | 132 | 24,25,28 |
| Shepard | 46 | 103 | | 22 |
| Sherman | 53 | 111 | | 23 |
| Sheeringhousen | 41 | 100 | | 20 |
| Shersinger | 57 | 114 | | 29 |
| Shingle mill, stack, Ahle Point | 38 | | | 16 |
| Shobert | 40 | 100 | | 17 |
| Shobert chimney | 80 | | | |
| Shortis chimney | 34 | 98 | | 12,13 |
| Shortridge | 57 | 115 | | 29 |
| Signboard | 48 | | | 22 |
| Simpson | 66 | 120 | | 34,36 |
| Sister Rock, 1871 | 76 | 130 | | 45 |
| Sister Rock, 1907 | 52 | | | 37,38 |
| Sister's farm | 45 | 102 | | 19 |
| Sisters Knob | 72 | 124 | | 42 |
| Siwash | 79 | | | |
| Six (U. S. E.) (Clarke County, Wash.) | 24 | 92 | | 17 |
| Six (U. S. E.) (Multnomah County) | 30 | 97 | | 18 |
| Six (U. S. E.) reference mark (Clarke County, Wash.) | 24 | | | |
| Sixes | 50 | 109 | 133 | 37,40 |
| Sixteen (U. S. E.) | 30 | 97 | | 18,19 |
| Skamokowa (U. S. E.) | 35 | 98 | | 13,14 |
| Skeppernawin Creek | 80 | | | |
| Skiff | 79 | | | |
| Skull | 75 | 128 | | 44 |
| Skumaquea | 17 | 83 | | 13,14 |
| Skumaquea School square cupola | 35 | | | 13,14 |
| Skunk Cabbage Ridge | 36 | 99 | | 14 |
| Slab | 79 | | | |
| Slaughter 2 (U. S. E.) | 20 | 88 | | 15 |
| Slaughter 2 (U. S. E.) reference mark No. 1 | 20 | | | |
| Slaughter 2 (U. S. E.) reference mark No. 2 | 20 | | | |
| Slaughterhouse, east gable | 69 | | | 36 |
| Slaughter Island Bar range rear light | 37 | | | 15 |
| Slip | 59 | 117 | | 31 |
| Slope | 59 | 117 | | 31 |
| Slough | 55 | 113 | | 28 |
| Slue (Columbia County) | 22 | 90 | | 16 |
| Slue (Lincoln County) | 59 | 117 | | 31 |
| Slue reference mark No. 1 (Columbia County) | 22 | | | |
| Slue reference mark No. 2 (Columbia County) | 22 | | | |
| Small hill southwest of Bosley | 52 | | 133 | 38 |
| Small house on shore, pipe | 37 | | | 15 |
| Small Rock | 78 | | | 44 |
| Small white barn, north gable | 47 | | | 22 |
| Smith (U. S. E.) | 33 | 97 | | 12 |
| Smith Hill | 72 | 124 | | 41,42 |
| Smith Point | 16 | 82 | | 12 |
| Smith Point iron chimney, Astoria | 32 | | | 12 |
| Smith Point light | 32 | | | 12 |
| Smith River | 65 | | | 33 |
| Smokestack, cannery | 65 | | | 33 |
| Smyth | 76 | 130 | | 45 |
| Smyth 2 | 76 | 129 | | 45 |
| Snag (Coos County) | 79 | | | |
| Snag (Lane County) | 63 | 119 | 132 | 26,27 |
| Snag (U. S. E.) | 35 | 98 | | 13 |
| Snipe | 64 | | | 33,34 |
| Snodgrass | 71 | 124 | | 41 |
| Soap | 59 | 118 | | 32 |
| Soft | 58 | 116 | | 30,31 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| South base, Coos Bay | 67 | 121 | | 35 |
| South Point 2 | 64 | | | 33 |
| Southwest Peak Neahkanie | 54 | | | 24 |
| Southwest Seal Rock Point A | 78 | | | 44 |
| Southwest Seal Rock Point B | 77 | | | 44 |
| Spit (Lincoln County) | 59 | 117 | | 31,32 |
| Spit (Tillamook County) | 55 | 113 | | 28 |
| Split Rock | 77 | 131 | | 39 |
| Spring | 70 | | | 34,35 |
| Springville | 28 | 95 | | 20 |
| Spruce | 57 | 115 | | 29 |
| Spur (Del Norte County, Cal.) | 74 | 127 | | 43 |
| Spur (Lane County) | 63 | 119 | 132 | 26,27 |
| Squaw | 74 | 128 | | 44 |
| Squirrel | 50 | 109 | 133 | 37,38 |
| Stack | 51 | 109 | 133 | 38 |
| Stack fish house | 35 | | | 13 |
| Stackhouse | 46 | 104 | | 22 |
| Stack, Mountain Lumber Co | 38 | | | 16 |
| Stack, Western Lumber Co | 37 | | | 15,16 |
| Stage Lading | 64 | | | 33 |
| Standard Oil Co., white tank | 44 | | | 19 |
| Stansbury | 45 | 101 | | 21 |
| Star (U. S. E.) | 31 | | | 19 |
| Star Rock | 78 | | | 44 |
| Stave mill, stack | 69 | | | 36 |
| Stave mill (U. S. E.) | 69 | 122 | | 36 |
| Steamboat Rock | 76 | 129 | | 45 |
| Stenger | 47 | 105 | | 21 |
| Stewart's house, south gable | 80 | | | |
| Stick | 75 | 128 | | 44 |
| Stoughton | 17 | 84 | | 14 |
| Stream | 62 | 118 | | 32 |
| Stump (Coos County) | 66 | | | 36 |
| Stump (Lincoln County) | 58 | 116 | | 30,31 |
| Stump (Tillamook County) | 55 | 113 | | 28 |
| Stump (Wahkiakum County) | 20 | | | 13,14 |
| Sugar | 50 | 108 | 133 | 37 |
| Sugar Loaf | 77 | | | 39 |
| Sugar Loaf 2 | 63 | 119 | 132 | 26,27 |
| Summer | 70 | | | 34,35 |
| Sundown | 71 | 123 | | 38,41 |
| Sundown 2 | 51 | 109 | 133 | 38,41 |
| Surf | 67 | | | 35 |
| Swamp | 74 | 128 | | 44 |
| Swan Island Bar lower light | 43 | | | 19 |
| Swan Island Bar upper light | 43 | | | 19 |
| Swan Island Channel range front light | 43 | | | 19 |
| Swan Island Channel range rear light | 43 | | | 19 |
| Swan Island range front light | 43 | | | 19 |
| Swan Island range rear light | 43 | | | 19 |
| T (U. S. E.) | 29 | 96 | | 19 |
| T (U. S. E.) reference mark | 29 | | | |
| Table | 49 | 106 | 132 | 26 |
| Table Cliff | 18 | 86 | | 17 |
| Taggarts Bluff | 45 | 102 | | 21 |
| Talbert | 57 | 115 | | 29 |
| Tall building, weather vane, Portland | 44 | | | 19 |
| Tall post | 48 | | | 22 |
| Tangent (U. S. E.) | 21 | 88 | | 15 |
| Tank, Beaver Lumber Co | 38 | | | 16 |
| Tank, oil, large black | 38 | | | 16 |
| Tansy Point | 16 | 83 | | 12 |
| Tansy Point 2 | 16 | 82 | | 12 |
| Taylor (Clatsop County) | 20 | 87 | | 12,13 |
| Taylor (Curry County) | 73 | 125 | | 42 |
| Taylor Sands light | 34 | | | 12,13 |
| Taylor School cupola, Astoria | 32 | | | 12 |
| Telegraph | 67 | 121 | | 35 |
| Ten | 20 | 88 | | 13,14 |
| Ten (U. S. E.), (Clarke County) | 24 | 92 | | 17 |
| Ten (U. S. E.), (Multnomah County) | 30 | 97 | | 18,19 |
| Tenasillihee | 35 | 98 | | 14 |
| Ten Mile | 66 | | | 34 |
| Ten reference mark | 20 | | | |
| Ten (U. S. E.) reference mark (Clarke County) | 24 | | | |
| Thicket | 80 | | | |
| Thirteen (U. S. E.) | 30 | 97 | | 18,19 |
| Thirteen 2 (U. S. E.) | 31 | 90 | | 18,19 |
| Thirty (U. S. E.) | 30 | 97 | | 19 |
| Thirty-eight (U. S. E.) | 29 | 96 | | 19 |
| Thirty-eight 2 (U. S. E.) | 28 | 96 | | 19 |
| Thirty-five (U. S. E.) | 30 | 96 | | 19 |
| Thirty-five 2 (U. S. E.) | 31 | | | 19 |
| Thirty-four (U. S. E.) | 30 | 96 | | 19 |
| Thirty-nine (U. S. E.) | 28 | | | 19 |
| Thirty-nine 2 (U. S. E.) | 28 | 96 | | 19 |
| Thirty-one (U. S. E.) | 30 | 97 | | 19 |
| Thirty-seven (U. S. E.) | 28 | 96 | | 19 |
| Thirty-six (U. S. E.) | 29 | 96 | | 19 |
| Thirty-six 2 (U. S. E.) | 31 | | | 19 |
| Thirty-three (U. S. E.) | 30 | 97 | | 19 |
| Thirty-two (U. S. E.) | 30 | 97 | | 19 |
| Thistle | 41 | 101 | | 20 |
| Thomas Hill | 72 | 125 | | 41 |
| Thomas Point | 72 | 125 | | 41 |
| Three 3 (U. S. E.) | 27 | 95 | | 18 |
| Three 3 (U. S. E.) reference mark | 27 | | | |
| Three Tree Island Shoal light | 43 | | | 18,19 |
| Three Tree Point | 17 | 83 | | 13 |
| Three Tree Point (U. S. E.) | 20 | 88 | | 13 |
| Three Tree Point light | 35 | | | 13 |
| Tibbets | 28 | 96 | | 20 |
| Tillamook Bay east base | 55 | 113 | | 28 |
| Tillamook Bay west base | 55 | 113 | | 28 |
| Tillamook Head | 49 | 107 | 133 | 23 |
| Tillamook Rock lighthouse | 54 | | | 23 |
| Timber Knob | 79 | | | |
| Timmerman | 68 | 121 | | 36 |
| Toledo Beacon 10 | 62 | | | 32 |
| Toledo Beacon 12 | 62 | | | 32 |
| Tongue (U. S. E.) | 20 | 87 | | 12,13 |
| Tongue Point | 17 | 83 | | 12,13 |
| Tongue Point light | 35 | | | 12,13 |
| Tongue Point Neck | 34 | 98 | | 12,13 |
| Tongue (U. S. E.) reference mark | 20 | | | |
| Tophet | 67 | 121 | | 35 |
| Tower Rock | 52 | | | 40 |
| Trail (Coos County) | 78 | | | |
| Trail (Curry County) | 72 | 125 | | 42 |
| Trail (Douglas County) | 49 | 106 | 132 | 27,33 |
| Tree (Columbia County) | 20 | | | 15 |
| Tree (Lane County) | 63 | 119 | 132 | 26,27 |
| Tree on Rocky Butte | 80 | | | |
| Tunnel Point tree | 47 | | | 21 |
| Turn | 63 | 119 | 132 | 26,27 |
| Twelve (U. S. E.) | 30 | 97 | | 18,19 |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Twenty (U. S. E.) | 30 | 97 | | 18,19 |
| Twenty-eight (U. S. E.) | 30 | 97 | | 19 |
| Twenty-five (U. S. E.) | 30 | 97 | | 19 |
| Twenty-four (U. S. E.) | 30 | 97 | | 19 |
| Twenty-four 2 (U. S. E.) | 31 | 90 | | 19 |
| Twenty-nine (U. S. E.) | 30 | 97 | | 19 |
| Twenty-one (U. S. E.) | 30 | 97 | | 18,19 |
| Twenty-seven (U. S. E.) | 30 | 97 | | 19 |
| Twenty-six (U. S. E.) | 30 | 97 | | 19 |
| Twenty-six 2 (U. S. E.) | 31 | 90 | | 19 |
| Twenty-three (U. S. E.) | 30 | 97 | | 19 |
| Twenty-two (U. S. E.) | 30 | 97 | | 19 |
| Twin Mountain | 46 | 103 | | 22 |
| Two (U. S. E.) | 25 | 92 | | 17 |
| Two 2 (U. S. E.) | 27 | 94 | | 18 |
| Two 2 (U. S. E.) reference mark | 27 | | | |
| Umpqua | 65 | | | 33 |
| Umpqua north base | 64 | | | 33 |
| Umpqua River lighthouse | 64 | | 132 | 33 |
| Umpqua south base | 64 | | | 33 |
| Union Depot, Portland | 30 | | | 19 |
| Union Oil Co. white tank, knob | 43 | | | 19 |
| United States buoy depot flag | 33 | | | 12 |
| United States quarantine station flagpole | 32 | | | 12 |
| United Wireless Co. pole | 40 | | | 17 |
| University flagstaff | 44 | | | 19 |
| Unknown | 65 | | | 34 |
| Unpainted house, stovepipe | 39 | | | 17 |
| Upper Astoria | 80 | | | |
| Upper Bluff | 77 | 131 | | 39 |
| Upper fish wheel | 48 | | | 22 |
| Upper flagstaff, Vancouver | 47 | | | 21 |
| Upper Skumaquea light | 36 | | | 14 |
| Upper Willow Bar range front light | 42 | | | 18 |
| Upper Willow Bar range rear light | 42 | | | 18 |
| Vancouver: | | | | |
| Bridge, center of draw | 43 | | | 19 |
| Episcopal Church | 46 | | | 21 |
| Lower flagstaff | 46 | 105 | | 21 |
| Presbyterian Church | 46 | | | 21 |
| St. James Church | 46 | | | 21 |
| Upper flagstaff | 47 | 105 | | 21 |
| Vine Maple | 57 | 114 | | 29 |
| Violet | 68 | 122 | | 35,36 |
| W (U. S. E.) | 29 | | | 19 |
| W 1 (U. S. E.) | 26 | 94 | | 18 |
| W. $2_2$ (U. S. E.) | 26 | 94 | | 18 |
| W $2_2$ (U. S. E.) reference mark | 26 | | | |
| W 3 (U. S. E.) | 26 | 94 | | 18 |
| W 3 (U. S. E.) reference mark | 26 | | | |
| W $4_2$ (U. S. E.) | 26 | 94 | | 18 |
| W $4_2$ (U. S. E.) reference mark | 26 | | | |
| W $5_2$ (U. S. E.) | 26 | 93 | | 18 |
| W $5_2$ (U. S. E.) reference mark | 26 | | | |
| W 6 (U. S. E.) | 26 | 94 | | 18 |
| W 6 (U. S. E.) reference mark | 26 | | | |
| W $7_2$ (U. S. E.) | 26 | 93 | | 18 |
| W $7_2$ (U. S. E.) reference mark No. 1. | 26 | | | |
| W $7_2$ (U. S. E.) reference mark No. 2. | 26 | | | |
| W $8_2$ (U. S. E.) | 26 | 94 | | 18 |
| W 9 (U. S. E.) | 26 | 93 | | 18 |
| W 9 (U. S. E.) reference mark | 26 | | | |
| W $10_2$ (U. S. E.) | 26 | 93 | | 18 |
| W $10_2$ (U. S. E.) reference mark | 26 | | | |
| W 11 (U. S. E.) | 25 | 93 | | 17,18 |
| W $12_2$ (U. S. E.) | 26 | 93 | | 18 |
| W 14 (U. S. E.) | 25 | 93 | | 17,18 |
| W 14 (U. S. E.) reference mark | 26 | | | |
| W 16 (U. S. E.) | 25 | 93 | | 17,18 |
| W 16 (U. S. E.) reference mark No. 1. | 25 | | | |
| W 16 (U. S. E.) reference mark No. 2. | 25 | | | |
| Walker Island Dike light | 36 | | | 14,15 |
| Walker Island Light | 36 | | | 14,15 |
| Wallaces Island | 36 | 99 | | 14 |
| Wallicut (U. S. E.) | 19 | | | 12 |
| Warren (Columbia County) | 18 | 85 | | 15 |
| Warren (Multnomah County) | 46 | 104 | | 22 |
| Warren, 1903 (Columbia County) | 19 | 86 | 133 | 20 |
| Warrendale Church | 48 | | | 22 |
| Warren's cannery | 48 | | | 22 |
| Warrior (U. S. E.) | 24 | 92 | | 17 |
| Warrior (U. S. E.) reference mark | 24 | | | |
| Warrior Rock lighthouse, ventilator | 40 | | | 17 |
| Warriors Point | 40 | 100 | | 17 |
| Washougal | 45 | 102 | | 21 |
| Washougal Hall flagstaff | 47 | | | 21 |
| Washougal schoolhouse | 47 | | | 21 |
| Water (Clatsop County) | 20 | 87 | | 13 |
| Water (Lincoln County) | 58 | 116 | | 30,31 |
| Waterworks pumping tower, Portland | 42 | | | |
| Watts | 28 | 95 | | 20 |
| Waud | 28 | 95 | | 20 |
| Weather Bureau tower flagpole | 33 | | | 12 |
| Welch | 35 | 98 | | 13,14 |
| Welch's fish house, northeast gable | 35 | | | 13,14 |
| West | 70 | 123 | | 40 |
| West end of jetty | 31 | 97 | | 12 |
| Westerly of two trees | 80 | | | |
| Westport (Clatsop County) | 17 | 83 | | 14 |
| Westport (Coos County) | 50 | 108 | 133 | 37 |
| West stack, Beaver Lumber Co | 38 | | | 16 |
| Wet | 60 | | | 30 |
| Whale | 65 | | | 34 |
| Whale Rock | 77 | | | 44 |
| Whalers Island | 76 | 129 | | 45 |
| Wharf (Clatsop County) | 20 | 88 | | 13 |
| Wharf (Lincoln County) | 59 | 117 | | 31 |
| Wheeler | 65 | | | 34 |
| White (Coos County) | 79 | | | |
| White (Del Norte County, Cal.) | 75 | 129 | | 44,45 |
| White (Douglas County) | 50 | 107 | | 37 |
| White house, chimney | 39 | | | 16 |
| White house, chimney, back | 39 | | | 17 |
| White house, chimney, small | 47 | | | 22 |
| White house, middle chimney | 42 | | | 18 |
| White house, near wharf, north chimney | 39 | | | 17 |
| White house, north gable | 48 | | | 22 |
| White house, terra-cotta pipe | 38 | | | 16 |
| White Knob | 76 | 130 | | 45 |
| White Point 2 | 68 | 121 | | 36 |
| White Point 3 | 66 | 120 | 133 | 36 |
| White tank inshore, one of two | 44 | | | 19 |
| White tree, three prongs | 37 | | | 15 |
| Whitewashed Cliff | 79 | | | |

| Station | Position | Description | Elevation | Sketch |
|---|---|---|---|---|
| | *Page* | *Page* | *Page* | *Number* |
| Whitewashed sapling | 79 | | | |
| W. house, west gable | 80 | | | |
| Wikman | 80 | | | |
| Willamet | 18 | 86 | | 20 |
| Willamette River range front light | 43 | | | 18 |
| Williams | 47 | 105 | | 21 |
| Willow Bar | 80 | | | |
| Willows | 80 | | | |
| Wilson (Curry County) | 70 | 123 | | 40 |
| Wilson (Del Norte County, Cal.) | 76 | 130 | | 45 |
| Wind | 64 | 119 | 132 | 33 |
| Windmill on bluff | 44 | | | 19 |
| Windmill on unpainted tower | 42 | | | 18 |
| Windmill white tank | 43 | | | 18 |
| Winter | 70 | | | 34 |
| Wintler | 45 | 101 | | 21 |
| Wire | 58 | 115 | | 30 |
| Wise | 58 | 116 | | 30,31 |
| Wood 2 (U. S. E.) | 21 | 88 | | 15 |
| Woodedge | 75 | 129 | | 44,45 |
| Woodland | 78 | | | |
| Woodland 2 | 79 | | | |
| Woods | 17 | 84 | | 14 |
| Woody Point | 76 | 130 | | 45 |
| Wreck | 78 | | | |
| Wreck Tacoma | 64 | | | 33 |
| Wynell | 75 | 129 | | 44,45 |
| Yank | 74 | 128 | | 44 |
| Yaq | 58 | 116 | | 30,31 |
| Yaquina Bar range front light | 61 | | | 30 |
| Yaquina Bar range rear light | 61 | | | 30 |
| Yaquina east base | 58 | 116 | | 30 |
| Yaquina Head lighthouse | 51 | | 132 | 26 |
| Yaquina Jetty light | 60 | | | 30 |
| Yaquina lighthouse, old tower | 51 | | | 26,30 |
| Yaquina west base | 58 | 116 | | 30 |
| Yellow Bluff | 34 | 98 | | 13 |
| Yellow house, south chimney | 42 | | | 18 |
| Yokam | 78 | | | |
| Yokam 2 | 79 | | | |
| Y. M. C. A. east wireless, Portland | 44 | 101 | | 19 |
| Y. M. C. A. west wireless, Portland | 44 | 101 | | 19 |
| Youngs Bay Bridge, center of draw | 32 | | | 12 |
| Youngs River | 80 | | | |