# REPORT

# INTERNATIONAL BOUNDARY COMMISSION

# ESTABLISHMENT OF THE BOUNDARY BETWEEN THE UNITED STATES AND CANADA SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN



OTTAWA 1934











RANGE MARKS 47 AND 48 ON CAMPOBELLO ISLAND AS SEEN FROM BOUNDARY TURNING POINT 13 AT ENTRANCE TO QUODDY ROADS

INTERNATIONAL BOUNDARY COMMISSION

# JOINT REPORT

UPON THE

# SURVEY AND DEMARCATION OF THE BOUNDARY

BETWEEN THE

# UNITED STATES AND CANADA

# FROM THE SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN

IN ACCORDANCE WITH THE PROVISIONS OF ARTICLES I AND II OF THE TREATY SIGNED AT WASHINGTON, APRIL 11, 1908, ARTICLES I AND II OF THE TREATY SIGNED AT WASHINGTON, MAY 21, 1910, AND ARTICLE III OF THE TREATY SIGNED AT WASHINGTON, FEBRUARY 24, 1925

HIS BRITANNIC MAJESTY'S COMMISSIONER W. F. KING, 1908–1916 J. J. McARTHUR, 1917–1924 J. D. CRAIG, 1925–1931 NOEL J. OGILVIE, 1931– UNITED STATES COMMISSIONER O. H. TITTMANN, 1908–1915 E. C. BARNARD, 1915–1921 E. LESTER JONES, 1921–1929 JAMES H. VAN WAGENEN, 1929–



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# LETTER OF TRANSMITTAL

The Right Honourable

WASHINGTON, May 9, 1934.

The Secretary of State for External Affairs of Canada, Ottawa.

The Honourable

The SECRETARY OF STATE OF THE UNITED STATES,

Washington.

SIRS:

We have the honour to submit herewith our printed joint report upon the establishment of the section of the international boundary between Canada and the United States from the source of the St. Croix River to the Atlantic Ocean, together with an atlas of eighteen signed joint maps of the boundary as now established in accordance with the provisions of Articles I and II of the treaty between Great Britain and the United States signed at Washington April 11, 1908, of Articles I and II of the treaty between Great Britain and the United States signed at Washington May 21, 1910, and of Article III of the treaty between His Britannic Majesty in respect of Canada and the United States signed at Washington February 24, 1925.

This report is the fifth of a series of seven final reports being prepared by the Commissioners on the survey and demarcation of the several sections of the international boundary line between Canada and the United States and Canada and Alaska in accordance with the provisions of existent boundary treaties. The seven reports, together with their accompanying maps, will cover the entire boundary between Canada and the United States and between Canada and Alaska, with the exception of that part of the boundary through the St. Lawrence River and the Great Lakes which was reestablished and reported upon by the International Waterways Commission under the special provisions of Article IV of the treaty of April 11, 1908.

The signed originals of the report and the originals of each of the eighteen boundary maps have been prepared in quadruplicate and two originals of the report and two sets of the original maps, bound in atlas form, are transmitted herewith to each Government.

Very truly yours,

His Britannic Majesty's Commissioner.

United States Commissioner.

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XI



# INTRODUCTION

This report of the commissioners upon the establishment of the section of the international boundary from the source of the St. Croix River to the Atlantic Ocean is submitted to the two Governments in accordance with the provisions of Articles I and II of the treaty between the United States and Great Britain signed April 11, 1908, which stipulate that the commissioners shall "prepare in duplicate and file with each Government a joint report" or reports "under their hands and seals" describing in detail the course and location of the line as laid down and marked by them and the monuments and range marks which reference it.

The report includes, in addition to the detailed description of the boundary required by the treaty of 1908, an account of all the field and office work done by the commissioners in carrying out the provisions of the several articles of the three boundary treaties pertaining to this section of the international boundary line, namely: Articles I and II of the treaty of 1908, Articles I and II of the treaty of 1910 between the United States and Great Britain, and Article III of the treaty of 1925 between the United States and His Britannic Majesty in respect of the Dominion of Canada. Included with the report are also four appendixes which contain historical, geodetic, and topographic data: Appendix I, Historical sketch of the international boundary from the source of the St. Croix River to the Atlantic Ocean; Appendix II, Treaties and conventions pertaining to the boundary previous to the treaty of 1908; Appendix III, Elevations and descriptions of bench marks; and Appendix IV, Geographic positions and descriptions of triangulation and traverse stations.

Prior to the work of the commissioners under the treaty of 1908, the international boundary line in the St. Croix River and through Passamaquoddy Bay to the Atlantic Ocean had never been definitely located. Although in 1798 the commissioners appointed under the provisions of Article V of the treaty of 1794 to identify the St. Croix River prepared a general map of this boundary waterway, they did not lay down nor mark on this map the actual line of demarcation. Nor did the commissioners appointed under the convention of 1892 "to determine upon a method of more accurately marking the boundary line between the two countries in the waters of Passamaquoddy Bay in front of and adjacent to Eastport" definitely locate the boundary line in these waters. The original establishment of the line in the St. Croix River and through Passamaquoddy Bay was delegated to the commissioners under the treaty of 1908.

The field operations of the commissioners in establishing this part of the boundary included a careful determination in the field of the course of the line which followed the main channel or thalweg of the St. Croix River from its source to its mouth, and the laying down of the several courses of the line through Passamaquoddy Bay, as stipulated by the boundary treaties. In addition to determining and laying down the boundary, the operations of the commissioners also comprised the establishment of boundary reference monuments along the shores of the St. Croix River; the establishment of boundary range marks ranging and cross-ranging

#### INTRODUCTION

the courses and turning points of the boundary through Passamaquoddy Bay; the determination of the geographic positions of the monuments and range marks and of the turning points of the boundary line by means of accurate triangulation and traverse; and the mapping of a strip of terrain adjacent to the line to show the shore lines and other topographic features of the boundary waterways.

The office work consisted largely of the preparation of the boundary maps and of making the geodetic computations necessary to determine the geographic positions of the boundary reference monuments, range marks, and the turning points of the boundary line.

Articles I and II of the treaty of 1908 require that the course of the boundary line from the source of the St. Croix River to its mouth and through Passamaquoddy Bay shall be laid down by the commissioners upon quadruplicate sets of "accurate modern charts" to be prepared or adopted by them for that purpose and that these charts shall be certified and signed by them and that two duplicate originals thereof shall be filed by them with each Government. The "accurate modern charts" specified in the foregoing provisions of the treaty comprise 18 modern topographic maps and an index sheet, prepared from the surveys made by the commissioners. The maps have been engraved on copper plates and printed from lithographic stones on heavy chart paper 26 by 38 inches in size. They show the shore lines of the boundary waterways and the character of the country adjacent thereto, and the location of the boundary line, the boundary turning points, and all the boundary reference monuments and range marks. The four original sets of these maps, specified by the treaty, have been bound in atlas form, and two sets have been filed with each Government. Copies of each map have been published in sheet form for distribution to other Government agencies and to the depository libraries of the two countries.

The description and definition of the line, as established by the commissioners and as marked by them on the 18 boundary maps which accompany this report, is set forth in terms of the geographic coordinates of the boundary line, reference monuments, etc. The description is presented in tabular form on pages 98 to 131, inclusive. It includes the geographic positions of all the boundary turning points, the lengths and azimuths of the connecting straight-line boundary courses, the geographic positions of the boundary reference monuments and range marks along the waterways, and the lengths and azimuths of the lines from the reference monuments and range marks to the boundary turning points which they reference.

The geographic positions of all the boundary turning points and the positions of all the triangulation and traverse stations have been computed on the original North American geodetic datum. This work comprised the computation of approximately 1,900 geodetic positions. The results are set forth in the tables of the description of the boundary line and in the tables of geographic positions of boundary triangulation and traverse stations, which are presented in Appendix IV, pages 169 to 209. Sketches of the network of the triangulation and the traverse, comprising 16 sheets, are shown on pages 288 to 303. These geodetic data have been and should continue to be of much value to other agencies of the two Governments and to engineers and surveyors as the foundation for other and more extensive surveys of the region adjacent to the boundary line.





# TREATIES OF 1908, 1910, AND 1925, APPOINTMENTS OF THE COMMISSIONERS, AND RESERVATION OF LANDS ALONG THE INTERNATIONAL BOUNDARY

# TREATY BETWEEN THE UNITED STATES OF AMERICA AND THE UNITED KINGDOM CONCERNING THE BOUNDARY BETWEEN THE UNITED STATES AND THE DOMINION OF CANADA FROM THE ATLANTIC OCEAN TO THE PACIFIC OCEAN

### Signed at Washington, April 11, 1908

### (Ratifications exchanged at Washington, June 4, 1908)

The United States of America and His Majesty Edward the Seventh, of the United Kingdom of Great Britain and Ireland, and of the British Dominions beyond the Seas, King, and Emperor of India, being desirous of providing for the more complete definition and demarcation of the international boundary between the United States and the Dominion of Canada, have for that purpose resolved to conclude a treaty, and to that end have appointed as their Plenipotentiaries:

The President of the United States of America, Elihu Root, Secretary of State of the United States; and

His Britannic Majesty, Right Honorable James Bryce, O. M., his Ambassador Extraordinary and Plenipotentiary at Washington;

Who, after having communicated to each other their respective full powers, which were found to be in due and proper form, have agreed to and concluded the following articles:

### ARTICLE I

# THE BOUNDARY THROUGH PASSAMAQUODDY BAY

The High Contracting Parties agree that each shall appoint, without delay, an expert geographer or surveyor to serve as Commissioners for the purpose of more accurately defining and marking the international boundary line between the United States and the Dominion of Canada in the waters of Passamaquoddy Bay from the mouth of the St. Croix River to the Bay of Fundy, and that in defining and marking said boundary line the Commissioners shall adopt and follow, as closely as may be, the line surveyed and laid down by the Commissioners appointed under Article II of the Treaty of July 22, 1892, between the United States and Great Britain, so far as said Commissioners agreed upon the location of said line, namely:

(1) From a point at the mouth of the St. Croix River defined by the ranges established by them, by a connected series of six straight lines defined by ranges and cross ranges, to a point between Treat Island and Friar Head, likewise defined by ranges and cross ranges established by them; and also

(2) From a point in Quoddy Roads, defined by the intersection of the range passing through the position of the Beacon of 1886 and Lubec Channel Light, with a range established by them on the west shore of Quoddy Roads along the course of this latter range, which is about 80° 35' east of true south, into the Bay of Fundy.

In ascertaining the location of the above-described line, the Commissioners shall be controlled by the indications of the range marks and monuments established along its course by said former 47378°-34-2 1 Commissioners and by the charts upon which the said Commissioners marked the line as tentatively agreed upon by them.

The remaining portion of the line, lying between the two above-described sections, and upon the location of which said former Commissioners did not agree, shall pass through the center of the Lubec Narrows Channel between Campo Bello Island and the mainland, and, subject to the provisions hereinafter stated, it shall follow on either side of the said Narrows such courses as will connect with the parts of the line agreed upon as aforesaid, and such boundary shall consist of a series of straight lines defined by distances and courses; but inasmuch as differences have arisen in the past as to the location of the line with respect to Pope's Folly Island above Lubec Narrows and with respect to certain fishing grounds east of the dredged channel below Lubec Narrows, it is agreed that each of the High Contracting Parties shall present to the other within six months after the ratification of this Treaty a full printed statement of the evidence, with certified copies of original documents referred to therein which are in its possession, and the arguments upon which it bases its contentions, with a view to arriving at an adjustment of the location of this portion of the line in accordance with the true intent and meaning of the provisions relating thereto of the treaties of 1783 and 1814 between the United States and Great Britain, and the award of the Commissioners appointed in that behalf under the treaty of 1814; it being understood that any action by either or both Governments or their representatives authorized in that behalf or by the local governments on either side of the line, whether prior or subsequent to such treaties and award, tending to aid in the interpretation thereof, shall be taken into consideration in determining their true intent and meaning. Such agreement, if reached, shall be reduced to writing in the form of a protocol and shall be communicated to the said Commissioners, who shall lay down and mark this portion of the boundary in accordance therewith and as herein provided.

In the event of a failure to agree within six months after the date of exchanging the printed statements aforesaid, the question of which Government is entitled to jurisdiction over such island and fishing grounds under treaty provisions, and proceedings thereunder, interpreted in accordance with their true intent and meaning as above provided, and by reason of any rights arising under the recognized principles of international law, shall be referred forthwith for decision upon the evidence and arguments submitted as aforesaid, with such additional statement of facts as may be appropriate, and an argument in reply on each side, to an arbitrator to be agreed upon by the two Governments, or, in case of a failure to agree, to be appointed by a third Power selected by the two Governments by common accord, or, if no agreement is thus arrived at, each Government shall select a different Power and the choice of the arbitrator shall be made in concert by the Powers thus selected. The decision of such arbitrator shall be final, and the line shall be laid down and marked by the said Commissioners in accordance therewith and as herein provided.

The arbitrator shall be requested to deliver, together with his award, a statement of all the costs and expenses incurred by him in connection with the arbitration, which shall forthwith be repaid by the two Governments in equal moieties.

It is further agreed that if, under the foregoing provisions, the boundary be located through the channel to the east of the dredged channel above mentioned, the latter shall be equally free and open for the passage of ships, vessels, and boats of both parties.

The entire boundary shall be marked by permanent range marks established on land and, if desirable in the opinion of Commissioners, by buoys in the water, so far as practicable, and by such other boundary marks and monuments and at such points as the Commissioners may determine to be necessary; but the said Commissioners shall proceed to define and mark and chart the portion of the line agreed upon by the former Commissioners under the Treaty of 1892 aforesaid without waiting for the final determination of the location of the remaining portion of the line.

The course of the said boundary line as defined and marked as aforesaid shall be laid down by said Commissioners on quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose, which charts shall be certified and signed by the Commissioners, and two duplicate originals thereof shall be filed by them with each Government; and they shall also prepare in duplicate and file with each Government a joint report or reports under their hands and seals describing in detail the course and location of the boundary line and the range marks and monuments and buoys marking it.

The line so defined and laid down shall be taken and deemed to be the international boundary rom the Bay of Fundy to the mouth of the St. Croix River, as established by treaty provisions and the proceedings thereunder.

### ARTICLE II

# The Boundary from the Mouth to the Source of the St. Croix River

Whereas Article II of the Treaty of 1783 between the United States and Great Britain provides that a line drawn along the middle of the River St. Croix from its mouth in the Bay of Fundy to its source shall be, between those points, the international boundary between the United States and the British possessions in North America, and the identity of the River St. Croix has been determined by the Commissioners appointed for that purpose under Article V of the Treaty of 1794 between the United States and Great Britain, and the location of the mouth and the source of said river has been duly established, and the course of said river has been described, surveyed, and charted by said Commissioners, as appears from their joint report dated the 25th day of October, 1798, and from the chart or plan of said river prepared and filed by them with said report, but said line of boundary along the middle of said river was not laid down by them on said chart or plan, and was not marked or monumented by them along the course of said river; and whereas, pursuant to an additional article, dated March 15, 1798, supplementing the provisions of the Treaty of 1794 above referred to, a monument was erected by joint action of the two Governments marking the source of the River St. Croix, but said line of boundary through the River St. Croix has not otherwise been monumented and has never been laid down on charts by joint action of the two Governments: therefore, in order to complete and render thoroughly effective the demarcation of the boundary described and established as aforesaid,

It is agreed that each of the High Contracting Parties shall appoint, without delay, an expert geographer or surveyor as a Commissioner, and the Commissioners so appointed shall jointly lay down upon accurate modern charts, to be prepared or adopted by them for that purpose, the line of boundary along the middle of the River St. Croix from its mouth to its source as defined and established by the existing treaty provisions and the proceedings thereunder, above referred to, with the agreed understanding, however, that the line of boundary through said river shall be a water line throughout and shall follow the center of the main channel or thalweg as naturally existing, except where such course would change, or disturb, or conflict with the national character of an island as already established by mutual recognition and acquiescence, in which case the line shall pass on the other side of any such island, following the middle of the channel nearest thereto, or, if the Commissioners find that the national character of any island is in dispute, the question of its nationality shall be submitted by them to their respective Governments, with a chart or map certified jointly by said Commissioners, showing the depth and volume of the water at its high and low stages between such island and the river banks on each side and indicating the course of the main channel of the river as it passes such island, together with a descriptive statement by said Commissioners showing the reasons for selecting such channel as the main channel; and in all such cases the High Contracting Parties agree that the location of the boundary with respect to each island in dispute shall be determined and settled in accordance with the following rules:

(1) The nationality of each island in dispute shall be determined by the predominance of the claims established on either side to such island, arising from the exercise of jurisdiction and sovereignty over it, including such exercise of jurisdiction by the local governments on either side of the line.

(2) The burden of proving the nationality of any such island shall be upon the party seeking to change the general course of the boundary as above prescribed so as to include such island on its own side of the boundary.

(3) The selection by the Commissioners of the main channel passing such island shall not be conclusive upon the parties hereto and is subject to review, but the burden of proving the main channel to be other than the one selected shall be upon the party proposing the change.

The Government proposing such change in the prescribed course of the boundary shall, upon the submission of the question of the nationality of any island or islands by the Commissioners as aforesaid, promptly present to the other Government a printed statement, with certified copies of any original documents in its possession referred to therein, showing the grounds and arguments upon which its claim of jurisdiction and ownership with respect to such island rests. Unless an agreement is reached upon the presentation of such statement, the Government to which such statement is presented shall within six months after its receipt present in reply a similar statement showing the grounds and arguments upon which the claims of the other Government are contested. If an agreement is reached between the two Governments, it shall be reduced to writing in the form of a protocol and shall be communicated to the said Commissioners, who shall proceed to lay down and mark the boundary so as to leave such island on the side of the boundary to which it is shown it belongs, in accordance with the determination of its nationality arrived at as aforesaid.

In the event of a failure by the two Governments to come to an agreement within six months after the presentation of the printed statements in reply herein above provided for, then the question of the nationality of the islands in dispute shall be referred forthwith for decision under the rules herein above set forth for the determination of that question, and under the recognized principles of international law not inconsistent therewith, and upon the evidence and arguments submitted as aforesaid, with such additional statement of facts as may be appropriate, and such further printed argument on each side as may be desired, to an arbitrator to be agreed upon by the two Governments, or, in case of a failure to agree, to be appointed by a third Power selected by the two Governments by common accord, or, if no agreement is thus arrived at, each Government shall select a different Power and the choice of the arbitrator shall be made in concert by the Powers thus selected. The decision of such arbitrator shall be final, and the line shall be laid down and marked by the said Commissioners in accordance therewith and as herein provided.

The arbitrator shall be requested to deliver, together with his award, a statement of all the costs and expenses incurred by him in connection with the arbitration, which shall forthwith be repaid by the two Governments in equal moieties.

It is further agreed that so far as practicable the said Commissioners shall establish boundary monuments and ranges and buoys marking the course and location of the said line, and showing on which side of the boundary the several islands lying in said river belong, wherever in their judgment it is desirable that the boundary be so marked.

The charts upon which the boundary is marked as aforesaid shall be in quadruplicate, and shall be certified and signed by said Commissioners, and two duplicate originals thereof shall be filed by them with each Government, and it shall also be the duty of said Commissioners to prepare in duplicate, and file with each Government, a joint report under their hands and seals describing the line so marked by them and the monuments and range marks and buoys marking it.

The line so defined and laid down shall be taken and deemed to be the international boundary from the mouth to the source of the St. Croix River as established by treaty provisions and the proceedings thereunder as aforesaid.

#### ARTICLE III

# THE BOUNDARY FROM THE SOURCE OF THE ST. CROIX RIVER TO THE ST. LAWRENCE RIVER

Whereas the remonumenting of the course of the boundary defined and laid down under the provisions of Articles I and VI of the Treaty of August 9, 1842, between the United States and Great Britain has already been undertaken without a formal treaty agreement, but by the joint and concurrent action of the Governments of the United States and Great Britain, certain monuments between Vermont and Canada having been relocated in 1849, and the portion of said boundary extending between Hall's Stream and the St. Lawrence River in part having been remonumented in recent years and in part is now being remonumented under such action on both sides; and whereas the Commissioners appointed under Article VI of the Treaty of 1842 aforesaid were required to and did mark by monuments the land portion only of said line,

and were not required to and did not mark by monuments the portions of the boundary extending along water courses, with the exception that the nationality of the several islands in the St. John River was indicated by monuments erected thereon and a series of monuments was placed by them along the edge of certain of the water courses to fix the general direction of the boundary, most of which monuments have since disappeared, but the entire boundary, including its course through the waterways as well as on land, was charted and marked on maps by said Commissioners under the provisions of Article VI above referred to, and the nationality of the respective islands in the St. John River was determined by them, as appears from the joint report filed by said Commissioners dated June 28, 1847, and the series of maps signed by said Commissioners and filed with their joint report; and whereas the portion of the line through said waterways has not since been monumented or marked along its course by joint action of the two Governments, and the monuments placed by said Commissioners along the land portion of said boundary require repairing and renewing where such work has not already been done in recent years, and additional or supplementary intermediate monuments at convenient points are required under modern conditions: therefore, in order to carry on and complete the work already undertaken as aforesaid, and to reestablish the location of said boundary and render thoroughly effective the demarcation of the said boundary as existent and established.

It is agreed that each of the High Contracting Parties shall appoint, without delay, an expert geographer or surveyor as a Commissioner, and under the joint direction of such Commissioners the lost or damaged boundary monuments shall be relocated and repaired, and additional monuments and boundary marks shall be established wherever necessary in the judgment of the Commissioners to meet the requirements of modern conditions along the course of the land portion of said boundary, and where the said boundary runs through waterways it shall be marked along its course, so far as practicable, by buoys and monuments in the water and by permanent ranges established on the land, and in such other way and at such points as in the judgment of the Commissioners it is desirable that the boundary be so marked; and it is further agreed that the course of the entire boundary, as described in Article I of the Treaty of 1842 and as laid down as aforesaid under Article VI of that Treaty, shall be marked by said Commissioners upon quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose, and that said charts so marked shall be certified and signed by them and two duplicate originals thereof shall be filed with each Government, and said Commissioners shall also prepare in duplicate and file with each Government a joint report or reports describing in detail the course of the boundary so marked by them, and the character and location of the several monuments and boundary marks and ranges marking it.

The line so defined and laid down shall be taken and deemed to be the international boundary as defined and laid down under Articles I and VI of the said Treaty of 1842.

#### ARTICLE IV

## THE BOUNDARY FROM ITS INTERSECTION WITH THE ST. LAWRENCE RIVER TO THE MOUTH OF PIGEON RIVER

The High Contracting Parties agree that the existing International Waterways Commission, constituted by concurrent action of the United States and the Dominion of Canada and composed of three Commissioners on the part of the United States and three Commissioners on the part of the Dominion of Canada, is hereby authorized and empowered to ascertain and reestablish accurately the location of the international boundary line beginning at the point of its intersection with the St. Lawrence River near the forty-fifth parallel of north latitude, as determined under Articles I and VI of the Treaty of August 9, 1842, between the United States and Great Britain, and thence through the Great Lakes and communicating waterways to the mouth of Pigeon River, at the western shore of Lake Superior, in accordance with the description of such line in Article II of the Treaty of Peace between the United States

and Great Britain, dated September 3, 1783, and of a portion of such line in Article II of the Treaty of August 9, 1842, aforesaid, and as described in the joint report dated June 18, 1822, of the Commissioners appointed under Article VI of the Treaty of December 24, 1814, between the United States and Great Britain, with respect to a portion of said line and as marked on charts prepared by them and filed with said report, and with respect to the remaining portion of said line as marked on the charts adopted as treaty charts of the boundary under the provisions of Article II of the Treaty of 1842, above mentioned, with such deviation from said line, however, as may be required on account of the cession by Great Britain to the United States of the portion of Horse Shoe Reef in the Niagara River necessary for the light-house erected there by the United States in accordance with the terms of the protocol of a conference held at the British Foreign Office December 9, 1850, between the representatives of the two Governments and signed by them agreeing upon such cession; and it is agreed that wherever the boundary is shown on said charts by a curved line along the water the Commissioners are authorized in their discretion to adopt, in place of such curved line, a series of connecting straight lines defined by distances and courses and following generally the course of such curved line, but conforming strictly to the description of the boundary in the existing treaty provisions, and the geographical coordinates of the turning points of such line shall be stated by said Commissioners so as to conform to the system of latitudes and longitudes of the charts mentioned below, and the said Commissioners shall so far as practicable mark the course of the entire boundary line located and defined as aforesaid, by buoys and monuments in the waterways and by permanent range marks established on the adjacent shores or islands, and by such other boundary marks and at such points as in the judgment of the Commissioners it is desirable that the boundary should be so marked; and the line of the boundary defined and located as aforesaid shall be laid down by said Commissioners on accurate modern charts prepared or adopted by them for that purpose, in quadruplicate sets, certified and signed by the Commissioners, two duplicate originals of which shall be filed by them with each Government; and the Commissioners shall also prepare in duplicate and file with each Government a joint report or reports describing in detail the course of said line and the range marks and buoys marking it, and the character and location of each boundary mark. The majority of the Commissioners shall have power to render a decision.

The line so defined and laid down shall be taken and deemed to be the international boundary as defined and established by treaty provisions and the proceedings thereunder as aforesaid from its intersection with the St. Lawrence River to the mouth of Pigeon River.

### ARTICLE V

# THE BOUNDARY FROM THE MOUTH OF PIGEON RIVER TO THE NORTHWESTERN-MOST POINT OF THE LAKE OF THE WOODS

In order to complete and perfect the demarcation of the international boundary line between the United States and the Dominion of Canada from the mouth of Pigeon River, at the western shore of Lake Superior, to the northwesternmost point of the Lake of the Woods, which boundary is defined in Article II of the Treaty of Peace between the United States and Great Britain dated September 3, 1783, and in Article II of the Treaty of August 9, 1842, between the United States and Great Britain, wherein is defined also the location of the said northwesternmost point of the Lake of the Woods, and the greater part of the said boundary is marked on charts covering that section of the boundary adopted as treaty charts of the boundary under the provisions of Article II of the Treaty of 1842 aforesaid, but has never been actually located or monumented along its course by joint action of the two Governments, and no joint survey of its course has been made since the survey under the direction of the Commissioners appointed under Article VII of the Treaty of December 24, 1814, between the United States and Great Britain, under whose direction the charts above mentioned were prepared.

It is agreed that each of the High Contracting Parties shall appoint, without delay, an expert geographer or surveyor as Commissioners, who shall reestablish and fix the actual location of said entire boundary described and charted as aforesaid, and designate the side of the boundary upon which each island adjacent to the boundary belongs, it being mutually understood that the boundary, so far as practicable, shall be a water line and shall not intersect islands lying along its course, and the Commissioners shall so far as practicable mark such boundary along its course by monuments and buoys and range marks, and such other boundary marks as the Commissioners may determine, and at such points as in their judgment it is desirable that the boundary shall be so marked; and it is further agreed that the course of the entire boundary as described and laid down as aforesaid and as monumented by said Commissioners shall be marked by them upon quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose, and that said charts so marked shall be certified and signed by them and two duplicate originals thereof shall be filed with each Government, and said Commissioners shall also prepare in duplicate and file with each Government a joint report or reports describing in detail the course of the boundary so marked by them and the character and location of the several monuments and boundary marks and ranges marking it.

The line so defined and laid down shall be taken and deemed to be the international boundary as defined and established under the aforesaid treaties from the mouth of Pigeon River to the northwesternmost point of the Lake of the Woods.

#### ARTICLE VI

### THE BOUNDARY FROM THE NORTHWESTERNMOST POINT OF THE LAKE OF THE WOODS TO THE SUMMIT OF THE ROCKY MOUNTAINS

In order to complete and render thoroughly effective the demarcation of the international boundary between the United States and the Dominion of Canada from the northwesternmost point of the Lake of the Woods to the summit of the Rocky Mountains, which boundary, according to existing treaties, runs due south from said northwesternmost point to the forty-ninth parallel of north latitude and thence along that parallel to the summit of the Rocky Mountains and has been surveyed and charted and monumented as appears from the series of twenty-four sectional maps covering this portion of the boundary prepared and filed by the Joint Commission appointed for that purpose by joint action of the two Governments in 1872,

It is agreed that each of the High Contracting Parties shall appoint, without delay, an expert geographer or surveyor as a Commissioner, and under the joint direction of such Commissioners lost or damaged monuments along the course of said boundary shall be relocated and repaired and additional monuments and boundary marks shall be established wherever necessary in the judgment of the Commissioners, to meet the requirements of modern conditions and to render more effective the demarcation of the existent boundary established under the treaty provisions and proceedings thereunder as aforesaid; and it is further agreed that in carrying out these provisions the said Commissioners shall observe the agreement stated in the protocol of the final meeting, dated May 29, 1876, of the Joint Commission aforesaid, which is as follows:

"2. In the intervals between the monuments along the parallel of latitude, it is agreed that the line has the curvature of a parallel of 49° north latitude; and that such characteristic shall determine all questions that may hereafter arise with reference to the position of the boundary at any point between neighboring monuments.

"3. It is further agreed that, in the event of any of the said three hundred and eightyeight monuments or marks being obliterated beyond the power of recognition, the lost site or sites shall be recovered by their recorded position relatively to the next neighboring unobliterated mark or marks."

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It is further agreed that the said Commissioners shall mark upon quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose the entire course of said boundary and the location of the boundary monuments and marks established along the course of said boundary, and two duplicate originals thereof shall be filed with each Government, and said Commissioners shall also prepare in duplicate and file with each Government a joint report describing in detail the work done by them in replacing and repairing lost or damaged monuments and the character and location of the several monuments and boundary marks placed by them along said boundary.

The line so laid down and defined shall be taken and deemed to be the international boundary as defined and established by treaty provisions and the proceedings thereunder as aforesaid from the northwesternmost point of the Lake of the Woods to the summit of the Rocky Mountains.

# ARTICLE VII

# THE BOUNDARY FROM THE SUMMIT OF THE ROCKY MOUNTAINS TO THE GULF OF GEORGIA

Whereas, by concurrent action of the Government of the United States and the Government of Great Britain in 1902 and 1903, Commissioners were designated to act jointly for the purpose of renewing lost or damaged monuments and placing additional monuments where such were needed throughout the course of the boundary along the forty-ninth parallel of north latitude, from the summit of the Rocky Mountains westward to the eastern shore of the Gulf of Georgia, as defined in Article I of the Treaty of June 15, 1846, between the United States and Great Britain and as marked by monuments along its course and laid down on a series of charts, seven in number, by a Joint Commission organized in 1858 for that purpose and composed of two Commissioners appointed one by each Government, which charts, duly certified and authenticated in duplicate by said Commissioners, were approved and adopted by the two Governments, as appears from the declaration in writing to that effect signed on February 24, 1870, at Washington by duly authorized Plenipotentiaries of the respective Governments, and it appearing that the remonumenting of this line by the Commissioners first above referred to is now approaching completion;

It is hereby agreed by the High Contracting Parties that when such work is completed the entire course of said boundary, showing the location of the boundary monuments and marks established along the course of the boundary, shall be marked upon quadruplicate sets of accurate modern charts prepared or adopted for that purpose, and the said Commissioners, or their successors, are hereby authorized and required to so mark the line and designate the monuments on such charts, two duplicate originals of which shall be filed with each Government, and the said Commissioners, or their successors, shall also prepare in duplicate and file with each Government a joint report describing in detail the work done by them in replacing and repairing lost or damaged monuments and the character and location of the several monuments and boundary marks placed by them along said boundary.

The line so laid down and defined shall be taken and deemed to be the international boundary as defined and established by treaty provisions and the proceedings thereunder as aforesaid, from the summit of the Rocky Mountains to the eastern shore of the Gulf of Georgia.

### ARTICLE VIII

#### THE BOUNDARY FROM THE FORTY-NINTH PARALLEL TO THE PACIFIC OCEAN

The High Contracting Parties agree that each shall appoint, without delay, an expert geographer or surveyor to serve as Commissioners for the purpose of delineating upon accurate modern charts, prepared or adopted by them for that purpose, the international boundary line between the United States and the Dominion of Canada from the forty-ninth parallel of north latitude along the middle of the channel which separates Vancouver's Island from the mainland

and the middle of the Haro Channel and of Fuca's Straits to the Pacific Ocean, as defined in Article I of the Treaty of June 15, 1846, between the United States and Great Britain, and as determined by the award made on October 21, 1872, by the Emperor of Germany as arbitrator pursuant to the provisions of Articles XXXIV-XLII of the Treaty of May 8, 1871, between the United States and Great Britain, and as traced out and marked on a quadruplicate set of charts prepared for that purpose and agreed upon and signed by the duly authorized representatives of the respective Governments, as appears from the protocol of a conference at Washington on March 10, 1873, between such representatives which was signed by them on that date, and as defined by them in a written definition of said boundary signed by them and referred to in and attached to said protocol, and it is agreed that the said Commissioners shall adopt in place of the curved line passing between Saturna Island and Patos Island as shown on said charts a straight line running approximately north and south through a point midway between the eastern point of Saturna Island and the western point of Patos Island and intersecting the prolongations of the two straight lines of the boundary now joined by a curved line. The entire line thus laid down shall consist of a series of connecting straight lines defined by distances and courses; and the Commissioners are authorized to select and establish such reference marks on shore as they may deem necessary for the proper definition and location on the water of the boundary aforesaid. A quadruplicate set of such charts, showing the lines so laid down and marked by them and the location of the several marks or monuments selected or established by them along its course, shall be signed by them and two duplicate originals thereof shall be filed by them with each Government, and the Commissioners shall also prepare in duplicate and file with each Government a joint report, or reports, describing in detail the course of said line and the boundary marks and their location along its course.

The line so defined and laid down shall be taken and deemed to be the international boundary, as defined and established by treaty provisions and the proceedings thereunder as aforesaid, from the forty-ninth parallel of north latitude along the middle of the channel which separates Vancouver's Island from the mainland and the middle of Haro Channel and of Fuca's Straits to the Pacific Ocean.

### ARTICLE IX

#### GENERAL PROVISIONS

The Commissioners appointed under the provisions of this Treaty shall proceed without delay to perform the duties assigned to them, but each Commissioner shall, before entering upon his duties, make oath in writing that he will impartially and faithfully perform his duties as such Commissioner.

In case a vacancy occurs in any of the Commissions constituted by this Treaty, by reason of the death, resignation, or other disability of a Commissioner, before the work of such Commission is completed, the vacancy so caused shall be filled forthwith by the appointment of another Commissioner by the party on whose side the vacancy occurs, and the Commissioner so appointed shall have the same powers and be subject to the same duties and obligations as the Commissioner originally appointed.

If a dispute or difference should arise about the location or demarcation of any portion of the boundary covered by the provisions of this Treaty and an agreement with respect thereto is not reached by the Commissioners charged herein with locating and marking such portion of the line, they shall make a report in writing jointly to both Governments, or severally each to his own Government, setting out fully the questions in dispute and the differences between them, but such Commissioners shall, nevertheless, proceed to carry on and complete as far as possible the work herein assigned to them with respect to the remaining portions of the line.

In case of such a disagreement between the Commissioners, the two Governments shall endeavor to agree upon an adjustment of the questions in dispute, and if an agreement is reached between the two Governments it shall be reduced to writing in the form of a protocol, and shall be communicated to the said Commissioners, who shall proceed to lay down and mark the boundary in accordance therewith, and as herein provided, but without prejudice to the special provisions contained in Articles I and II regarding arbitration.

It is understood that under the foregoing articles the same persons will be appointed to carry out the delimitation of boundaries in the several sections aforesaid, other than the section covered by Article IV, unless either of the Contracting Powers finds it expedient for some reason which it may think sufficient to appoint some other person to be Commissioner for any one of the above-mentioned sections.

Each Government shall pay the expenses of its own Commissioners and their assistants, and the cost of marking and monumenting the boundary shall be paid in equal moieties by the two Governments.

#### ARTICLE X

This Treaty shall be ratified by the President of the United States, by and with the advice and consent of the Senate thereof, and by His Britannic Majesty; and the ratifications shall be exchanged in Washington as soon as practicable.

In faith whereof the respective Plenipotentiaries have signed this Treaty in duplicate and have hereunto affixed their seals.

Done at Washington the 11th day of April in the year of our Lord one thousand nine hundred and eight.

ELIHU ROOT [SEAL.] JAMES BRYCE [SEAL.]

# TREATY BETWEEN THE UNITED STATES OF AMERICA AND THE UNITED KINGDOM CONCERNING THE BOUNDARY BETWEEN THE UNITED STATES AND THE DOMINION OF CANADA IN PASSAMAQUODDY BAY

# Signed at Washington, May 21, 1910

#### (Ratifications exchanged at Washington, August 20, 1910)

The United States of America and His Majesty the King of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, Emperor of India, being equally desirous of fixing and defining the location of the international boundary line between the United States and the Dominion of Canada in Passamaquoddy Bay and to the middle of Grand Manan Channel, and of removing all causes of dispute in connection therewith, have for that purpose resolved to conclude a treaty, and to that end have appointed as their Plenipotentiaries:

The President of the United States of America, Philander C. Knox, Secretary of State of the United States; and

His Britannic Majesty, the Right Honorable James Bryce, O. M., his Ambassador Extraordinary and Plenipotentiary at Washington;

Who, after having communicated to each other their respective full powers, which were found to be in due and proper form, have agreed to and concluded the following articles:

#### ARTICLE I

Whereas, by Article I of the Treaty of April 11, 1908, between the United States and Great Britain, it was agreed that Commissioners should be appointed for the purpose of more accurately defining and marking the international boundary line between the United States and the Dominion of Canada in the waters of Passamaquoddy Bay from the mouth of the St. Croix River to the Bay of Fundy, the description of the location of certain portions of such line being set forth in the aforesaid Article, and it was agreed with respect to the remaining portion of the line that "each of the High Contracting Parties shall present to the other within six months after the ratification of this Treaty a full printed statement of the evidence, with certified copies of original documents referred to therein which are in its possession, and the arguments upon which it bases its contentions, with a view to arriving at an adjustment of the location of this portion of the line in accordance with the true intent and meaning of the provisions relating thereto of the Treaties of 1783 and 1814 between the United States and Great Britain, and the award of the Commissioners appointed in that behalf under the Treaty of 1814; it being understood that any action by either or both Governments or their representatives authorized in that behalf or by the local governments on either side of the line, whether prior or subsequent to such Treaties and award, tending to aid in the interpretation thereof. shall be taken into consideration in determining their true intent and meaning";

And it was further agreed that if such agreement was reached between the Parties the Commissioners aforesaid should lay down and mark this portion of the boundary in accordance therewith and as provided in the said Article, but it was provided that in the event of a failure to agree within a set period, the location of such portion of the line should be determined by reference to arbitration;

And whereas, the time for reaching an agreement under the provisions of the aforesaid Article expired before such agreement was reached but the High Contracting Parties are nevertheless desirous of arriving at an adjustment of the location of this portion of the line by agreement without resort to arbitration, and have already, pursuant to the provisions above quoted of Article I of the Treaty aforesaid, presented each to the other a full printed statement of the evidence and of the arguments upon which the contentions of each are based, with a view to arriving at an adjustment of the location of the portion of the line referred to in accordance with the true intent and meaning of the provisions relating thereto in the Treaties of 1783 and 1814 between the United States and Great Britain and the award of the Commissioners appointed in that behalf under the Treaty of 1814;

Now, therefore, upon the evidence and arguments so presented, and after taking into consideration all actions of the respective Governments and of their representatives authorized in that behalf and of the local governments on either side of the line, whether prior or subsequent to such Treaties and award, tending to aid in the interpretation thereof, the High Contracting Parties hereby agree that the location of the international boundary line between the United States and the Dominion of Canada from a point in Passamaquoddy Bay accurately defined in the Treaty between the United States and Great Britain of April 11, 1908, as lying between Treat Island and Friar Head, and extending thence through Passamaquoddy Bay and to the middle of Grand Manan Channel, shall run in a series of seven connected straight lines for the distances and in the directions as follows:

Beginning at the aforesaid point lying between Treat Island and Friar Head, thence

(1) South 8° 29' 57'' West true, for a distance of 1152.6 meters; thence

(2) South 8° 29' 34'' East, 759.7 meters; thence

(3) South 23° 56' 25'' East, 1156.4 meters; thence

(4) South 0° 23' 14'' West, 1040.0 meters; thence

(5) South  $28^{\circ} 04' 26''$  East, 1607.2 meters; thence

(6) South 81° 48' 45'' East, 2616.8 meters to a point on the line which runs approximately North 40° East true, and which joins Sail Rock, off West Quoddy Head Light, and the southernmost rock lying off the southeastern point of the southern extremity of Campobello Island; thence

(7) South 47° East 5100 meters to the middle of Grand Manan Channel.

The description of the last two portions of the line thus defined, viz, those numbered (6) and (7), is intended to replace the description of the lowest portion of the line, viz, that numbered (2), as defined in Article I of the Treaty of April 11, 1908.

#### ARTICLE II

The location of the boundary line as defined in the foregoing Article shall be laid down and marked by the Commissioners under Article I of the aforesaid Treaty of April 11, 1908, in accordance with the provisions of such Article, and the line so defined and laid down shall be taken and deemed to be the international boundary extending between the points therein mentioned in Grand Manan Channel and Passamaquoddy Bay.

#### ARTICLE III

It is further agreed by the High Contracting Parties that on either side of the hereinabove described line southward from the point of its intersection with a line drawn true north from Lubec Channel Light, as at present established, either Party shall have the right, upon two months' notice to the other, to improve and extend the channel to such depth as may by it be deemed desirable or necessary, and to a width not exceeding one hundred and fifteen (115) meters on each side of the boundary line, and from such point of intersection northerly through Lubec Narrows to the turning point in the boundary lying between Treat Island and Friar Head, either Party shall have the right, upon two months' notice to the other, to improve and deepen the present channel to a width not exceeding sixty-five (65) meters on each side of the boundary line and to such depth as may by it be deemed desirable or necessary; it being

understood, however, that each Party shall also have the right to further widen and deepen the channel anywhere on its own side of the boundary.

## ARTICLE IV

This Treaty shall be ratified by the President of the United States, by and with the advice and consent of the Senate thereof, and by His Britannic Majesty; and the ratifications shall be exchanged in Washington as soon as practicable.

In faith whereof, the respective Plenipotentiaries have signed this Treaty in duplicate and have hereunto affixed their seals.

Done at Washington the 21st day of May, in the year of our Lord one thousand nine hundred and ten.

P. C. KNOX [SEAL] JAMES BRYCE [SEAL]

# TREATY BETWEEN THE UNITED STATES OF AMERICA AND HIS BRITANNIC MAJESTY, IN RESPECT OF THE DOMINION OF CAN-ADA, TO DEFINE MORE ACCURATELY AT CERTAIN POINTS AND TO COMPLETE THE INTERNATIONAL BOUNDARY BETWEEN THE UNITED STATES AND CANADA AND TO MAINTAIN THE DEMAR-CATION OF THAT BOUNDARY

### Signed at Washington, February 24, 1925

#### (Ratifications exchanged at Washington, July 17, 1925)

The United States of America and His Majesty the King of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, Emperor of India, in respect of the Dominion of Canada, desiring to define more accurately at certain points and to complete the international boundary between the United States and Canada and to maintain the demarcation of that boundary, have resolved to conclude a treaty for these purposes, and to that end have appointed as their respective Plenipotentiaries:

The President of the United States of America: Charles Evans Hughes, Secretary of State of the United States; and

His Britannic Majesty, in respect of the Dominion of Canada: The Honorable Ernest Lapointe, K. C., a member of His Majesty's Privy Council for Canada and Minister of Justice in the Government of that Dominion;

Who, after having communicated to each other their respective full powers, which were found to be in due and proper form, have agreed to and concluded the following articles:

### ARTICLE I

Whereas Article V of the Treaty concerning the boundary between the United States and the Dominion of Canada concluded on April 11, 1908, between the United States and Great Britain, provided for the survey and demarcation of the international boundary line between the United States and the Dominion of Canada from the mouth of Pigeon River, at the western shore of Lake Superior, to the northwesternmost point of Lake of the Woods, as defined by the Treaties concluded between the United States and Great Britain on September 3, 1783, and August 9, 1842;

And whereas Article VI of the said Treaty concluded on April 11, 1908, provided for the relocation and repair of lost or damaged monuments and for the establishment of additional monuments and boundary marks along the course of the international boundary between the United States and the Dominion of Canada from the northwesternmost point of Lake of the Woods to the summit of the Rocky Mountains, as established under existing treaties and surveyed, charted, and monumented by the Joint Commission appointed for that purpose by joint action of the Contracting Parties in 1872;

And whereas it has been found by surveys executed under the direction of the Commissioners appointed pursuant to the said Treaty of April 11, 1908, that the boundary line between the United States and the Dominion of Canada from the mouth of Pigeon River, at the western shore of Lake Superior, to the northwesternmost point of Lake of the Woods as defined by the Treaties concluded on September 3, 1783, and August 9, 1842, is intersected by the boundary from the northwesternmost point of Lake of the Woods to the summit of the Rocky Mountains as established under existing treaties and surveyed, charted, and monumented by the Joint Commission appointed for that purpose in 1872, at five points in Lake of the Woods adjacent to and directly south of the said northwesternmost point, and that there are two small areas
of United States waters in Lake of the Woods, comprising a total area of two and one-half acres, entirely surrounded by Canadian waters;

And whereas no permanent monuments were ever erected on these boundary lines north of the most southerly of these points of intersection;

The Contracting Parties, in order to provide for a more practical definition of the boundary between the United States and the Dominion of Canada in Lake of the Woods, hereby agree that this most southerly point of intersection, being in latitude 49° 23′ 04″.49 north, and longitude 95° 09′ 11″.61 west,<sup>a</sup> shall be the terminus of the boundary line heretofore referred to as the international boundary line between the United States and the Dominion of Canada from the mouth of Pigeon River, at the western shore of Lake Superior, to the northwesternmost point of Lake of the Woods and the initial point of the boundary line heretofore referred to as the international boundary between the United States and the Dominion of Canada from the northwesternmost point of Lake of the Woods to the summit of the Rocky Mountains, in lieu of the said northwesternmost point.

The aforesaid most southerly point shall be located and monumented by the Commissioners appointed under the said Treaty of April 11, 1908, and shall be marked by them on the chart or charts prepared in accordance with the provisions of Articles V and VI of the said Treaty, and a detailed account of the work done by the Commissioners in locating said point, together with a description of the character and location of the several monuments erected, shall be included in the report or reports prepared pursuant to the said Articles.

The point so defined and monumented shall be taken and deemed to be the terminus of the boundary line heretofore referred to as the international boundary line between the United States and the Dominion of Canada, from the mouth of Pigeon River, at the western shore of Lake Superior, to the northwesternmost point of Lake of the Woods and the initial point of the boundary line heretofore referred to as the international boundary between the United States and the Dominion of Canada from the northwesternmost point of Lake of the Woods to the summit of the Rocky Mountains.

#### ARTICLE II

Whereas Article VI of the Treaty concerning the boundary between the United States and the Dominion of Canada concluded on April 11, 1908, between the United States and Great Britain, provided for the relocation and repair of lost or damaged monuments and for the establishment of additional monuments and boundary marks along the courses of the international boundary between the United States and the Dominion of Canada from the northwesternmost point of Lake of the Woods south to the 49th parallel of north latitude and thence westward along said parallel of latitude to the summit of the Rocky Mountains, as established under existing treaties and surveyed, charted, and monumented by the Joint Commission appointed for that purpose by joint action of the Contracting Parties in 1872;

And whereas Article VI of the said Treaty concluded on April 11, 1908, further provides that in carrying out the provisions of that Article the agreement stated in the protocol of the final meeting of the said Joint Commission, dated May 29, 1876, should be observed, by which protocol it was agreed that in the intervals between the monuments along the 49th parallel of north latitude the boundary line has the curvature of a parallel of 49° north latitude;

And whereas the Commissioners appointed and acting under the provisions of Article VI of the said Treaty of 1908 have marked the boundary line wherever necessary in the intervals between the original monuments established by the said Joint Commission, appointed in 1872, in accordance with the agreement stated in the protocol of the final meeting, dated May 29,

<sup>&</sup>lt;sup>a</sup> This geographic position was obtained from an adjustment made in 1919 of triangulation executed by the International Boundary Commission, and is derived from the positions of stations "States" and "Canada" as published in Appendix IV of the U. S. Coast and Geodetic Survey Report for 1911. The adjustment of first-order triangulation and traverse, done by the Geodetic Survey of Canada and the U. S. Coast and Geodetic Survey in 1923–1925, will slightly change the latitude and longitude given in the treaty.

1876, of the Joint Commission aforesaid, and as set forth in Article VI of the Treaty of 1908, by placing intermediate monuments on lines joining the original monuments, which have in each case the curvature of a parallel of  $49^{\circ}$  north latitude;

And whereas the average distance between adjacent monuments as thus established or reestablished along the 49th parallel of north latitude from Lake of the Woods to the summit of the Rocky Mountains by the Commissioners acting under Article VI of the Treaty of 1908 is one and one-third miles and therefore the deviation of the curve of the 49th parallel from a straight or right line joining adjacent monuments is, for this average distance between monuments, only one-third of a foot, and in no case does the actual deviation exceed one and eighttenths feet;

And whereas it is impracticable to determine the course of a line having the curvature of a parallel of 49° north latitude on the ground between the adjacent monuments which have been established or reestablished by the Commissioners and the demarcation of the boundary would be more thoroughly effective if the line between adjacent monuments be defined as a straight or right line;

And whereas it is desirable that the boundary at any point between adjacent monuments may be conveniently ascertainable on the ground, the Contracting Parties, in order to complete and render thoroughly effective the demarcation of the boundary between the United States and the Dominion of Canada from the northwesternmost point of Lake of the Woods to the summit of the Rocky Mountains, hereby agree that the line heretofore referred to as the international boundary between the United States and the Dominion of Canada from the northwesternmost point of Lake of the Woods to the summit of the Rocky Mountains shall be defined as consisting of a series of right or straight lines joining adjacent monuments as now established or reestablished and as now laid down on charts by the Commissioners acting under Article VI of the Treaty of 1908, in lieu of the definition set forth in the agreement of the aforesaid Joint Commissioners, dated May 29, 1876, and quoted in Article VI of the said Treaty of 1908, that in the intervals between the monuments the line has the curvature of the parallel of 49° north latitude.

#### ARTICLE III

Whereas the Treaty concluded on May 21, 1910, between the United States and Great Britain, defined the international boundary line between the United States and the Dominion of Canada, from a point in Passamaquoddy Bay lying between Treat Island and Friar Head to the middle of Grand Manan Channel and provided that the location of the line so defined should be laid down and marked by the Commissioners appointed under the Treaty of April 11, 1908;

And whereas it has been found by the surveys executed pursuant to the said Treaty of May 21, 1910, that the terminus of the boundary line defined by said Treaty at the middle of Grand Manan Channel is less than three nautical miles distant both from the shore line of Grand Manan Island in the Dominion of Canada and from the shore line of the State of Maine in the United States, and that there is a small zone of waters of controvertible jurisdiction in Grand Manan Channel between said terminus and the High Seas;

The Contracting Parties, in order completely to define the boundary line between the United States and the Dominion of Canada in the Grand Manan Channel, hereby agree that an additional course shall be extended from the terminus of the boundary line defined by the said Treaty of May 21, 1910, south 34° 42' west, for a distance of two thousand three hundred eightythree (2,383) meters, through the middle of Grand Manan Channel, to the High Seas.

The course so defined shall be located and marked by the Commissioners appointed under the Treaty of April 11, 1908, and shall be laid down by them on the chart or charts adopted in accordance with the provisions of Article I of the said Treaty, and a detailed account of the work done by the Commissioners in locating and marking said line, together with a description of the several monuments erected, shall be included in the report or reports prepared pursuant to Article I of the Treaty of April 11, 1908.

#### TREATY OF 1925

The course so defined and laid down shall be taken and deemed to be the boundary line between the United States and the Dominion of Canada in Grand Manan Channel from the terminus of the boundary line as defined by the Treaty of May 21, 1910, to the High Seas.

#### ARTICLE IV

Whereas, pursuant to existing treaties between the United States and Great Britain, a survey and effective demarcation of the boundary line between the United States and the Dominion of Canada through the Great Lakes and the St. Lawrence River and through the Straits of Georgia, Haro, and Juan de Fuca from the 49th Parallel to the Pacific Ocean and between Alaska and the Dominion of Canada from the Arctic Ocean to Mount St. Elias have been made and the signed joint maps and reports in respect thereto have been filed with the two Governments;

And whereas a survey and effective demarcation of the boundary line between the United States and the Dominion of Canada from the Gulf of Georgia to Lake Superior and from the St. Lawrence River to the Atlantic Ocean and between Alaska and the Dominion of Canada from Mount St. Elias to Cape Muzon are nearing completion;

And whereas boundary monuments deteriorate and at times are destroyed or damaged; and boundary vistas become closed by the growth of timber;

And whereas changing conditions require from time to time that the boundary be marked more precisely and plainly by the establishment of additional monuments or the relocation of existing monuments;

The Contracting Parties, in order to provide for the maintenance of an effective boundary line between the United States and the Dominion of Canada and between Alaska and the Dominion of Canada, as established or to be established, and for the determination of the location of any point thereof, which may become necessary in the settlement of any question that may arise between the two Governments hereby agree that the Commissioners appointed under the provisions of the Treaty of April 11, 1908, are hereby jointly empowered and directed: to inspect the various sections of the boundary line between the United States and the Dominion of Canada and between Alaska and the Dominion of Canada at such times as they shall deem necessary; to repair all damaged monuments and buoys; to relocate and rebuild monuments which have been destroyed; to keep the boundary vistas open; to move boundary monuments to new sites and establish such additional monuments and buoys as they shall deem desirable; to maintain at all times an effective boundary line between the United States and the Dominion of Canada and between Alaska and the Dominion of Canada, as defined by the present Treaty and Treaties heretofore concluded, or hereafter to be concluded; and to determine the location of any point of the boundary line which may become necessary in the settlement of any question that may arise between the two Governments.

The said Commissioners shall submit to their respective Governments from time to time, at least once in every calendar year, a joint report containing a statement of the inspections made, the monuments and buoys repaired, relocated, rebuilt, moved, and established, and the mileage and location of vistas opened, and shall submit with their reports, plats and tables certified and signed by the Commissioners, giving the locations and geodetic positions of all monuments moved and all additional monuments established within the year, and such other information as may be necessary to keep the boundary maps and records accurately revised.

After the completion of the survey and demarcation of the boundary line between the United States and the Dominion of Canada from the Gulf of Georgia to Lake Superior and from the St. Lawrence River to the Atlantic Ocean, as provided for by the Treaty of April 11, 1908, the Commissioners appointed under the provisions of that Treaty shall continue to carry out the provisions of this Article, and, upon the death, resignation, or other disability of either of them, the Party on whose side the vacancy occurs shall appoint an Expert Geographer or Surveyor as Commissioner, who shall have the same powers and duties in respect to carrying

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out the provisions of this Article, as are conferred by this Article upon the Commissioner appointed under the provisions of the said Treaty of 1908.

The Contracting Parties further agree that each Government shall pay the salaries and expenses of its own Commissioner and his assistants, and that the expenses jointly incurred by the Commissioners in maintaining the demarcation of the boundary line in accordance with the provisions of this Article shall be borne equally by the two Governments.

#### ARTICLE V

This Treaty shall be ratified by the Contracting Parties and the ratifications shall be exchanged in Washington or Ottawa as soon as practicable. The Treaty shall take effect on the date of the exchange of ratifications.

Upon the expiration of six years from the date of the exchange of ratifications of the present Treaty, or any time thereafter, Article IV may be terminated upon twelve months' written notice given by either Contracting Party to the other, and following such termination the Commissioners therein mentioned and their successors shall cease to perform the functions thereby prescribed.

In faith whereof, the respective Plenipotentiaries have signed this Treaty in duplicate and have hereunto affixed their seals.

Done at Washington the 24th day of February, A. D. 1925.

[SEAL] [SEAL] CHARLES EVANS HUGHES. ERNEST LAPOINTE.

# APPOINTMENTS OF THE COMMISSIONERS UNDER THE TREATY OF 1908

#### MR. O. H. TITTMANN FOR THE UNITED STATES

#### THEODORE ROOSEVELT, PRESIDENT OF THE UNITED STATES OF AMERICA

## To all to whom these Presents shall come, Greeting:

Know ye, that reposing special trust and confidence in the integrity and ability of Otto H. Tittmann, of Missouri, Superintendent of the United States Coast and Geodetic Survey, I do appoint him the expert Commissioner on the part of the United States for the purpose of more accurately defining and marking the international boundary line between the United States and the Dominion of Canada, under the provisions of Articles I, II, III, V, VI, VII, and VIII of the treaty between the United States and Great Britain, signed at Washington on April 11, 1908, and do authorize and empower him to execute and fulfill the duties of this commission with all the powers, privileges, and emoluments thereunto of right appertaining, during the pleasure of the President of the United States.

In testimony whereof, I have caused the Seal of the United States to be hereunto affixed. Given under my hand at the City of Washington this fifth day of June, in the year of our Lord one thousand nine hundred and eight, and of the Independence of the United States of America the one hundred and thirty-second.

[SEAL]

THEODORE ROOSEVELT.

By the President: ELIHU ROOT, Secretary of State.

#### DR. W. F. KING FOR HIS BRITANNIC MAJESTY

#### P. C. 2181–M

CERTIFIED COPY OF A REPORT OF THE COMMITTEE OF THE PRIVY COUNCIL, APPROVED BY HIS EXCELLENCY THE GOVERNOR GENERAL ON THE 27TH JUNE, 1908

The Committee of the Privy Council have had under consideration a despatch, dated 10th June, 1908, from His Majesty's Ambassador to the United States, containing the information that the ratifications of the Treaty for the Delimitation of the International Boundary between the United States and Canada were exchanged on the 4th June, 1908.

The Minister of the Interior, to whom the despatch was referred, observes that the Treaty, for the purpose of the more complete definition and demarcation which it contemplates, divides the boundary line from the Atlantic Ocean at the entrance to Passamaquoddy Bay, to the Pacific Ocean at the Strait of Fuca, into eight sections, and provides that for each section, with the exception of the fourth section, which includes the line through the St. Lawrence River and the Great Lakes, and which is to be dealt with by the existing International Waterways Commission, two expert geographers or surveyors shall be appointed, one by each Government, as Commissioners to accurately define and mark the line, with the understanding stated in Article 9, that the same persons shall be appointed Commissioners under the several sections, excepting the fourth section, unless either Government find it expedient for some reason which it may think sufficient, to appoint some other person to be Commissioner for any of the sections. The Minister, in accordance with the provisions above mentioned, recommends that Mr. William Frederick King, Dominion Topographical Surveyor, and Chief Astronomer of the Department of the Interior, be nominated for the position of His Majesty's Commissioner for all the sections of the line except the fourth.

The Committee concurring advise that your Excellency may be pleased to inform his Majesty's Secretary of State for the Colonies of the desire of your Excellency's Government in this regard.

All which is respectfully submitted for approval.

RODOLPHE BOUDREAU, Clerk of the Privy Council.

The Honourable

THE MINISTER OF THE INTERIOR.

#### MR. E. C. BARNARD FOR THE UNITED STATES

WOODROW WILSON, PRESIDENT OF THE UNITED STATES OF AMERICA

#### To all to whom these Presents shall come, Greeting:

Know Ye, that reposing special trust and confidence in the integrity and ability of Edward C. Barnard, of New York, I do appoint him the expert Commissioner on the part of the United States for the purpose of more accurately defining and marking the international boundary line between the United States and the Dominion of Canada, under the provisions of Articles I, II, III, V, VI, VII, and VIII of the treaty between the United States and Great Britain, signed at Washington on April 11, 1908, and do authorize and empower him to execute and fulfill the duties of this commission with all the powers, privileges and emoluments thereunto of right appertaining, during the pleasure of the President of the United States.

In testimony whereof, I have caused the Seal of the United States to be hereunto affixed. Given under my hand at the City of Washington this thirtieth day of April, in the year of our Lord one thousand nine hundred and fifteen, and of the Independence of the United States of America the one hundred and thirty-ninth.

[SEAL]

WOODROW WILSON.

By the President,

W. J. BRYAN, Secretary of State.

#### MR. J. J. MCARTHUR FOR HIS BRITANNIC MAJESTY

#### [SEAL]

GEORGE R. I.

GEORGE by the Grace of God, of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas King, Defender of the Faith, Emperor of India, Etc., Etc.

#### To All and Singular to whom these Presents shall come, Greeting:

Whereas by a Treaty concluded at Washington on the 11th day of April, 1908, between our Royal Predecessor His Majesty King Edward VII and our Good Friends the United States of America, respecting the Demarcation of the International Boundary between the United States and the Dominion of Canada, it was in effect provided that Commissioners should be appointed on Our part and on that of Our said Good Friends, and that the Commissioners so appointed should define and mark the Boundary Line, with the exception of that portion of it extending from the 45th Parallel of north latitude through the St. Lawrence River, the Great Lakes and connecting waterways to the mouth of the Pigeon River; Now Know Ye that We, reposing especial trust and confidence in the approved learning, wisdom and fidelity of Our Trusty and Well-Beloved James Joseph McArthur, Esquire, Dominion Land Surveyor, have named and appointed, as We do by these Presents name and appoint him to be Our Commissioner for the purposes aforesaid and pursuant to the said Treaty, to meet the other Commissioner appointed or to be appointed in like manner by Our Good Friends the United States of America, to do and determine all such matters as are provided to be done by him under the said Treaty, in the manner therein provided.

In witness whereof We have signed these presents with Our Royal Hand.

Given at Our Court of Saint James the Twenty-sixth day of February One thousand Nine Hundred and Seventeen in the Seventh year of Our Reign.

By His Majesty's Command:

ARTHUR JAMES BALFOUR.

# MR. E. LESTER JONES FOR THE UNITED STATES

WOODROW WILSON, PRESIDENT OF THE UNITED STATES OF AMERICA

#### To all to whom these Presents shall come, Greeting:

Know Ye, that reposing special trust and confidence in the integrity and ability of E. Lester Jones, of Virginia, I do appoint him the expert Commissioner on the part of the United States for the purpose of more accurately defining and marking the international boundary line between the United States and the Dominion of Canada, under the provisions of Articles I, II, III, V, VI, VII, and VIII of the treaty between the United States and Great Britain, signed at Washington on April 11, 1908, and do authorize and empower him to execute and fulfill the duties of this commission with all the powers, privileges and emoluments thereunto of right appertaining, during the pleasure of the President of the United States.

In testimony whereof, I have caused the Seal of the United States to be hereunto affixed. Given under my hand, in the District of Columbia, this twenty-eighth day of February, in the year of our Lord one thousand nine hundred and twenty-one, and of the Independence of the United States of America the one hundred and forty-fifth.

[SEAL]

[SIGNET]

WOODROW WILSON.

By the President: BAINBRIDGE COLBY, Secretary of State.

#### MR. J. D. CRAIG FOR HIS BRITANNIC MAJESTY

(Sgd.) GEORGE R. I.

GEORGE, by the Grace of God, of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, King, Defender of the Faith, Emperor of India, Etc., Etc., Etc.

To all and singular to whom these Presents shall come, Greeting:

Whereas by Article VI of a Convention concluded at Washington on the 24th day of January 1903 between Our Royal Predecessor His Majesty King Edward VII and Our Good Friends the United States of America, respecting the adjustment of the Boundary between the Dominion of Canada and the Territory of Alaska, it was in effect provided that Commissioners should be appointed on Our part and on that of Our said Good Friends, for the purpose of laying down the boundary line in conformity with the decision of the Tribunal constituted under the terms of Article I of the said Convention:

And whereas by a Treaty concluded at Washington on the 11th day of April 1908 between Our said Royal Predecessor and Our said Good Friends, respecting the Demarcation of the International Boundary between the United States and the Dominion of Canada, it was in effect provided that Commissioners should be appointed on Our part and on that of Our said Good Friends, to define and mark the boundary line, with the exception of that portion of it extending from the 45th parallel of north latitude through the Saint Lawrence River, the Great Lakes and connecting waterways to the mouth of the Pigeon River;

Now know ye that We, reposing especial Trust and Confidence in the approved Learning, Wisdom and Fidelity of Our Trusty and Well-beloved John Davidson Craig, Esquire, Bachelor of Arts, Bachelor of Science, Member of the Engineering Institute of Canada, Dominion Land Surveyor and International Boundary Commission Engineer, have named and appointed, as We do by these Presents name and appoint him to be Our Commissioner for the purposes aforesaid and pursuant to the said Convention and Treaty, to meet the other Commissioners appointed or to be appointed in like manner by Our Good Friends the United States of America, and to do and determine all such matters as are provided to be done by him under the said Convention and Treaty, in the manner therein provided.

In witness whereof We have signed these Presents with Our Royal Hand.

Given at our Court of Saint James the Seventh day of March in the Year of Our Lord One thousand Nine hundred and Twenty-Five and in the Fifteenth Year of our Reign.

#### MR. JAMES H. VAN WAGENEN FOR THE UNITED STATES

HERBERT HOOVER, PRESIDENT OF THE UNITED STATES OF AMERICA

#### To all to whom these Presents shall come, Greeting:

Know Ye, That reposing special trust and confidence in the integrity and ability of James H. Van Wagenen, of Iowa, I do appoint him the expert Commissioner on the part of the United States for the purpose of more accurately defining and marking the international boundary line between the United States and the Dominion of Canada, under the provisions of Articles I, II, III, V, VI, VII and VIII of the treaty between the United States and Great Britain, signed at Washington on April 11, 1908, and Article IV of the treaty between the United States and empower him to execute and fulfil the duties of this commission with all the powers, privileges, and emoluments thereunto of right appertaining, during the pleasure of the President of the United States.

In testimony whereof, I have caused the Seal of the United States to be hereunto affixed. Done at the City of Washington this third day of May, in the year of our Lord one thousand nine hundred and twenty nine, and of the Independence of the United States of America the one hundred and fifty-third.

[SEAL]

By the President:

HENRY L. STIMSON, Secretary of State.

## MR. NOEL J. OGILVIE FOR HIS BRITANNIC MAJESTY

#### [SIGNET]

(Sgd.) GEORGE R. I.

HERBERT HOOVER.

GEORGE, by the Grace of God, of Great Britain, Ireland and the British Dominions beyond the Seas King, Defender of the Faith, Emperor of India, Etc., Etc., Etc.

#### To all and singular to whom these Presents shall come, Greeting!

Whereas by Article VI of a Convention concluded at Washington on the 24th day of January 1903 between Our Royal Predecessor His Majesty King Edward VII and Our Good Friends the United States of America, respecting the adjustment of the Boundary between the Dominion of Canada and the Territory of Alaska, it was in effect provided that Commissioners should be

appointed on Our part and on that of Our said Good Friends, for the purpose of laying down the boundary line in conformity with the decision of the Tribunal constituted under the terms of Article I of the said Convention;

And whereas by a Treaty concluded at Washington on the 11th day of April 1908 between Our said Royal Predecessor and Our said Good Friends, respecting the Demarcation of the International Boundary between the United States and the Dominion of Canada, it was in effect provided that Commissioners should be appointed on Our part and on that of Our said Good Friends, to define and mark the boundary line, with the exception of that portion of it extending from the 45th parallel of north latitude through the Saint Lawrence River, the Great Lakes and connecting waterways to the mouth of the Pigeon River;

Now know ye that We, reposing especial Trust and Confidence in the approved Learning, Wisdom and Fidelity of Our Trusty and Well-beloved Noel John Ogilvie, Esquire, Dominion Land Surveyor, Member of the Engineering Institute of Canada, Member of the American Society of Civil Engineers, the Director of the Geodetic Survey of Canada, have named and appointed, as We do by these Presents name and appoint him to be Our Commissioner for the purposes aforesaid and pursuant to the said Convention and Treaty, to meet the other Commissioners appointed or to be appointed in like manner by Our Good Friends the United States of America, and to do and determine all such matters as are provided to be done by him under the said Convention and Treaty, in the manner therein provided, this appointment to be effective as and from the 14th day of May of this year.

In witness whereof We have signed these Presents with Our Royal Hand.

Given at Our Court of Saint James the tenth day of June in the Year of Our Lord One Thousand Nine Hundred and Thirty-one and in the Twenty-second Year of Our Reign.

# RESERVATION OF LANDS ALONG THE INTERNATIONAL BOUNDARY

# PROCLAMATIONS BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

#### (No. 810)

Whereas, the customs and immigration laws of the United States can be better enforced and the public welfare thereby better advanced when the Federal Government has complete control of the use and occupation of lands abutting on international boundary lines;

Now, therefore, I, Theodore Roosevelt, President of the United States, do hereby proclaim and make known that all unpatented public lands of the United States, lying within sixty feet of the boundary line between the United States and the Dominion of Canada, are hereby declared to be, and are set apart as a public reservation, and shall hereafter be subject only to such rights as have been heretofore legally acquired under settlements, entries, reservations, or other forms of appropriation, and are now existing, but shall not be subject at any time to any other claim, use, or occupation, except for public highways; and any patent issued for any legal subdivision affected by this reservation under any claim hereafter initiated, shall contain a recital that it is issued subject to this proclamation.

In witness whereof, I have hereunto set my hand and caused the Seal of the United States to be affixed.

Done at the City of Washington this 15th day of June, in the year of our Lord one thousand nine hundred and eight, and of the Independence of the United States the one hundred and thirty-second.

THEODORE ROOSEVELT.

[SEAL.] By the President: ELIHU ROOT, Secretary of State.

#### (No. 1196)

Whereas, the customs and immigration laws of the United States can be better enforced and the public welfare thereby advanced by the retention in the Federal Government of complete control of the use and occupation of lands abutting on International Boundary Lines;

Now, therefore, I, William Howard Taft, President of the United States, do hereby declare, proclaim, and make known that there are hereby reserved from entry, settlement, or other form of appropriation and disposition under the public-land laws, and set apart as a public reservation, all public lands lying within sixty feet of the Boundary Line between the United States and the Dominion of Canada.

Excepting from the force and effect of this proclamation all lands which were prior to June fifteenth, nineteen hundred and eight, embraced in any legal entry or covered by any lawful filing, selection, or right of way duly of record in the proper United States land office or upon which any valid settlement had been made pursuant to law, the statutory period within which to make or complete entry or filing of record had not expired, and which has been or may be perfected as required by law. Any claims lawfully initiated between June fifteenth, nineteen hundred and eight, and the date hereof, lawfully maintained and perfected, may be patented subject to the reservation prescribed in proclamation of the President dated June fifteenth, nineteen hundred and eight.

In witness whereof, I have hereunto set my hand and caused the seal of the United States to be affixed.

Done at the city of Washington, this third day of May, in the year of our Lord one thousand nine hundred and twelve, and of the Independence of the United States the one hundred and thirty-sixth.

[SEAL]

By the President:

HUNTINGTON WILSON Acting Secretary of State. WM. H. TAFT.

# Orders in Council by the Executive Council of the Province of New Brunswick

The Honourable the Minister of Lands and Mines reports for the information of the committee of the Executive Council:---

That the International Boundary Commission, Department of Interior, Ottawa, desires that a strip, sixty feet (60) in width, through the Crown Lands of the Province of New Brunswick, be reserved on the eastern side of the International Boundary between the Province of New Brunswick and State of Maine.

The Honourable the Minister of Lands and Mines now recommends that all ungranted crown lands bordering on the eastern side of the International Boundary Line between the Province of New Brunswick and the State of Maine to the extent of sixty (60) feet, from said line be reserved for government purposes.

And His Honour the Lieutenant-Governor and Committee of Council concurring in said report and recommendation

IT IS ACCORDINGLY SO ORDERED.

Certified passed. August 7th, 1923. M. B. DIXON, Clerk Executive Council.

It will be noted from the above proclamations and orders in council that no reservation exists along the international boundary in the Province of New Brunswick where Crown lands were not available on August 7, 1923, and, likewise, no reservation exists along the line in any State or portion thereof in the United States where public lands were not available for that purpose on June 15, 1908.

# AGREEMENT OF THE COMMISSIONERS AS TO THE MANNER IN WHICH THE PROVISIONS OF ARTICLES I AND II OF THE TREATY OF 1908, ARTICLES I AND II OF THE TREATY OF 1910, AND ARTICLE III OF THE TREATY OF 1925 SHOULD BE CARRIED OUT

At a meeting of the commissioners held in Ottawa on December 28, 1908, the appointments of the commissioners under the treaty of April 11, 1908, were presented and found to be in due and proper form. At this and subsequent conferences of the commissioners it was agreed that the provisions of Articles I and II of the treaty of 1908, Articles I and II of the treaty of 1910, and Article III of the treaty of 1925 should be carried out in the following manner:

I. That, in the determination of the course of the boundary from the source to the mouth of the St. Croix River, as set forth in Article II of the treaty of 1908, the "center of the main channel or thalweg" as shown by soundings

indicated on maps and charts prepared by the United States Coast and Geodetic Survey, should in general be accepted in laying down the boundary. That at certain places where the number of soundings taken by the Coast and Geodetic Survey was insufficient to determine the exact position of the thalweg, or where the channels on both sides of an island were found to be of nearly the same depth and the thalweg of the stream difficult to determine, additional investigations of the channels should be made. That in Monument Brook, where no soundings had been made by the Coast and Geodetic Survey, the position of the main channel should be carefully determined and the boundary line should be run out in the field. That the line of boundary as traced in the above manner should be verified in the field before being finally laid down on the joint maps prepared by the commissioners.



Determining course of main channel of St. Croix River at Calais, Me., by sounding with stadia rod



One of the bronze post monuments set along the St. Croix River to reference the boundary

II. That the boundary from the source to the mouth of the St. Croix River, when established, should consist throughout of a series of connecting straight courses, similar in character to the "series of straight lines defined by distances and courses," which are required by the provisions of Article I of the treaty of 1908 in laying down the boundary through Passamaquoddy Bay, and that the line should be referenced by permanent monuments on the shores of the waterways.

III. That the boundary reference monuments along all the waterways from the source to the mouth of the St. Croix River should consist of bronze posts 8 inches high or bronze disks 2 inches in diameter set in solid rock, or in concrete bases 12 inches square and 3

feet or more in depth; and that the boundary range marks along the shores of Passamaquoddy Bay should be truncated pyramids of concrete, rising 7 feet above the surface of the ground and extending 3 feet below the surface of the ground or to bedrock.

IV. That each reference monument should bear a suitable number, cut in the metal, to identify it on the ground and in the final report and on the boundary maps; and that each range mark on Passamaquoddy Bay should bear a bronze

plate inscribed with the number of the range mark and the number of the boundary course or turning point to which it refers.

V. That, for the purpose of accurately defining, locating, and describing the boundary as laid down by the commissioners, all boundary reference monuments and range marks should be located geodetically on the North American datum by triangulation, or by accurate traverses controlled by triangulation, and their positions should be certified by the commissioners in their joint report as being part of the true description and definition of the international boundary as established, surveyed, and marked in accordance with Articles I and II of the treaty of 1908, Articles I and II of the treaty of 1910, and Article III of the treaty of 1925.

VI. That the charts of the boundary, specified in Articles I and II of the treaty of 1908, should consist of a



One of the concrete range marks which range and reference the boundary on Passamaquoddy Bay

#### AGREEMENT OF THE COMMISSIONERS

series of 18 topographic maps, to be prepared from surveys made by the commissioners and from former surveys made by the United States Coast and Geodetic Survey and by the British Admiralty, showing the course of the boundary line, the location of the boundary reference monuments and range marks, and the topography for a minimum distance of one-fourth mile from each shore. The scales of these maps should be as follows: The maps of Monument Brook and the channels connecting the Chiputneticook Lakes, 1:6,000; of the St. Croix River from the outlet of Spednik Lake to The Narrows, below Calais, Me., 1:12,000; and of the Chiputneticook Lakes, the St. Croix River below The Narrows, and Passamaquoddy Bay, 1:24,000. That the contour interval for the maps of the boundary from the source of Monument Brook to Baring, Me., should be 10 feet and for the maps of the boundary from Baring to the Atlantic Ocean, 20 feet.



Running traverse lines to locate monuments along Monument Brook

VII. That the maps of the boundary should be engraved on copper plates and printed from lithographic stones, using the conventional colors and symbols, and that after the completion of the printing, and the signing of the official maps by the commissioners, the engraved copper plates should be deposited in fireproof vaults for safe-keeping.

VIII. That, in view of the special provisions of Article II of the treaty of 1908, investigations should be made, before laying down the boundary along "the center of the main channel or thalweg" of the St. Croix River to ascertain whether or not "such course would change, or disturb, or conflict with the national character of an island as already established by mutual recognition and acquiescence."

IX. That the provisions of Article I of the treaty of 1908, with respect to the boundary through Passamaquoddy Bay, which stipulates that the commissioners shall "prepare in duplicate and file with each Government a joint report or reports under their hands and seals", and similar provisions of Article II with respect to the St. Croix River boundary, would be fully met by including both these sections of the boundary in a single joint report and a single atlas of maps prepared in quadruplicate, two duplicate originals for each Government. That such report and set of maps should be printed and copies thereof distributed to Government agencies and depository libraries of the two countries.

# DETERMINATION OF THE COURSE OF THE BOUNDARY

The work of the commissioners under Articles I and II of the treaty of 1908 on the portion of the international boundary line in the St. Croix River and Passamaquoddy Bay was the establishment for the first time of a definite line of demarcation through these waterways. It was not, as was the case on certain other sections of the boundary, the retracement or reestablishment of a line that had previously been laid down.

Although the three commissioners appointed by the Governments under Article V of the treaty of 1794 determined the identity of the St. Croix River and roughly surveyed and mapped the region, and showed the river on their map as being the boundary stream (see page 145) they did not determine the exact course of a boundary line in the stream. Provision, therefore, was made in the treaty of 1908 whereby the commissioners were required to lay down the boundary line in the St. Croix River as "a water line throughout" which should "follow the center of the main channel or thalweg as naturally existing, except where such course would change, or disturb, or conflict with the national character of an island as already established by mutual recognition and acquiescence."

Considerable data were available for determining the position of the main channel or thalweg of the St. Croix River from hydrographic and topographic surveys made by the United States Coast and Geodetic Survey between the years 1889 and 1893, in the course of which the St. Croix River and the Chiputneticook Lakes as far north as the mouth of Monument Brook had been thoroughly sounded. The commissioners agreed that much of this work should be accepted in deciding upon the position of the main channel or thalweg of the stream as naturally existing. Additional soundings, however, were necessary to determine the location of the thalweg in Monument Brook, where no soundings had previously been



Monument Brook, backwater above upper dam, about 4 miles south of Initial Monument

made, and in the river between the bridge at Milltown and the bridge connecting Calais, Me., with St. Stephen, New Brunswick, where the number of soundings had not been sufficient to determine accurately the course of the main channel.

The determination of the channel in Monument Brook was undertaken in 1921. The season was very dry, and above reference monument 10 the bed of the brook was for the greater part of its length almost flat

and nearly dry except for a few stretches of deep water. In the stretches of deep water the channel could frequently be approximately determined by the absence of water plants, but enough soundings were taken to make sure that the straight lines joining adjacent turning points conformed closely to the line of the deepest water. Where the bed of the stream was dry and flat, turning points were so chosen that the straight lines followed closely the center of the stream. The turning points



Boundary stream which connects Grand and Mud Lakes

were marked temporarily with stakes, which were then located by angle and distance from traverse stations or by offsets from traverse lines.

Below reference monument 10 Monument Brook is in many places deep and sluggish, and many soundings were made to ascertain the position of the channel. Long poles were driven firmly into the bed of the stream to mark the turning points, and these were located from triangulation or traverse stations by transit and stadia or by triangulation.



International bridge across The Thoroughfare at head of Grand Lake



Boundary stream which connects Mud and Spednik Lakes

reference the positions of the boundary turning points.

Old residents of Forest City maintained that the course of the stream which connects Grand Lake and Mud Lake had been changed by blasting, by the building of a grist mill, and by the dumping of refuse from a large tannery many years ago; but the evidence as to just what the changes were, was too inconclusive to affect the location of the boundary. In 1917 a tentative boundary through this stream was located by the party engaged in surveying the Chiputneticook Lakes and this boundary was approved by the commissioners. Similarly the boundary was located in the stream connecting Mud and Spednik Lakes.

Mud and Spednik Lakes had been thoroughly sounded during the surveys The waterway now known as The Thoroughfare, connecting North Lake and Grand Lake, had originally been little more than a shallow stream, full of old logs and stumps. About 1880 it was dredged by lumbering interests for the purpose of bringing logs cut along Monument Brook and North Lake into Grand Lake, hence the name "Thoroughfare" by which it is now known. In 1921 The Thoroughfare was sounded and its channel was determined as a tentative boundary. This line was later accepted by the commissioners.

Sufficient soundings had been made in North and Grand Lakes during the surveys of 1889–1893 for the determination of the line of deepest water. Accordingly, the courses of the boundary were tentatively laid down by the commissioners on a map on which these soundings were shown, and monuments were then set on the shores of the lakes to



Boundary stream below dam at outlet of Mud Lake

of 1889–1893 and the commissioners were able to decide upon the boundary through them without further investigation, except for a few soundings to verify the channel near reference monument 111.

The final location of the boundary in the St. Croix River between Vanceboro and Milltown was made by carefully sounding the river at all points where the former soundings, made by the United States Coast and Geodetic Survey in 1889– 1893, were not sufficient in number to indicate definitely the position of the main channel or thalweg. In the vicinity of islands, where there was any doubt as to which was the main channel, great care was taken to determine which was the channel of greater depth.

The line of the center of the main channel was then drawn on the hydrographic maps and the boundary turning points so located that the straight-line courses of the boundary joining the turning points formed a close approximation to the course of the channel. Boundary reference monuments were then set in appropriate locations along the shores of the river, their geodetic positions were determined by triangulation or traverse, and the monuments were tied in by angles and distances to the boundary turning points. The boundary turning points themselves were not marked.

The location of the boundary from Milltown to the head of tidewater at Calais, Maine, and St. Stephen, New Brunswick, was made by laying down the line in accordance with the hydrographic data obtained by careful surveys made in 1918. Particular care was taken, however, to so locate the line, as the treaty provides, that it would not "change, or disturb, or conflict with the national character of an island as already established by mutual recognition and acquiescence."

From Calais and St. Stephen to the mouth of the St. Croix River, the boundary line was established to conform with the line of soundings of deepest water as determined from hydrographic surveys made in former years by the United States Coast and Geodetic Survey.

# THE BOUNDARY THROUGH PASSAMAQUODDY BAY

By the provisions of Article I of the treaty of 1908, the commissioners were required to lay down a portion of the boundary through Passamaquoddy Bay as "a series of straight lines defined by distances and courses" which were to be "marked by permanent range marks established on land." In so doing they were to adopt the seven courses tentatively agreed upon by the commissioners appointed under the convention of 1892, the treaty of 1908 stipulating that "In ascertaining the location of the above-described line, the Commissioners shall be controlled by the indications of the range marks and monuments established along its course by said former Commissioners and by the charts upon which the said Commissioners marked the line as tentatively agreed upon by them."

With regard to the location of a portion of the boundary in the vicinity of Pope's Folly Island and a portion of the line south of Lubec Narrows, upon which the commissioners appointed under the convention of 1892 had been unable even tentatively to agree, Article I of the treaty of 1908 provided for the exchange, by the two Governments, of printed evidence and arguments within six months of the ratification



St. Croix River at Little Falls, 10 miles below Spednik Lake

of the treaty, as to where the line should be "in accordance with the true intent and meaning of the provisions relating thereto of the treaties of 1783 and 1814 between the United States and Great Britain, and the award of the Commissioners appointed in that behalf under the treaty of 1814." It further provided that if an agreement concerning these portions of the boundary was

not reached within six months after the exchange of these statements, the question was to be settled by arbitration. No agreement was reached within the stipulated time, but the two Governments, "desirous of arriving at an adjustment of the location of this portion of the line by agreement without resort to arbitration", instructed the commissioners appointed under the treaty of 1908 to describe a proposed boundary which would give Pope's Folly Island to the United States and a certain water area known as the Upper Middle Ground, south of Lubec Narrows, to Canada.

The commissioners accordingly submitted a proposed location for the unsettled portion of the boundary, consisting of seven connected straight-line courses, which would have the effect desired by the two Governments, and which would extend the boundary to the center of Grand Manan Channel. The last two courses of the line proposed by the commissioners would supersede the last course of the line as described in the item numbered (2) in Article I of the treaty of 1908.

By Article I of the treaty of 1910 the aforesaid courses proposed by the commissioners were adopted and provision was made that they should be "laid down and marked by the Commissioners under Article I" of the treaty of 1908.

The principal problem in laying down the boundary through Passamaquoddy Bay was to determine by triangulation the positions of points, selected in pairs, to range or cross-range the boundary courses defined by the treaties. These points were marked by large triangular concrete pyramids which serve as range marks



West Quoddy Head Lighthouse, used as one of the boundary reference marks on Grand Manan Channel

or cross-range marks for all the courses of the boundary in Passamaquoddy Bay except the final course defined by the treaty of 1925, which is referenced to existent monuments and lighthouses.

Additional Boundary Course Provided for in the Treaty of 1925

After the surveys necessary for laying down and marking the boundary as defined in Article I of the treaty of 1908 and Article I of the treaty of 1910 had been completed and the boundary maps were being prepared, a careful study of the line based upon the results of these surveys showed that the terminal point in the middle of Grand Manan Channel was less than three nautical miles distant both from the shore line of the State of Maine and from the shore line of Grand Manan Island which is part of the Province of New Brunswick. The termination of the boundary line in this manner, before reaching the high seas, left a narrow zone of waters of controvertible jurisdiction in Grand Manan Channel, between the terminal point and the high seas.

In order, therefore, that the boundary might be extended to the high seas, the commissioners, acting under the treaties of 1908 and 1910, jointly recommended to both Governments in 1924 the adoption of an additional course, described by them as extending "south 34° 42′ west, for a distance of two thousand three hundred eighty-three (2,383) meters", from the former terminus of the line at the middle of Grand Manan Channel, to the high seas. This recommendation was acceptable to both Governments and, accordingly, such additional course was adopted by them under Article III of the boundary treaty of 1925.

In accordance with the provisions of this Article, this final course of the boundary was located and marked by the commissioners and laid down by them on the boundary maps. As reference monuments for this course of the boundary line, the commissioners used West Quoddy Head Lighthouse and Southwest Wolfe Island Lighthouse, and boundary range marks 45, 46, and 47. The appropriate azimuths and distances between boundary turning points 14 and 15, the ends of this course, and these reference points were determined, and these results, together with the latitudes and longitudes of turning points 14 and 15 and of range marks 45, 46, and 47 were made a part of the description and definition of the boundary line, these data being set forth specifically herein on pages 129 and 131.

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# FIELD OPERATIONS

The first field work of the survey and demarcation of the international boundary line from the source of the St. Croix River to the Atlantic Ocean, as defined by the treaty of April 11, 1908, was begun late in the summer of 1908, when a reconnaissance was made to determine what triangulation stations of the United States Coast and Geodetic Survey were available for the control of the boundary surveys to be made in the St. Croix River Valley between Robbinston, Me., and Vanceboro, Me. During this general reconnaissance a number of new triangulation stations were established near the river to furnish the control for the detailed work which was to follow.

During the years 1909 to 1913, inclusive, operations were conducted by cooperating field parties of the two Governments. Their work consisted principally of the establishment of control stations near the boundary by schemes of triangulation and traverse tied to triangulation stations of the United States Coast and Geodetic Survey.

At the time this work was in progress the commissioners' plans for the survey of this section of the boundary did not include the contour mapping of the wooded areas adjacent to the boundary waters. The commissioners were of the opinion that the "accurate modern charts" of the boundary, required by the treaty of 1908, could be prepared from existent maps. The maps available for this purpose consisted of charts of Passamaquoddy Bay and the lower portion of the St. Croix



Terrain along St. Croix River near Clark Point

River issued by the United States Coast and Geodetic Survey, a chart of Passamaquoddy Bay published by the British Admiralty, and some unpublished field maps of surveys of the St. Croix River made by the United States Coast and Geodetic Survey. The commissioners hoped at this time that by using these maps very little additional topographic mapping would be required, and that the field work of the boundary survey would consist principally of establishing new triangulation and traverse stations to control the shore line and other topography taken from the maps, and to determine the location of the boundary turning points, reference monuments and range marks.

Subsequently, however, as work on other sections of the boundary progressed, the commissioners decided that, in order to make the St. Croix River maps of the same standard as those of other portions of the boundary line, the topography taken from the Coast and Geodetic Survey charts of Passamaquoddy Bay and the St. Croix River should be supplemented by mapping the topography of the islands on the Canadian side of the line in the vicinity of St. Andrews and a strip at least one-fourth mile wide along the shores of the St. Croix River above Calais.

In 1914, 1915, and 1916 no surveying was done on this part of the boundary, as there was a more urgent demand for work on other portions, such as the Maine-Quebec, New Hampshire-Quebec, and Minnesota-Ontario lines. The work was resumed in 1917, when the United States surveyors, who had practically completed their portion of the boundary along the Maine-Quebec Highlands, were transferred to the St. Croix River and organized two parties for the completion of the topographic mapping and monument setting on Monument Brook, Chiputneticook Lakes, and the upper St. Croix River. The following year this work was continued down the St. Croix River by a United States party. In 1919 a United States



Village of Fairhaven, New Brunswick, on Deer Island, Passamaquoddy Bay

#### FIELD OPERATIONS

party built the range marks which reference the boundary courses and turning points through Passamaquoddy Bay and located them by triangulation.

Work on the St. Croix River was again discontinued in 1920, when the energies of both sections of the commission were devoted to the completion of the monumenting on a portion of the Alaska-British Columbia boundary, where mining operations and the staking of new claims had recently been very actively carried on.

In 1921 a joint party made a final field location of the boundary in Monument Brook and the St. Croix River, and in that and the following year Canadian parties completed the topographic mapping of the Canadian islands of Passamaquoddy Bay adjacent to the boundary.

The details of carrying on the work from the years 1909 to 1922, as outlined above, will be found in the chapter on "Field and Office Methods and Results" and in the accounts of the several seasons' field work, which follow.

# SEASON OF 1909—THE BOUNDARY ALONG THE ST. CROIX RIVER FROM ITS MOUTH TO BARING, ME.

In accordance with the report upon the examination of the existent triangulation stations in the St. Croix Valley, made late in the summer of 1908 by an engineer of the United States Coast and Geodetic Survey, plans were made by the commissioners to extend a scheme of minor triangulation upriver along the boundary beginning near Joes Point. Operations were begun in June, 1909, by a United States party of 3 men and a Canadian party of 10 men, working in conjunction with each other, each on their own side of the St. Croix River. The Canadian party made their first camp about 1 mile below St. Stephen, New Brunswick. The United



Boundary waters between Deer Island and Kendall Head, Passamaquoddy Bay

States party had no camp that year; the men, except the chief of party, were hired locally and the party boarded in the vicinity of the work.

For transportation to and from work the members of both parties used motor boats as far up the river as St. Stephen; above that point they used the electric railway or hired teams.

The triangulation, which determined the positions of the boundary reference monuments and furnished control for the topographic mapping, straddled the river, the stations being located close to the banks. Starting near the mouth of the river from the line "Chamcook–Shortland" of the first-order triangulation of the United States Coast and Geodetic Survey, the triangulation was carried upstream to the vicinity of Baring, Me., where a check on the lengths, azimuths, and positions was obtained by tying the scheme to the line "Todd Mountain–Sinclair 2," which had been determined during the reconnaissance in 1908 from the line "Collins– Maguerrewoc."

The stations were permanently marked with bronze disks, which would serve as boundary reference monuments or furnish control for establishing other reference monuments later on. Most of the stations were on outcropping ledges near the river banks, but where ledge rock could not be found the disks were set in the tops of granite posts 8 inches square and 3 feet long, buried with the top flush with the surface of the ground.

The topography as far upstream as Milltown was taken from surveys made by the United States Coast and Geodetic Survey, a revision being made later to bring the semipermanent features of the topography up to date. A topographic map on a scale of 1 : 10,000 was made of the small strip of country extending along the Canadian shore from Joes Point to Warwig Creek.

The work was continued until Mohannas Creek was reached near Baring, Me., on November 25, when the parties withdrew from the field.

The personnel of the field parties for the season of 1909 was as follows:

For His Britannic Majesty: Chief of party, A. J. Brabazon, D. L. S.; assistants, C. R. Westland, D. L. S., C. H. Brabazon, A. J. Rainboth.

For the United States: Chief of party, J. E. McGrath.

# SEASON OF 1910—THE BOUNDARY ALONG THE ST. CROIX RIVER FROM BARING, ME., TO VANCEBORO, ME.

Early in June, 1910, the same Canadian and United States parties which had begun the survey in 1909 resumed operations where work had been discontinued the previous fall near Baring, Me. The United States party of 7 men at first used Calais, Me., as a base of operations, while the Canadian party of 14 men made their first camp at Upper Mills, New Brunswick.

The work consisted chiefly of the determination of control points along the river and was similar in most respects to the work of the previous season except that, where the river was narrow and where dense timber was encountered, the control points were determined by transit and tape traverses run from the nearest major scheme stations instead of by triangulation.

#### FIELD OPERATIONS

Beginning at Mohannas Creek, the triangulation was continued up the river to Bailey Rips. Another scheme of triangulation was extended downstream from a measured base near Woodland to a point about three-fourths mile above Bailey Rips. These triangulation schemes were tied to first-order triangulation stations of the United States Coast and Geodetic Survey and in later years were connected by a traverse run along the river.

While the Canadian party was completing the greater portion of the above triangulation work, the United States party ran secondary traverses from triangulation stations "Middlemiss" and "Pomeroy" to points on the river near Woodland, Me., and Pomeroy Landing, New Brunswick, and on August 15 moved camp to Spednik Falls. Working from this camp, the party ran secondary traverse lines from triangulation station "Pomeroy" to establish local stations at the two pitches of Grand Falls, and a secondary traverse line from station "Scotch Ridge Church Spire" to Gleason Point.

On August 1 the Canadian party moved camp to the mouth of Canoose River, a tributary of the St. Croix. They ran a secondary traverse from the United States Coast and Geodetic Survey station "Oak" to Dog Island Rips, and from that point carried a scheme of triangulation downstream to near Gleason Point and upstream to the mouth of the Canoose River.

The parties withdrew from the field during the last week of October.



Triangulation station "Pomeroy" at Little Ridge, New Brunswick, near St. Croix River

The personnel of the field parties for the season of 1910 was as follows:

For the United States: Chief of party, J. E. McGrath.

For His Britannic Majesty: Chief of party, A. J. Brabazon, D. L. S.; assistants, C. R. Westland, D. L. S., C. H. Brabazon.

# SEASON OF 1911—THE BOUNDARY ALONG THE ST. CROIX RIVER AND THROUGH GRAND AND SPEDNIK LAKES

Field operations were resumed again in June, 1911, by the same United States and Canadian parties which had cooperated in the survey of the boundary along the St. Croix River in 1909 and 1910.

The work, as in the two previous seasons, consisted largely of the execution of triangulation and traverse for controlling the topography and shore line of former surveys made by the United States Coast and Geodetic Survey, and for the determination of the geographic positions of boundary reference monuments, the operations being similar in all respects to those of the previous seasons.

The Canadian party, consisting of 15 men, made their first camp at Loon Bay, an expansion of the St. Croix River, about half way between Vanceboro, Me., and Woodland, Me. After establishing control stations in this vicinity by transit and steel-tape traverse which was connected to a traverse run the previous year, the party moved south by team and wagon to Pomeroy Landing.

In the meantime the United States party, consisting of eight men, had established a camp near Woodland, and from this camp and the Canadian camp near Pomeroy Landing the two parties, each on its own side, took up the survey of the new shore line of the flooded area (now known as Woodland Flowage Lake) formed by the construction of the Woodland Dam. The flooded area was filled with a dense growth of standing timber which had been killed by the rising water, and this condition, together with log-driving operations which were then under way, made movement from one point to another both difficult and dangerous and materially reduced the rate of progress of the work. The traverses of the new shore line formed by the impounded water above the dam were completed and tied together before the end of the season, and both parties moved to Vanceboro, Me.

During the remainder of the season the United States party made a topographic map on a scale of 1:10,000 of the river in the vicinity of Vanceboro, and extended



United States surveyors' camp on Grand Lake

### FIELD OPERATIONS

a combined scheme of triangulation and traverse from a point a short distance above the dam at Vanceboro downstream to Little Falls. When this was completed, they moved camp to Grand Lake and started work in the vicinity of Butterfield Landing. The Canadian party during this time had established a camp on Spednik Lake from which they worked northward along the lake, setting boundary reference monuments and doing the necessary triangulation. Both parties discontinued field work about the end of October.

The personnel of the field parties for the season of 1911 was as follows:

For His Britannic Majesty: Chief of party, A. J. Brabazon, D. L. S.; assistants, C. R. Westland, D. L. S., C. H. Brabazon.

For the United States: Chief of party, J. E. McGrath.

# SEASON OF 1912—THE BOUNDARY THROUGH SPEDNIK, MUD, GRAND, AND NORTH LAKES, AND ALONG MONUMENT BROOK

The United States and Canadian parties began operations late in May, 1912, at the points where they had discontinued work the preceding fall.

The United States party, consisting of nine men, whose outfit had been stored at Danforth, moved by team and wagon to Butterfield Landing on Grand Lake and from that point by motor boat to a camp site on North Lake.

While at this camp they completed the triangulation on Grand Lake, North Lake, the connecting waterway between these lakes, known as The Thoroughfare, and the lower and wider part of Monument Brook. They also ran a transit-and-steel-tape traverse along the narrower portion of Monument Brook as far as station "Poplar Mountain." This work was completed by September 18.

In the meantime the Canadian party, consisting of fourteen men, in camp near Forest City, New Brunswick, had completed the triangulation on Spednik and Mud Lakes and had traversed the streams which connect Grand Lake with Mud Lake and Mud Lake with Spednik Lake.

The dam which had recently been constructed at the outlet of Spednik Lake had raised the level of the lake and flooded the heavily timbered shores, and through this timber, much of which stood in water 5 to 10 feet deep, lines of sight had to be opened between triangulation stations on opposite sides of the lake. This was slow and difficult work, the axmen having to work in water near the shores and from boats where the lake was too deep for wading.

The triangulation on Grand, Spednik, and North Lakes and the traverse of Monument Brook were tied in at several points to the scheme of first-order triangulation of the United States Coast and Geodetic Survey.

After the completion of the work on the lakes, the Canadian party moved by team and wagon to a camp near the source of Monument Brook and ran a transitand-steel-tape traverse from Initial Monument southward along the brook to a junction with the work of the United States party at Poplar Mountain.

As there were no outcropping ledges along Monument Brook, the parties established boundary reference monuments by setting bronze disks in the ends of granite posts, 8 inches square and 3 feet long, buried with the top flush with the ground.

The United States party completed operations on Monument Brook in September. They then moved down the river in canoes as far as Spednik Falls, setting reference monuments en route, and at Spednik Falls setting additional reference monuments to be used in case those set in 1910 should later be submerged by the waters impounded by the new dam at Grand Falls then



Highway bridge at Princeton, Me., across West River, which enters the St. Croix above Grand Falls Dam

in the course of construction. They then went to Calais, where they spent the remainder of the season mapping certain topographic features near Milltown and locating reference monuments along the river in the vicinity of Woodland.

Operations of the United States party were brought to a close on October 7. Some of the party equipment was sold at public auction at Calais, Me., and the remainder of the outfit and the instruments were shipped to Washington.

The Canadian party completed their work on Monument Brook and withdrew from the field early in November.

The personnel of the field parties for the season of 1912 was as follows:

For the United States: Chief of party, J. E. McGrath.

For His Britannic Majesty: Chief of party, A. J. Brabazon, D. L. S.; assistants, J. W. Menzies, D. L. S., C. H. Brabazon, R. Byron.

# SEASON OF 1913-THE BOUNDARY THROUGH PASSAMAQUODDY BAY

The major part of the operations of the two parties in 1913 was on Passa-



Some of the many rapids in the St. Croix River

maquoddy Bay. Before beginning work on the bay, however, the United States party made a reconnaissance plane-table survey of the upper part of Monument Brook from its source south to Poplar Mountain. They also set some additional reference monuments on the lower part of Monument Brook at stations of the traverse line run in 1912, the temporary hubs of which were still in existence. The Canadian party made a plane-table survey of the St. Croix River at Milltown and took soundings to determine the location of the main channel of that part of the river.

The above operations completed, the United States party, consisting of 10 men, moved to Eastport, Me., and the Canadian party, of the same size, moved to Welshpool, New Brunswick, and began work on the location and construction of boundary range marks and cross-range marks on the shores of Passamaquoddy Bay. By agreement between the two chiefs of parties the Canadian party was assigned the work



One of the rubble masonry range marks constructed on Passamaquoddy Bay, 1913; these were replaced by concrete pyramids in 1919

from the mouth of the St. Croix River to Eastport, Me., and the United States party the remainder of the boundary from Eastport to Grand Manan Channel.

Both parties executed schemes of minor triangulation by means of which the range marks were established in the proper relation to the boundary turning points fixed by the treaties of 1908 and 1910. The triangulation of the section done by the United States party was based principally upon stations "Quoddy," "Indian Point," and "Lubec Church Spire," determined by the United States Coast and Geodetic Survey in 1860-61. The work done by the Canadian party south of Lubec was based upon stations "Campobello," "Kendall 2," and "Cumming," determined by the commissioners appointed under the convention of 1892 from stations of the United States Coast and Geodetic Survey

triangulation. All the triangulation was therefore upon the North American datum.

The boundary range marks and cross-range marks erected by the parties on Passamaquoddy Bay in 1913 were, with few exceptions, pyramidal structures 6 to 10 feet in height, built of rubble masonry laid in cement mortar. Thirty-five such structures were erected on sites above tidewater, where solid foundations could be obtained. At five places, where it was necessary to place the marks on rock ledges intermittently submerged by the tide, the type of mark used was a triangular steel target attached to a 2-inch iron pipe 5 feet in length set in a drill hole in solid rock. Both of these types of range marks proved to be less permanent than was expected, and in 1919, to comply more fully with the provisions of the treaty of 1908, the range marks were replaced by durable monolithic concrete structures.<sup>1</sup>

By the middle of November all the work on Passamaquoddy Bay was completed, and the parties disbanded.

The personnel of the field parties for the season of 1913 was as follows:

For His Britannic Majesty: Chief of party, A. J. Brabazon, D.L.S.; assistants, J. W. Menzies, D.L.S., C. H. Brabazon.

For the United States: Chief of party, J. E. McGrath; assistant, E. C. Guerin.

# SEASON OF 1917—THE BOUNDARY ALONG MONUMENT BROOK, THROUGH THE CHIPUTNETICOOK LAKES, AND ALONG THE ST. CROIX RIVER

After the close of the season's work in 1913 no further operations were undertaken on the boundary from the source of the St. Croix River to the Atlantic Ocean until 1917; in fact, the work on that section of the boundary had been regarded as practically completed by the season's work in 1913 on Passamaquoddy Bay. But as the more comprehensive surveys on other portions of the boundary, such as along the forty-ninth parallel and along the waterways between Minnesota



Rubble masonry range mark which had slid off its base; Treat Island, Passamaquoddy Bay

and Ontario, and along the Highlands between Quebec and Maine and New Hampshire, were brought to completion, it was realized that the work previously done along the St. Croix River and Passamaquoddy Bay was not sufficient to make the final demarcation of this portion of the boundary measure up to the standards which had been established elsewhere. The commissioners therefore decided that, in addition to the work already done, a complete topographic map should be made of Grand and Spednik Lakes, the St. Croix River, and the islands adjacent to the boundary in Passamaquoddy Bay; that additional boundary reference monuments should be placed along the lakes and the river; and that the range marks on Passamaquoddy Bay should be rebuilt, substituting permanent concrete structures of uniform design<sup>1</sup> for those of rubble masonry, many of which had seriously deteriorated.

<sup>&</sup>lt;sup>1</sup> See Monuments and Monumenting, p. 84, and Field Operations, Season of 1919, p. 62.

## FIELD OPERATIONS

In the general allotment of work between the two sections of the commission on the several portions of the boundary this additional work from the source of the St. Croix to the Atlantic Ocean, with the exception of some topographic mapping on the islands of Passamaquoddy Bay, was assigned by the commissioners to the United States section of the commission.

Accordingly, about the middle of May, 1917, two parties under the direction of the engineer to the United States section of the commission were placed in the field; one, consisting of 5 surveyors and about 12 hands, began work on Grand Lake and Monument Brook, and was to complete the line as far south as Vanceboro, Me.; the other, consisting of 4 surveyors and about 11 hands, started at Vanceboro, Me., and worked southward down the St. Croix River.

# UNITED STATES PARTY ON MONUMENT BROOK, GRAND AND SPEDNIK LAKES, 1917

Before beginning the season's work on the lakes the chief of that party went to Scotstown, Quebec, and shipped the equipment and outfit, which had been stored there after the completion of the work on the Highlands at the close of the previous season, to Danforth, Me. From this place the outfit was hauled by teams  $4\frac{1}{2}$ miles to Butterfield Landing on Grand Lake, where the first camp was made on May 18. The party was assembled, and work was immediately begun erecting signals at the triangulation stations which had been established in 1911 and 1912, and, with these points as horizontal control, making a plane-table survey for the topographic mapping.

For transportation on the lakes three flat-bottomed boats and a large canoe, equipped with outboard motors, had been ordered early in the year and were on



Camp of United States party at Butterfield Landing, Grand Lake, 1917

hand when the party took the field; but as the lake is frequently too rough to be crossed by small boats a 28-foot gasoline launch, with a 14-horsepower engine, was

purchased locally. These boats, together with a scow which was used when moving camp, were the principal means of transportation throughout the season.

The topographic mapping of the strip of country along the shores of the boundary lakes and streams was done with plane table and stadia on a field scale of 1:5,000, 1:10,000, or 1:20,000, depending upon the narrowness of the boundary



Running traverse lines through flooded swamps along Monument Brook, 1917

waterway at different places and the amount of detail required to show the course of the line and the location of the reference monuments relative to the topographic features. The contour interval used on the largest-scale maps was 5 feet and on the maps on the smaller scales, 10 feet. The topography mapped on each sheet was controlled by geographic positions of the triangulation and traverse stations and the positions of the boundary reference monuments, all of which were plotted on a polyconic projection drawn on the sheet before the field mapping was started. This main basis of control was, in turn, supplemented by plane-table triangulation, which was extended into the long arms of the lakes and furnished tie points for the



Narrow waterway connecting Mud and Spednik Lakes

plane-table and stadia traverse lines through the heavily wooded country along the shores.

Considerable minor triangulation was done to fix the positions of the boundary reference monuments along the lakes and to strengthen the control of the boundary along the lower part of Monument Brook. A large part of Monument Brook, traverses a low swampy country which does not admit of triangulation, and along this part a transit-and-steel-tape traverse was run. This traverse was tied at either end to points

#### FIELD OPERATIONS

determined by the triangulation, and from it were computed the geographic positions of the intervening boundary reference monuments.



Waterway connecting Grand and Mud Lakes; one of the narrow streams through which the boundary was located in the field

This work along Monument Brook was carried on under very adverse conditions. At that time most of the area was flooded, and it was necessarv to run the traverse in water up to the men's waists. Where the ground was too soft to support the tripod of the theodolite, angle points of the traverse were often located on the tops of large pine stumps, which in each case made a rigid stand for the theodolite.

Vertical control for the topographic mapping along the lakes was obtained by running lines of levels in closed circuits from bench marks of first-order levels of the United States Coast and Geodetic Survey at Danforth, Forest Station, and Vanceboro, Me., to points on the lakes, where permanent bench marks were estab-

lished. These bench marks were then connected with water gauges, by means of which the elevation of the water surface was determined daily so that the topographer, working at various places along the lake, could use this elevation for controlling his alidade levels used in mapping the contours. The line of levels which was run from Danforth, Me.. to Grand Lake was extended northward along the highway to Initial Monument at the head of Monument Brook. Between this point and the bench mark established at The Thoroughfare, the topographic work along the brook was controlled entirely by leveling done with plane table and alidade.

The selection of sites for the boundary reference monuments through the lakes was made by the field parties in accordance with positions indicated by the commissioners with reference to a tentative boundary line drawn by them



Initial Monument, at head of Monument Brook, source of St. Croix River

on charts of the lakes before the parties went to the field. This line, which was a series of straight-line courses, followed in general the deepest part of the waterways

as shown by soundings on unpublished field maps made by the United States Coast and Geodetic Survey in 1890, 1892. and 1893. As a general rule the reference monuments on the lakes were placed in pairs, one on each side of the lake, so that a straight line joining the two monuments would pass through a boundary turning point. Along Monument Brook, The Thoroughfare, and the narrow waterways joining the lakes this practice was not followed, because of the great number of reference monuments which



Typical monument site on Chiputneticook Lakes; boundary reference monument 66, Mud Lake

would have been required. Instead, on Monument Brook the traverse of the boundary line was tied at intervals to the reference monuments, and in the other streams each turning point was tied to a reference monument by an angle and distance. The eight reference monuments along The Thoroughfare were so placed that each turning point in the boundary line could be seen from at least two monuments.

The course of the boundary line through all the narrow waterways was run out in the field so as to conform as closely as possible to the deep-water channel determined by soundings taken from a boat or by the rodmen wading the stream. Each boundary turning point so determined was then tied to one or more reference



Gate in upper logging dam, Monument Brook

monuments by the instrument man reading an angle and a stadia distance from the monument to the turning point. In deep, swift water, where a stadia rod could not be held steadily, buoys were floated into place at the turning points and held by lines, and their positions determined by intersections read from two or more reference monuments. Later, in the preparation of the commissioners' description of the boundary line, in the office, these distances and angles were adopted as exact values from which were computed the final geographic positions of the boundary turning points.

The monumenting work done by the party consisted of setting 8-inch manganese-bronze posts in solid rock or in concrete bases, each 12 inches square at the



Mud Lake at low water

top and extending to a solid foundation below the frost line. Where the site of the monument was on an outcropping ledge or on a large bowlder, a 1-inch hole was drilled in the rock to a depth of 10 inches; a metal wedge was then placed in the split end of the 10-inch round shank and the post driven into the hole, which had first been filled with a thin mixture of neat cement.

Along Monument Brook the

reference monuments were as a rule set in pairs about 1 mile apart. As this region is flat and swampy and contains no outcropping ledges or material suitable for making concrete, the most laborious work on the entire section of the boundary was the transportation of the materials used in the concrete bases of these monuments. The banks of the stream are accessible only on foot, or by canoe when the country is flooded. The nearest suitable gravel was found on the south shore of North Lake, and from there it was taken up the dead-water section of the brook as far as possible in the launch. The gravel and cement, to the amount of 1,500 pounds or more for each monument, were then transferred to small boats and the large canoe, and, after the water in the stream had been raised by closing some of the dams which had been built in former years to facilitate log driving, were floated to points as near to the monument sites as possible. The dams were then opened, and after the swamp had drained, the materials were

packed to the monument sites and put in place.

In constructing the base of each of the monuments on Monument Brook an excavation was made about 5 feet deep, and in the bottom of this pit was driven a spruce or cedar pile until it was firmly fixed in the clay subsoil. This pile was braced with three timbers driven at an angle of 45°. The excavation was then filled with concrete, which was puddled into place around the timbers, and the part of the base



Dam and gates which control the level of Mud Lake

## SEASON OF 1917-MONUMENT BROOK, GRAND AND SPEDNIK LAKES 49

which projected above the ground was finished in a form 12 inches square, in the center of which was set the bronze post. Aside from those on Monument Brook, practically all the monuments placed on the shores of North, Grand, and Spednik

Lakes and their connecting waters were set in ledge rock or in bowlders.

The above-mentioned work on Monument Brook was not undertaken until July 19, when the organization on Grand Lake was strengthened by the addition of another instrument man, two rodmen, and a monumenting foreman who had been engaged on the completion of the boundary along the Maine-Quebec Highlands. In the meantime the party had completed the work in the vicinity of Butter-



Bear swimming Spednik Lake; near camp of United States party, September, 1917

field Landing and on June 23 had moved to the north end of Grand Lake at the highway crossing of The Thoroughfare.

Upon the arrival of the additional personnel the organization was divided for the time being into two parties, one remaining at The Thoroughfare and the other going into camp on the upper part of Monument Brook to map the topography



Camp of United States party near The Thoroughfare Bridge, head of Grand Lake, 1917 47378°-34-5

#### FIELD OPERATIONS

and do the monumenting downstream toward North Lake. By the second week in August a large-scale topographic map had been made of Monument Brook and The Thoroughfare; the triangulation, traverse, and monumenting had been completed from Initial Monument to the head of Grand Lake; and on August 12 the parties moved camp to Foster Island, at the eastern end of Grand Lake near Forest City.

The narrow waterway which connects Grand Lake with Azesko or Mud Lake, and the stream connecting Mud Lake with Spednik Lake, were mapped on a field scale of 1: 5,000 and a contour interval of 5 feet. The deep-water channel of the stream was carefully sounded out, and the course of the boundary line through the channel was laid down and tied to the reference monuments by determining the angles and stadia distances from the reference monuments to the boundary turning points. Special care was taken in locating the boundary through these streams, for there were reasons for believing that the present channel might differ materially from the original one. In some places considerable blasting had been done to facilitate log driving, and in Mud Lake and at the head of Spednik Lake the channel had been partially obliterated by deposits of large quantities of tanbark and other débris which had been washed into the stream and thence into the lakes from the tanneries which were operated many years ago at Forest City.

During the latter part of August, while the party was camped in the vicinity of Forest City, the work was inspected by Mr. E. C. Barnard, United States boundary commissioner, and by the engineer to the United States section of the commission. Inspection trips were made from Forest City across Grand Lake and North Lake into the mouth of Monument Brook; also southeastward from Forest City along the connecting waterways to Spednik Lake and down Spednik Lake by steamboat to Vanceboro.



United States party moving camp to Foster Island, Grand Lake, 1917
On September 6 the launch was hauled out and placed on runners and portaged by teams from Grand Lake to Spednik Lake, and on September 10 the party moved camp from Foster Island to the mouth of Birch Creek on Spednik Lake.

About this time the size of the organization was increased by the addition of another topographic party. The topographic work along the boundary between Que-



End of season of 1917; hauling out Government launch "I. B. S." at Vanceboro, Me.

bec and New York had just been completed by the United States section of the commission, and one of the topographers who had been engaged on that work was assigned to the party on Spednik Lake. The organization therefore for the rest of the season consisted of a triangulation party, a monumenting party, and three topographic parties. This additional help, together with several weeks of favorable fall weather, added materially to the progress of the work, with the result that by the first week in October all the topographic mapping had been completed as far down the lake as Sandy Point, and the boundary line had been located and most of the reference monuments set as far south as Vanceboro.

As the weather by this time was getting much cooler, and severe storms and winds were to be expected at any time, it was decided to move camp to Vanceboro, where the party could be more comfortably quartered in a vacant building. On October 6, after a delay of several days due to storms and heavy winds, camp was



Housing Government launch for the winter

moved, and by October 20 all the work except the topography of the lower end of Spednik Lake was completed to the point where the second United States party operating on the St. Croix River south of Vanceboro had begun work in the spring.

The launch was hauled out of the water and housed. The equipment was inventoried and stored at Vanceboro, and on October 22 the party disbanded.

The personnel of the United States party on Monument Brook, Grand and Spednik Lakes

#### FIELD OPERATIONS

in 1917 was as follows: Engineer in charge of the work, James H. Van Wagenen; chief of party, H. C. O. Clarke; assistants, Lee Morrison, E. V. Perkinson, G. A. Perry, R. N. Ashmun, Walter McCrea, and J. A. Stewart. The Canadian repre-



sentative with the party throughout the season was T.C. Dennis, D.L.S.

UNITED STATES PARTY ON THE ST. CROIX RIVER, 1917

The United States party which operated on the St. Croix River in 1917 was organized on May 15, at Vanceboro, Me. A camp outfit for the party had been

Topographic party shooting Canoose Rips, St. Croix River, 1917

shipped to Vanceboro from Scotstown, Quebec, where the large outfits used by the United States parties along the Highlands in 1916 had been stored for the winter. The organization consisted of a reconnaissance and triangulation party, a topographic party, and a monumenting party. The first camp was established on the United States side of the river about 3 miles south of Vanceboro.

The first work of the party was the extension of control up the river from United States Coast and Geodetic Survey triangulation station "Elbow Rip" and the making of a topographic map of the town of Vanceboro. The work of mapping the topography and controlling and monumenting the boundary was then to be extended down the river as far as the party could take it that season.

Throughout the season transportation for the party was continually a troublesome problem. Traveling by river was always difficult by reason of the fact that the stream was frequently obstructed for several miles by log jams. Besides this, the river contained a number of dangerous rapids and falls which could be run only by experienced rivermen, and over which it was always hazardous to take a load. Although the party was



Dangerous rapids at Little Falls, St. Croix River

amply equipped for river transportation, the outfit including two 17-foot Rangeley boats, a large canoe, and a flat-bottomed boat, it was frequently necessary, especially during the log-driving season, to transport supplies and move camp over old logging roads along the river by team and wagon.

The party used in general the same methods of work as those used by the party operating on Monument Brook, Grand and Spednik Lakes. The topography, however, on the St. Croix River was all done on a 1: 10,000 scale. Horizontal control points for the topography were established at one-half-mile intervals along the river and were tied by triangulation or traverse to the control points determined by the boundary parties who were on the river in 1910 and 1911. Vertical control was furnished by a line of levels run down the river from a first-order-level bench mark at Vanceboro.



Forty-foot native timber tower at triangulation station "Oak"

The lines of the major triangulation, connecting sta-



Erecting tower at triangulation station "Elbow Rip," 1917

tions near the river with first-order triangulation stations of the United States Coast and Geodetic Survey which were established in 1887 and 1888, were from 5 to 14 miles long, and, as the country is flat or rolling and heavily timbered, towers had to be built at five of the stations to enable the triangulators to see over the surrounding trees. The height of the towers from the ground to the instrument stand varied from 25 to 70 feet; they were built of native timber cut near the points at which they were erected.

Minor triangulation was carried along the river wherever its width and the character of its shores permitted and was either tied to the major triangulation directly or through traverse lines. A transit-and-tape traverse was run along or near the parts of the river not straddled by minor triangulation and was the means of determining the positions of the reference monuments. The traverse was tied to major triangulation at points along the river varying from 2 to 6 miles apart.

Levels for controlling the topography were run in closed circuits along the river beginning at a first-order-level bench mark of the United States Coast and Geodetic Survey at Vanceboro, Me., and ending at precise-level bench marks of the Geodetic Survey of Canada at Calais, Me., and St. Stephen, New Brunswick. The levelman followed old roads and trails or the brushed-out lines of the traverse. Seventeen permanent bench marks, most of which are close to the river, were established at intervals of about 3 miles.

Boundary reference monuments consisting of 8-inch manganese-bronze posts set in solid rock or in concrete bases were placed in pairs at intervals of approximately 1 mile along the river, one on each side of the stream.

The field work also included an investigation of the depth of the channel on each side of islands in the river where there was any doubt as to which side the deeper channel, and consequently the boundary line, lay. In several instances these investigations had to be left temporarily uncompleted until times of low water, when the channels were clear of logs.

By June 28 the party had completed the work to a point 10 miles downstream from Vanceboro, and on June 29 they moved camp 12 miles down river to Rocky Rips. At this point the progress of the work was considerably retarded; several members of the party were called out for military duty, and it took some time to fill their places; then, too, log-driving operations were at their height, making work with the boats both slow and dangerous, particularly on many of the long rapids which were filled with fast-moving logs brought downstream by the large



Camp of United States party at Clark Point, St. Croix River, 1917

volume of water released for that purpose at the control dam at the foot of Spednik Lake.

Despite these difficulties, however, the work in the vicinity of Rocky Rips was completed by the last week in July, and plans were made to move to Canoose Rips. Accordingly, on Sunday, July 29, while the river was temporarily free of logs, the outfit was loaded on the boats and a raft and floated downstream as far as Loon Bay, where the party was held up by a boom of logs which blocked the river for 2 miles. A temporary camp was pitched for the night, and next day the men assisted the river drivers in getting the logs past the boom. As soon as a way was cleared the party proceeded to the foot of Canoose Rips, where late that night they pitched camp. Next morning, however, rising water drove them out of this camp site, so the move was continued downstream to Clark Point, where a good camp site was found on high ground, on the Canadian side of the river.

The party remained in camp at Clark Point until September 15, when they moved to Pomeroy Landing, about a mile below Grand Falls, the last camp of the season.

On October 22 the party withdrew from the field. The monumenting work had been completed to Grand Falls, the topographic mapping to a point 2 miles farther downstream, and the triangulation and traverse to a point near Woodland, at which place the traverse was tied to the traverses which had been run by the boundary parties in 1911.

The personnel of the organization operating on the St. Croix River in 1917 was as follows: Engineer in charge of the work, James H. Van Wagenen; chief of party, Nelson W. Smith; assistants, D. X. Shubin, Walter McCrea, S. O. White, Clarence Tull, and Perley Stevens.

## SEASON OF 1918—THE BOUNDARY ALONG THE ST. CROIX RIVER AND THROUGH SPEDNIK LAKE

In 1918 three United States parties were placed in the field—a triangulation, topographic, and monumenting party which resumed the work on the St. Croix River; a topographic party which completed the mapping of the lower end of Spednik Lake; and a small party which, with a representative of the Canadian commissioner, made a detailed topographic and hydrographic survey of the St. Croix River between Milltown and the international bridge at Calais, Me., and St. Stephen, New Brunswick. These parties began work about May 20.

In addition to these operations, the engineer to the United States section of the commission made a thorough inspection of the cairns and other semipermanent boundary range marks which had been built in 1913 to reference the boundary through Passamaquoddy Bay. His report included comprehensive plans for the complete and permanent marking of this portion of the boundary, together with details for the construction of pyramidal range marks of concrete and of sufficient size to be visible from the boundary courses and turning points which they range and reference.

The larger of the United States parties on the St. Croix River in 1918 was the same organization which had been engaged on the survey of the boundary along

#### FIELD OPERATIONS



Cairn on Cherry Island, Passamaquoddy Bay; one of the boundary range marks, built in 1913, which were replaced by concrete structures in 1919; note crack in masonry

the river in 1917. They established their first camp at Woodland, Me., and resumed operations where they had discontinued work the previous fall, between Woodland and Grand Falls. Their objective that season was to complete all the work on the St. Croix River as far south as the international bridge between Milltown, Me., and Milltown, New Brunswick.

The work of the party was similar in most respects to that done in 1917. The topography was continued on a field scale of 1:10,000. Trian-

gulation and traverse were executed for topographic control and for the determination of the geographic positions of the boundary reference monuments, the plans for which included the erection of three towers averaging 30 feet in height and constructed of native timber. The levels for vertical control of the topography had been run in 1917 along the railroad from Calais, Me., to Woodland, Me., and this line of bench marks furnished all the elevations needed in 1918 for the completion of the topographic mapping. As was the practice in 1917 on the St. Croix River, the reference monu-

ments, consisting of the usual form of manganese-bronze posts set in ledge rock or in concrete bases, were placed in pairs, one on each side of the river at intervals averaging about 1 mile.

Exhaustive investigations were made to determine the course of the main channel or thalweg of the stream in the vicinity of the numerous islands and also above and below the dams at Woodland and Grand Falls. The channels were



Cairn at Eastport, Me.; cross-range mark built in 1913; showing deterioration of masonry

thoroughly sounded and the position of each sounding was located by plane table and stadia upon special hydrographic sheets whose scales ranged from 1:5,000 to 1:500, depending upon the amount of detail to be shown. These special hydrographic sheets, 14 in number, together with reports of the conditions at places

under investigation, supplied the data which enabled the commissioners to lay down the boundary along the main channel or thalweg of the river as required by the treaty.

The party in camp at Woodland, Me., was not recruited up to its full strength of 13 men until July 1, after which date the work progressed so rapidly that on July 24 camp was moved down river to Baring, Me.



Gates and spillway of storage dam on St. Croix River at Grand Falls

The work between Baring and Milltown was practically completed by September 3, but there still remained some channel investigations between Vanceboro and Grand Falls which were not completed the previous season on account of log drives and high water. Accordingly the party, reduced in size and with a light outfit, went by rail to Vanceboro, where the trip down river was begun in a Rangeley boat and two flat-bottomed boats. Besides the work of sounding out the channels, this



Channel on south side of Todd Island, St. Croix River, Milltown, 1918

trip afforded the opportunity to strengthen the triangulation and traverse by additional observations, to stamp numbers on the monuments, and to set and locate a few new monuments. Camp was moved downstream at intervals of a few days, and



Survey camp at Rocky Rips, St. Croix River, 1918

by October 4 the party was back at Woodland.

Soon after camp was reestablished at Woodland several members of the party were stricken with influenza, which was epidemic throughout the eastern part of the country at that time. This crippled the work so completely that on October 15 the party was disbanded, and the outfit was stored for the winter. The chief of party with one assistant then ran

levels to check work of the previous season, and set the last few monuments, completing the work as far as the international bridge at Milltown.

The work of this party was inspected on September 2 by the United States commissioner, Mr. E. C. Barnard.

The hydrographic survey to determine the position of the main channel of the St. Croix River through the thickly settled manufacturing district extending from the international bridge at Milltown, Me., and Milltown, New Brunswick, to the



Channel on north side of Todd Island, St. Croix River, Milltown, 1918

### SEASON OF 1918-ST. CROIX RIVER

international bridge at Calais, Me., and St. Stephen, New Brunswick, was begun on May 21 by a small United States party with a Canadian representative. The adjacent topography was first mapped on a scale of 1:5,000, contour interval of 5 feet, and then lines of soundings were run from shore to shore at intervals sufficiently close to determine the thread of the main channel. The work of locating each point at which a sounding was taken was done directly on the topographic map of the river with plane table, telescopic alidade, and stadia, the operations being controlled by near-by triangulation stations. Soundings were made from a boat with the stadia rod, and the elevation of the water surface was determined at frequent intervals, so that the soundings could later be converted into elevations of the bottom above mean sea level.

The work was inspected on June 7 and 8 by the United States commissioner, Mr. E. C. Barnard.

The hydrographic work on the 1:5,000 scale was completed on June 27, and the Canadian member of the party left to join a survey party on the Highlands boundary between Maine and Quebec.

The 1:5,000 hydrographic sheet furnished sufficient information for the commissioners to lay down the boundary at all but two points on this portion of the stream. From the bridge at Milltown to the foot of Todd Island the threads of the two channels proved to be of nearly equal depth, and the commissioners decided that it would be necessary to obtain additional soundings plotted on a 1:600 scale sheet to determine on which side of Todd Island the main channel or thalweg lay. Above and below the dam at Union Mills, where the swift current and the obstructions in the channel made the work difficult, the soundings proved to be too few to be conclusive, and additional soundings were ordered.

Work was begun on the 1:600 scale hydrographic sheet at Milltown by a small United States party on September 2, Labor Day, at which time a low stage of water

in the river was to be expected on account of the shutting down of the mills at Woodland and the stoppage of the flow at the Woodland Dam. The work on the first day was directed by the United States commissioner, the engineer to the United States section of the commission, and an engineer representing the Canadian commissioner. During this investigation a sounding rod with a pointed steel tip was used in order to pierce the layer of



Sawmill on Todd Island, Milltown, 1918

#### FIELD OPERATIONS

sawdust and mill refuse which had been deposited on the bed of the river. For each sounding the elevation of the bottom of the channel was determined by the instrument man at the plane table by reading the middle wire on the stadia rod with telescope leveled. About 2,000 soundings were taken during this channel investigation in the vicinity of Todd Island and many additional soundings were made above and below the dam at Union Mills and plotted on a field scale of 1:1,250.

Near the close of the season the topography of the region along the St. Croix River from Milltown to Oak Bay, which was originally mapped by the United States Coast and Geodetic Survey, was revised to show changes in the shore line, wharves, roads, and buildings. This work was completed on October 22 and the party was disbanded.

The work on the lower end of Spednik Lake and on the St. Croix River at Vanceboro, Me., which had been left uncompleted at the close of the season of 1917, was assigned to a small United States party which, during the early part of the summer, was part of the organization on the lower St. Croix River. Maximum economy required that the work should be done at a low stage of water, and accordingly this small party was not detached from the larger organization, which was then at Baring, Me., until reports had been received that conditions on the lake and river were favorable.

The party began operations on August 22, living at a boarding house at Vanceboro and using for transportation to their working ground on the lake the Government launch which had been hauled out and housed at the close of the previous season. A 16-foot rowboat, in which a small engine had been installed, was used in the shallow water along the lake shore and in the numerous coves while the topographic mapping was being done.

The topography of the lake from The Narrows to the dam at the outlet was mapped on a field scale of 1:10,000 with a contour interval of 10 feet, using plane table and stadia. From the outlet of the lake to the railroad bridge at Vanceboro the topography was mapped on a scale of 1: 5,000 with a contour interval of 5 feet. The horizontal control was furnished by the triangulation done the previous season. The vertical control was obtained by running a line of levels from the United States Coast and Geodetic Survey bench mark at Vanceboro to Spednik Lake, where connection was made with a water gauge, which was installed to determine the daily elevation of the water surface for the use of the topographers working at distant points on the lake. Hydrographic surveys were also made to determine the location of the main channel or thalweg in three localities—below The Narrows, above the dam at the outlet of the lake, and through the river from the dam to the railroad bridge.

The work was inspected by Mr. E. C. Barnard, United States commissioner, on September 3 and 4.

The work was completed on October 1 and the party rejoined the larger organization on the St. Croix River at Woodland, Me.

The personnel of the three United States parties on the St. Croix River in 1918 was as follows: Engineer in charge of the work, James H. Van Wagenen; chiefs of parties, Nelson W. Smith, F. H. Brundage, and Lee Morrison; assistants, Lee MorriSEASON OF 1919—PASSAMAQUODDY BAY

son, E. R. Martin, C. E. Carl, R. L. Ross, R. N. Ashmun, and J. A. Stewart.

The Canadian representative, who was attached to the United States parties in 1918 was T. C. Dennis, D. L. S. Also at Todd Island, Milltown, the Canadian commissioner was represented by Mr. A. J. Brabazon, D. L. S.

# SEASON OF 1919—PASSA-MAQUODDY BAY

As the result of the inspection made in 1918 the commis-



Rubble masonry range mark on Campobello Island; Pope's Folly Island at left

sioners decided to replace the rubble masonry cairns and other semipermanent range marks, which referenced the boundary turning points in Passamaquoddy Bay from the mouth of the St. Croix River to Grand Manan Channel, with permanent structures of concrete. This work was assigned to a United States party which



A rubble masonry range mark on Treat Island; all such marks were replaced in 1919 by concrete pyramids

began operations on May 15; the 28-foot launch, used in 1918 on Spednik Lake, was brought from Vanceboro, Me., to Calais, Me., and overhauled; work was commenced on the construction of the portable forms for the concrete range marks; and the camp outfit, which was stored at the close of the previous season at Woodland, Me., was shipped to Eastport, Me., where field work was to be begun.

The first camp was established June 1 at Buckman Head near Eastport, and work was begun on the construction of the range marks and on the triangulation for the determination of their geographic positions.

Of the 48 range marks which were to be constructed at points between the mouth of the St. Croix River and Grand Manan Channel, 27 were to be located on new sites, whose positions had



Transporting concrete materials to range mark site; Lubec Narrows, Passamaquoddy Bay

to be determined by triangulation before construction could be begun. The positions of the remaining marks had to be checked by triangulation. Great care was necessary in locating the range marks, especially those which range the courses of the boundary. The positions of the boundary turning points were fixed by the terms of the treaties of 1908 and 1910, and each pair of marks which range a boundary course was required to be so placed that they would lie in the prolongation of this straight

line course. Each pair of cross-range marks was then required to be so placed that the straight line through their centers, when prolonged, would intersect the boundary course at the turning point at the end of that course.

The form of range mark adopted was that of a truncated pyramid whose height above the surface of the ground is 7 feet. Its triangular base, each side of which is 6 feet long, extends 3 feet below the surface of the ground or to solid rock.

In order to increase its visibility, the side of the range mark facing the course or turning point which it ranges was given a coat of white cement. In this face a manganese-bronze plate was set bearing the appropriate words "United States" or "Canada," the number of the range mark, the number of the boundary course or turning point which it ranges, and "Treaty of 1908" (or "1910"). The center of the range mark was marked by a hole in a small copper plug set in the top of the range mark flush with the surface

of the concrete.

Most of the transportation of cement, sand, and gravel for the concrete was by water, using a 24foot, flat-bottomed launch with a capacity of  $1\frac{1}{2}$  tons for this purpose. For the longer hauls and for moving camp the party used a 13 by 27 foot barge, which was towed by the 28foot Government launch brought from Vanceboro at the beginning of the season. Teams and wagons were used to haul materials to some of the sites of the range marks near Eastport and on Campobello Island.



Type of concrete range mark which superseded the rubble masonry cairns built in 1913

The work was completed on October 21, the outfit was inventoried and stored at Calais, Me., and the party was disbanded on October 24.

An inspection of the work was made during August by the commissioners, Mr. E. C. Barnard, for the United States, and Mr. J. J. McArthur, for His Britannic Majesty. The work was also inspected in September by Mr. James H. Van Wagenen, engineer to the United States section of the commission, and by Mr. J. D. Craig, engineer to the Canadian section of the commission.

During the summer an engineer representing His Britannic Majesty's commissioner visited the party, with a view to determining the possibility of making a topographic map of the Canadian islands in Passamaquoddy Bay adjacent to the boundary by the phototopographic methods which had been so successfully used in the mountains of southeast Alaska and British Columbia. Many photographs were taken from triangulation stations and from a considerable number of especially determined camera stations. During the following winter an attempt to prepare the topographic map was made, but the results that were possible to obtain proved unsatisfactory, for the reason that a sufficient number of points could not be identified on the photographs of the low, wooded, and very broken terrain which characterizes these islands.

On September 1, Labor Day, the party assisted the commissioners in making a further examination of the channels of the St. Croix River at Todd Island at Milltown, at which time extremely low water was obtained by closing the dam at Woodland, thus enabling the party to secure many additional elevations of the river bed.

The personnel of the United States party on Passamaquoddy Bay was as follows: Chief of party, Jesse Hill; assistants, E. R. Martin, J. A. Stewart, and S. O. White.



St. Croix River above Todd Island, Milltown, during high water, 1920

### FIELD OPERATIONS

# SEASON OF 1921—BOUNDARY LOCATION ALONG THE ST. CROIX RIVER AND TOPOGRAPHIC MAPPING ON PASSAMAQUODDY BAY

At the beginning of the season of 1921, the boundary work still remaining to be completed on the St. Croix River and Passamaquoddy Bay comprised the actual determination in the field of the geographic positions of some of the boundary turning points in the more narrow portions of several of the waterways, and the completion of the topographic mapping of the islands in Passamaquoddy Bay.

UNITED STATES BOUNDARY LOCATION PARTY ON THE ST. CROIX RIVER

The method of laying down the water boundary on the topographic maps and determining the geographic positions of the turning points of the boundary by scaling their distances and directions from the boundary reference monuments was successfully used on Passamaquoddy Bay and on the St. Croix River below Milltown. But above Milltown it was found that, except through the lakes and through the storage reservoirs, the waterways were so narrow that unless the maps were on a very large scale and absolutely free from errors a sufficiently accurate location of the boundary in the water could not be made in this way. The commissioners therefore decided that the positions of the turning points of the line, as laid down by them, should be verified by running out the line in the field to make sure that it followed the center of the main channel or thalweg of the river.

For this purpose a United States party was organized at Vanceboro, Me., on June 9, and with a representative of His Britannic Majesty's commissioner began the work of running out the boundary line in the St. Croix River.



North channel of St. Croix River at Todd Island, Milltown, high water of 1920

Several methods of locating the turning points were employed, depending upon the various conditions of the waterways. On the river below Vanceboro the turning points were usually located from stations of the traverse which had been run along the river in 1917, the direction from the traverse station to the turning point being measured by theodolite and the distance by stadia. On the lower part of Monument Brook, where the water in the stream was deep and the shores were marshy, the turning points were located by the intersection of directions measured at two triangulation stations, from one of which the distance to the turning point was measured by stadia as a check on the work. On the upper part of Monument Brook, where the old traverse did not closely follow the boundary, additional transit-and-tape traverse was run from the old traverse stations to tie in the turning points.

On June 27 the party moved camp to a point about a mile below the lower dam on Monument Brook and located the turning points from the head of the stream to North Lake. After finishing this difficult work in the swampy region along Monument Brook, camp was moved at frequent intervals, and the party arrived at Baring, Me., on September 8. From this camp the last turning points were located as far downstream as the bridge at Milltown; and the monuments along the river from the bridge at Calais, Me., and St. Stephen, New Brunswick, to the mouth of the St. Croix River were set and located.

In addition to running out the boundary, all reference monuments were inspected and each bench mark was stamped with its elevation to the nearest foot.



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Survey camp near North Lake



Cherry Island bell tower, Passamaquoddy Bay; one of the control points for the topographic mapping

The season's work was completed on September 17. The camp outfit and boats were moved to Vanceboro, where they were inventoried and stored for the winter, and the party disbanded on September 19.

The personnel of the United States party for 1921 was as follows: Chief of party, Nelson W. Smith; assistant, George C. Tull; Canadian representative, John A. Pounder, D. L. S.; assistant, D. F. Chisholm.

CANADIAN TOPOGRAPHIC PARTY ON PASSAMAQUODDY BAY

When the United States party had finished work in 1921 the Canadian representative who had been cooperating with that party returned to Ottawa and assembled the necessary equipment for a plane-table and stadia survey of Campobello Island. A previous attempt, already re-

ferred to, had been made by a Canadian party in 1919 to map the interior of Campobello Island by phototopography. It was then hoped that the shore line could be obtained from existing maps and that the contours could be obtained from the photography, but when an attempt was made to plot the topography the results were unsatisfactory.

The plane-table party was organized at Eastport, Me., on September 27, and began the erection of signals at the triangulation stations of former surveys on Campobello Island and on some of the islands near by. Levels were carried across from Eastport to Campobello by simultaneously driving spikes into the docks at Eastport, Me., and Welshpool, New Brunswick, at the surface of the water, at the exact moment of high tide. As the day was particularly calm, it is believed that this transfer of levels was sufficiently accurate for topographic purposes. The elevation of the spike in the Eastport dock was subsequently determined from a tidal bench mark of the United States Coast and Geodetic Survey at Eastport.

Active operations were begun on Campobello Island on October 1. Lines of levels were run along the principal roads, temporary bench marks being left at convenient intervals, and the elevations of signals were determined. The position of these signals having been determined and plotted, work with the plane table was begun. It had been expected that the shore line and roads, which had been transferred to the plane-table sheets from existing maps, had been surveyed with sufficient accuracy to be incorporated in the boundary topography. This unfortunately was not the case. These features had to be remapped, which meant a considerable increase in the amount of work to be done, as the shore line as a rule is not visible from points more than



Eastport, Me.; looking west from Campobello Island

100 or 200 feet back from it. As the greater part of the area surveyed is covered with thick woods, progress was slow.

In the part of the island north of Welshpool there are many small isolated knobs of rock from 30 to 100 feet high, which are frequently nearly bare of trees. In the southern part the hills reach an elevation of over 200 feet and are very rough and broken and covered with timber. The interior of the island is comparatively flat, wooded for the most part, but with occasional wide bogs. The greater part of the interior is accessible only by trails through the woods, and from it no triangulation stations can be seen.

By November 18 the peninsula north of Welshpool and west of the Harbor de Loutre had been completely mapped and the island south of Welshpool had been mapped as far back as the beginning of the slopes toward the east. In addition a traverse about 3 miles long and a line of levels had been run along the road to Wilson Beach.



Survey camp of Canadian party on Campobello Island

In view of the lateness of the season and the fact that the weather was becoming very bad it was decided to cease operations, and the party was disbanded on November 21.

The work done by the United States party on the St. Croix River and by the Canadian party on Passamaquoddy Bay in 1921 was inspected by the commissioners, Mr. J. J. McArthur and Mr. E. Lester Jones, on September 3, 4, and 5, 1921.

### FIELD OPERATIONS

The personnel of the Canadian party for the season of 1921 was as follows: Chief of party, John A. Pounder, D. L. S.; assistant, D. F. Chisholm.

# SEASON OF 1922—COMPLETION OF FIELD OPERATIONS

The mapping of the small amount of topography in the vicinity of St. Andrews, New Brunswick, left unfinished by the Canadian party in 1921, and the setting and locating of a few monuments near Milltown, Me., and Milltown, New Brunswick, constituted the final field work on the boundary from the source of the St. Croix River to the Atlantic Ocean.

The topographic work, consisting of the completion of the necessary mapping of Deer, Indian, Navy, and Minister Islands, and the northeastern part of Campobello Island, was done by two small Canadian parties.

The first topographic party was organized at St. Andrews, New Brunswick, on July 27, and with a motor boat commenced work the following day at Wilson Beach. Much the same methods were used as had been used the previous year. The positions of triangulation stations of previous surveys furnished the horizontal control for the topography, which was done by plane table and stadia.

A second small party was organized late in September at St. Andrews to complete the topographic mapping of the peninsula on the southern end of which St. Andrews is situated. To control the work, transit-and-tape traverses were run along the roads and the railway, and the points of the traverse were plotted on a plane-table sheet. Levels based on several readings of a tide staff were run along these roads to furnish vertical control.

The topographic work of the two small parties was completed on October 30, when they disbanded and the equipment was shipped to Ottawa.



Mulholland Point, one of the topographic features of Campobello Island



North Harbor, west shore of Deer Island

During the completion of the topographic mapping on Passamaquoddy Bay, a Canadian engineer was detached from that organization to set and locate reference monuments between Milltown and Calais in cooperation with a representative of the United States commissioner. At the same time the reference monuments between Calais and the mouth of the St. Croix River were inspected and numbered. This work was begun on October 18 and completed on October 29.

The personnel of the Canadian topographic parties for the season of 1922 was as follows: Chiefs of parties, John A. Pounder, D. L. S., and G. T. Prinsep, D. L. S.; assistant, D. F. Chisholm.

		Inspection	A.J.Brabazon, D.L.S.
		Monumenting	
sistants engaged on-	Topography	C, R. Westland, D. L. S.	
	Chiefs of parties and a	Leveling	
	Ch	Traverse	25 2010-001 231
		Triangulation	C. R. Westland, D. L. S. C. H. Brabazon A. J. Rainboth
	Work in charge	-j0	A. J. Brabazon, D. L. S.
	Person-	gaged	10
	Saction of com-	mission	Canada
the second se		Location of work	St. Croix River from Baring, Me., to mouth of river
		Year	1909

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### SUMMARY OF PERSONNEL

J. E. McGrath

J. E. McGrath

A. J. Brabazon, D. L. S.

C. H. Brabazon

C. R. Westland, D. L. S. C. H. Brabazon

C. R. Westland, D. L. S. C. H. Brabazon

C. R. Westland, D. L. S. C. H. Brabazon

A. J. Brabazon, D. L. S.

15

St. Croix River from Grand Lake Canada to Woodland, Me.

1161

J. E. McGrath

J. E. McGrath

7 J. E. McGrath

United States

A.J. Brabazon, D. L. S.

C. H. Brabazon

J. W. Menzies, D. L. S. C. H. Brabazon R. Byron

J. W. Menzies, D. L. S. C. H. Brabazon

14 A. J. Brabazon, D. L. S.

St. Croix River from its source to Canada Spednik Lake

1912

J. E. McGrath

J. E. McGrath

J. E. McGrath

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United States

J. E. McGrath

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United States

A.J. Brabazon, D. L. S.

C. H. Brabazon

J. W. Menzies, D. L. S.

J. W. Menzies, D. L. S. C. H. Brabazon

10 A. J. Brabazon, D. L. S.

Monument Brook, St. Croix River at Militown, and Passama-quoddy Bay

1913

J. E. McGrath

10 J. E. McGrath

United States

J. E. McGrath

E. C. Guerin

E. C. Guerin

J. E. McGrath

J. E. McGrath

A. J. Brabazon, D. L. S.

C. H. Brabazon

C. R. Westland, D. L. S. C. H. Brabazon C. H. Brabazon

14 A. J. Brabazon, D. L. S.

1910 St. Croix River from Vanceboro, Canada Me., to Baring, Me.

J. E. McGrath

J. E. McGrath

00

United States

J. E. McGrath

## PERSONNEL-1909-1922

St. Croix River from its source Canada to Woodland, Me.	e Canada		53		T. C. Dennis, D. L. S.	T. C. Dennis, D. L. S.				T. C. Dennis, D. L. S.
United States 33 James H. V Wagenen	United States 33 James H. V Wagenen	33 James H. V Wagenen	James H. V Wagenen	an	H. C. O. Clarke Nelson W. Smith R. N. Ashmun S. O. White	H. C. O. Clarke E. V. Perkinson G. A. Perry Nelson W. Smith Perley Stevens	Walter McCrea	H. C. O. Clarke Lee Morrison E. V. Perkinson G. A. Perry D. X. Shubin	J. A. Stewart Clarence Tull	
<ul> <li>St. Croix River from Specinik Lake to Calais, Me., and St. Stephen, New Brunswick</li> </ul>	e Canada 2	63						T. C. Dennis, D. L. S.		T. C. Dennis, D. L. S.
United States 18 James H. Wagenen	United States 18 James H. Wagenen	18 James H. Wagenen	James H. Wagenen	Van	Nelson W. Smith R. N. Ashmun C. E. Carl E. R. Martin	Nelson W. Smith C. E. Carl	Nelson W. Smith	Lee Morrison F. H. Brundage C. E. Carl	E. R. Martin J. A. Stewart	
Passamaquoddy Bay Canada 2	Canada 2	3						H. M. Barton		J. D. Craig, D.L.S.
United States 15 Jesse Hill	United States 15 Jesse Hill	15 Jesse Hill	Jesse Hill		Jesse Hill				E. R. Martin J. A. Stewart S. O. White	James H. Van Wagenen
St. Croix River from its source to Canada 2 its mouth	to Canada 2	61				J. A. Pounder, D. F. Chisholm				J. A. Pounder, D. L. S.
United States 8 Nelson V	United States 8 Nelson W	8 Nelson V	Nelson V	V. Smith		Nelson W. Smith G. C. Tull			Nelson W. Smith	
Passamaquoddy Bay Canada 4 J. D. L. J.	Canada 4 J. D. L. I	4 J. D. L.	J. D. L.	Pounder,			D. F. Chisholm	J. A. Pounder, D. L. S. D. F. Chisholm		
St. Croix River from Milltown to Canada 2 J. A. its mouth	to Canada 2 J. D. L.	<sup>2</sup> J. <sup>A</sup> .	J. D.L.	Pounder, S.	J. A. Pounder, D. L. S.				J. A. Pounder, D. L. S.	J. A. Pounder, D. L. S.
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Passamaquoddy Bay Canada 8 J. A. D. L. i G. T. I	Canada 8 J. A. D. L. i G. T. i D. L. i	8 J. D. L. 8 G. T. R. D. L. 8	J. A. D.L. B G. T.	Pounder, S. Prinsep,			G. T. Prinsep, D. L. S. Uisholm D. F. Chisholm	J. A. Pounder, D. L. S. G. T. Prinsep, D. L. S. D. F. Chisholm		

# DESCRIPTION OF FIELD AND OFFICE METHODS AND RESULTS

## HORIZONTAL CONTROL

The horizontal control for the topographic surveys and for the determination of the geographic positions of the reference monuments, range marks, and turning points of the boundary from the source of the St. Croix River to the Atlantic Ocean consists of schemes of major and minor triangulation, and secondary <sup>2</sup> and tertiary <sup>3</sup> grades of traverse which are connected with the triangulation schemes of the United States Coast and Geodetic Survey. The general plan of control is shown on 16 triangulation and traverse sketches, together with an index sketch, on pages 287 to 303.

The geographic positions and descriptions of the triangulation stations, and of the marked stations of the traverses, are listed in Appendix IV, pages 169 to 286.

### GENERAL DESCRIPTION

The St. Croix River and Passamaquoddy Bay are covered by a scheme of major triangulation, about 90 miles in length, most of the stations of which are



Lubec Channel Lighthouse; used as one of the triangulation stations on Passamaquoddy Bay

stations of the triangulation of the United States Coast and Geodetic Survey.

Along Monument Brook, the most northern portion of the St. Croix River, a scheme of secondary traverse was extended from the source of the brook, beginning at the major scheme station "Initial Monument," for a distance of about 5 miles, where it was connected with the major scheme station "Poplar Mountain," and this traverse was adjusted to agree with the positions of these two controlling stations. From "Poplar Mountain" a scheme of secondary traverse and of minor triangulation was extended to North Lake, where connection again was made with a major scheme station, and the traverse and triangulation were adjusted to fit this control.

To cover North Lake, The Thoroughfare, and Grand Lake, a scheme of minor triangulation was extended to Forest City. A secondary traverse connected this triangulation with a scheme of triangulation on

<sup>2</sup> Transit and steel-tape traverse which checked with the triangulation control points within 1 part in 5,000.
 <sup>3</sup> Transit and steel-tape traverse which checked with the triangulation and secondary traverse within 1 part in 1,000.

Mud Lake, and another secondary traverse connected this again with a triangulation scheme on Spednik Lake, which scheme extended as far south as Vanceboro.

These schemes were tied to the major scheme of triangulation at several points.

From Vanceboro to Woodland, control was furnished by transit-and-tape traverse run between stations of the major scheme triangulation situated near the river, which stations occur at intervals of from 2 to 6 miles. Traverses or short schemes of minor triangulation along the river banks were used when expedient to supplement the principal traverses.



Running control traverse along Monument Brook

The traverses were adjusted to fit the major triangulation points to which they were connected.

From Woodland to Joes Point, control was furnished by a scheme of minor triangulation, the figures of which straddle the river. This scheme was supplemented in a



Placing signal pole over old triangulation station found submerged in 1917; Grand Lake

few places near Woodland by traverses and was connected at several places to the major scheme triangulation. On Passamaquoddy Bay the major scheme triangulation itself furnished the necessary control.

Reference monuments on Monument Brook, North Lake, and The Thoroughfare, on Grand, Mud, and Spednik Lakes, on the streams connecting Mud Lake with Grand and Spednik Lakes, and on the St. Croix River from the outlet of Spednik Lake to Calais, Me., and St. Stephen, New Brunswick, were located from the traverse or triangulation stations. They were usually set in pairs, one on each side of the stream or lake. On Grand and Spednik Lakes the referencemonument sites were so chosen that most of the turning points of the boundary are on range between monuments.

From Calais to Passamaquoddy Bay the reference monuments were set at or near such triangulation stations as were suitably located for the purpose. On Passamaquoddy Bay the sites for the range marks had to be chosen so that the marks, which were always set in pairs, form ranges for the successive courses of the boundary or cross-ranges for the boundary turning points. Both members of each pair were set on the same side of the boundary.

These range marks were located directly from the stations of the major triangulation or from other range marks by angle and distance.

# METHOD OF TRAVERSE ADJUSTMENT

The transit and steel-tape traverses which were run along the St. Croix River between stations of the triangulation were adjusted in the office by least squares to conform with the fixed positions of the control points. The method of adjustment, which differs slightly from methods commonly used, is presented on the following pages, including an actual adjustment of one of the St. Croix River traverses.



# HORIZONTAL CONTROL



Fifty-foot native timber tower at triangulation station "Elbow Rip," St. Croix River; showing various stages of construction

In the following traverse the latitude and longitude of the points  $T_1$  and  $T_{16}$ were fixed by triangulation from the major scheme triangulation stations "Keene" and "Loon Bay." The following data concerning the traverse are therefore known:

The latitude and longitude of the initial and final stations,  $T_1$  and  $T_{16}$ .

The azimuth of the line  $T_1$  to "Keene" and the azimuth of the line  $T_{16}$  to "Loon Bay."

The fixed position of  $T_1$  is {Latitude 45° 25′ 20″.570. Longitude 67° 28′ 00″.213. The fixed position of  $T_{16}$  is {Latitude 45° 24′ 27″.107. Longitude 67° 27′ 13″.773.

By an inverse solution the azimuth and distance between these two points are found to be: Azimuth,  $T_1$  to  $T_{16}$ , 328° 32′ 13″; distance, 1,934.90 meters.

The following data were obtained by measuring the distances between the traverse stations and observing the angles at the stations:

Stations	Measured distance	Corrected distance <sup>1</sup>	Stations	Measured distance	$\begin{array}{c} {\rm Corrected} \\ {\rm distance} \ ^1 \end{array}$
$\begin{array}{c} T_1 \text{ to } T_2 \\ T_2 \text{ to } T_3 \\ T_3 \text{ to } T_4 \\ T_4 \text{ to } T_5 \\ T_5 \text{ to } T_6 \\ T_6 \text{ to } T_7 \\ T_7 \text{ to } T_8 \\ T_8 \text{ to } T_9 \\ \end{array}$	$\begin{array}{c} Meters \\ 82, 75 \\ 104, 56 \\ 90, 29 \\ 75, 86 \\ 183, 10 \\ 288, 76 \\ 63, 09 \\ 77, 18 \end{array}$	Meters 82, 77 104, 59 90, 31 75, 88 183, 15 288, 83 63, 11 77, 20	$\begin{array}{c} T_9 \text{ to } T_{10} \\ T_{10} \text{ to } T_{11} \\ T_{11} \text{ to } T_{12} \\ T_{12} \text{ to } T_{13} \\ T_{13} \text{ to } T_{14} \\ T_{14} \text{ to } T_{15} \\ T_{15} \text{ to } T_{16} \\ \end{array}$	Meters 68, 76 90, 30 128, 79 170, 62 127, 39 98, 80 378, 99	Meters 68, 78 90, 32 128, 82 170, 66 127, 42 98, 82 379, 09

<sup>1</sup> These distances are obtained by multiplying the measured distances by the factor 1.0002533 determined on p. 80.

At station—	Between stations—	A	Angle		Corrected seconds <sup>2</sup>
$T_1$ $T_2$ $T_3$ $T_4$ $T_5$ $T_6$ $T_7$ $T_6$ $T_7$ $T_8$ $T_7$ $T_1$	Keene and $T_2$	$\circ$ 200 190 174 159 188 228 169 197 170 146 206 177 165 211 156 70 221	$' 11 \\ 21 \\ 06 \\ 37 \\ 46 \\ 12 \\ 03 \\ 48 \\ 10 \\ 47 \\ 28 \\ 14 \\ 47 \\ 24 \\ 54 \\ 02 \\ 40 \\ \end{cases}$	$\begin{array}{c} \prime \prime \\ 13 \\ 51 \\ 09 \\ 47 \\ 08 \\ 42 \\ 42 \\ 10 \\ 26 \\ 14 \\ 53 \\ 10 \\ 36 \\ 41 \\ 54 \\ 12 \\ 33 \end{array}$	$     \begin{array}{r}         \overline{59} \\             38 \\         \overline{58} \\             37 \\             \overline{59} \\             36 \\             39 \\             08 \\             26 \\             15 \\             55 \\           $
* 10	moon may and all (compared)	200	10	00	

<sup>2</sup> These values obtained by applying the corrections given on p. 79, derived from the adjustment, to the observed angles.

	Azimuth Distance -		L	atit	ude	Departure				
Course		Azimuth		Distance	+		-	+		
$\begin{array}{c} T_1 \ {\rm to} \ T_2 \\ T_2 \ {\rm to} \ T_3 \\ T_3 \ {\rm to} \ T_4 \\ T_4 \ {\rm to} \ T_5 \\ T_5 \ {\rm to} \ T_6 \\ T_5 \ {\rm to} \ T_6 \\ T_7 \ {\rm to} \ T_7 \\ T_7 \ {\rm to} \ T_8 \\ T_8 \ {\rm to} \ T_9 \\ T_9 \ {\rm to} \ T_{10} \\ T_1 \ {\rm to} \ T_{11} \\ T_{11} \ {\rm to} \ T_{12} \\ T_{12} \ {\rm to} \ T_{13} \\ T_{13} \ {\rm to} \ T_{14} \\ T_{14} \ {\rm to} \ T_{15} \\ T_{15} \ {\rm to} \ T_{16} \\ T_$	$\begin{array}{c} \circ \\ 338 \\ 348 \\ 342 \\ 331 \\ 19 \\ 8 \\ 26 \\ 16 \\ 343 \\ 9 \\ 7 \\ 352 \\ 24 \\ 1 \end{array}$	' $30$ $52$ $58$ $36$ $225$ $38$ $27$ $37$ $24$ $53$ $07$ $55$ $20$ $15$	$\begin{array}{c} & & & \\$	$\begin{array}{c} Meters \\ 82.\ 75 \\ 104.\ 56 \\ 90.\ 29 \\ 75.\ 86 \\ 183.\ 10 \\ 288.\ 76 \\ 63.\ 09 \\ 77.\ 18 \\ 68.\ 76 \\ 90.\ 30 \\ 128.\ 79 \\ 170.\ 62 \\ 127.\ 39 \\ 80 \\ 378.\ 99 \end{array}$	$\begin{array}{c} 77.\\ 102.\\ 86.\\ 60.\\ 160.\\ 272.\\ 62.\\ 69.\\ 65.\\ 86.\\ 126.\\ 169.\\ 126.\\ 169.\\ 126.\\ 378.\\ \end{array}$	$\begin{array}{c} 00\\ 60\\ 34\\ 27\\ 72\\ 05\\ 37\\ 10\\ 89\\ 54\\ 87\\ 30\\ 42\\ 02\\ 90\\ \end{array}$		96, 9, 34, 19, 22, 21, 40, 8,	81 49 38 67 13 18 71 27	30. 31 20. 17 26. 43 46. 07 87. 71 25. 78 15. 69
Total					1, 934. $^{1}+.$	39 02		-252. -252.	$\begin{array}{c} 64 \\ 16 \end{array}$	252. 16
					1, 934.	41		0.	48	
Azimuth $T_{16}$ to $T_{15}$	tions	T <sub>15</sub> a	nd $T$				181° 15′ 0 358° 45′ 2	3'' 0''		
Angular error $= 23^{\prime\prime}$ .							180° 00′ 2:	3''		

Considering the azimuth of the line  $T_1$  to  $T_{16}$  as zero, and using plane rectangular coordinates, the following latitude and departure computation is obtained:

<sup>1</sup> Obtained from equation (3), p. 80.

In the following adjustment or balancing of the traverse, the error of angular closure and the discrepancy in departure are corrected by changing the angles, and the discrepancy in the latitude is corrected by changing each measured length by the same proportional amount.

Assume the corrections to the angles at the stations  $T_1$ ,  $T_2$ , etc., to be  $V_1$ ,  $V_2$ , etc., and the latitudes and departures of courses  $T_1$  to  $T_2$ ,  $T_2$  to  $T_3$ , etc., to be  $L_1$ ,  $L_2$ , etc., and  $D_1$ ,  $D_2$ , etc., respectively.

In order that the figure will close, or that there will be no angular error, the sum of the corrections to the angles must equal the angular error, or

$$V_1 + V_2 + V_3 + \dots V_{16} = -23$$
 (1)

A change of  $V_1$  seconds in the angle at  $T_1$  will produce a change of

 $(L_1 + L_2 + L_3 + \ldots L_{15}) V_1 \sin 1^{\prime\prime}$ 

in the sum of the departures; a change of  $V_2$  seconds at  $T_2$  will produce a change of

$$(L_2+L_3+L_4+\ldots L_{15}) V_2 \sin 1''$$

and similarly a change of  $V_n$  seconds at station  $T_n$  will produce a change in the sum of the departures of

$$(L_n + L_{n+1} + \dots L_{15}) V_n \sin 1''$$

Hence the equation to be satisfied in order that there will be no error in departure is:

$$\begin{array}{l} (L_1 + L_2 + L_3 + \ldots + L_{15}) \quad V_1 \sin 1^{\prime\prime} + (L_2 + L_3 + L_4 + \ldots + L_{15}) \quad V_2 \sin 1^{\prime\prime} \\ + (L_3 + L_4 + L_5 + \ldots + L_{15}) \quad V_3 \sin 1^{\prime\prime} + \ldots + (L_{14} + L_{15}) \quad V_{14} \sin 1^{\prime\prime} \\ + L_{15} V_{15} \sin 1^{\prime\prime} = P \end{array}$$

where P is the sum of the departures or the error in departure.

Dividing both sides of this equation by 1,000 sin 1", this equation becomes

$$\left( \frac{L_1 + L_2 + L_3 + \dots + L_{15}}{1,000} \right) V_1 + \left( \frac{L_2 + L_3 + L_4 + \dots + L_{15}}{1,000} \right) V_2$$
$$+ \left( \frac{L_3 + L_4 + L_5 + \dots + L_{15}}{1,000} \right) V_3 + \dots + \left( \frac{L_{14} + L_{15}}{1,000} \right) V_{14} + \frac{L_{15} V_{15}}{1,000} = \frac{P}{1,000 \sin 1''}$$

By substituting the numerical values obtained from the latitude and departure computation, this equation becomes:

$$1.93 V_{1}+1.86 V_{2}+1.76 V_{3}+1.67 V_{4}+1.61 V_{5}+1.45 V_{6}+1.18 V_{7}$$

$$+1.11 V_{8}+1.04 V_{9}+0.98 V_{10}+0.89 V_{11}+0.76 V_{12}+0.60 V_{13}$$

$$+0.47 V_{14}+0.38 V_{15} = \frac{-0.48}{1,000 \times 0.000004848} = -99$$
(2)

The most probable values of the V's that satisfy these equations are those that make the sum of their squares a minimum subject to the two conditions given by equations (1) and (2). By the method of Lagrangian multipliers <sup>4</sup> the function U that is to be made a minimum is:

$$\begin{split} U &= V_{1}^{2} + V_{2}^{2} + V_{3}^{2} + V_{4}^{2} + V_{5}^{2} + V_{6}^{2} + V_{7}^{2} + V_{8}^{2} + V_{9}^{2} + V_{10}^{2} + V_{11}^{2} \\ &+ V_{12}^{2} + V_{13}^{2} + V_{14}^{2} + V_{15}^{2} + V_{16}^{2} - 2C_{1}(V_{1} + V_{2} + V_{3} + V_{4} + V_{5} + V_{6} \\ &+ V_{7} + V_{8} + V_{9} + V_{10} + V_{11} + V_{12} + V_{13} + V_{14} + V_{15} + 23) - 2C_{2}(1.93 V_{1} \\ &+ 1.86 V_{2} + 1.76 V_{3} + 1.67 V_{4} + 1.61 V_{5} + 1.45 V_{6} + 1.18 V_{7} + 1.11 V_{8} \\ &+ 1.04 V_{9} + 0.98 V_{10} + 0.89 V_{11} + 0.76 V_{12} + 0.60 V_{13} + 0.47 V_{14} \\ &+ 0.38 V_{15} + 99) \end{split}$$

The following correlate equations are obtained by differentiating with respect to the V's in succession and equating to zero:

$V_1 = C_1 + 1.93C_2$	$V_5 = C_1 + 1.61C_2$	$V_9 = C_1 + 1.04C_2$	$V_{13} = C_1 + 0.60C_2$
$V_2 = C_1 + 1.86C_2$	$V_6 = C_1 + 1.45C_2$	$V_{10} \equiv C_1 + 0.98C_2$	$V_{14} = C_1 + 0.47C_2$
$V_3 = C_1 + 1.76C_2$	$V_7 = C_1 + 1.18C_2$	$V_{11} \equiv C_1 + 0.89C_2$	$V_{15} \equiv C_1 + 0.38C_2$
$V_4 = C_1 + 1.67C_2$	$V_8 = C_1 + 1.11C_2$	$V_{12} = C_1 + 0.76C_2$	$V_{16} = C_1$

<sup>4</sup> For a more detailed solution of equations by this method see Special Publication No. 28 of the United States Coast and Geodetic Survey or other books on Least Squares.

Correlate equations in tabular form

	Ι	II	V's <sup>1</sup>	$\begin{array}{c} \text{Adopted} \\ V'\text{s} \end{array}$
$\begin{array}{c} V_1 & & \\ V_2 & & \\ V_3 & & \\ V_4 & & \\ V_5 & & \\ V_6 & & \\ V_7 & & \\ V_8 & & \\ V_9 & & \\ V_{10} & & \\ V_{11} & & \\ V_{12} & & \\ V_{13} & & \\ V_{14} & & \\ V_{15} & & \\ \end{array}$	$+1\\+1\\+1\\+1\\+1\\+1\\+1\\+1\\+1\\+1\\+1\\+1\\+1\\+$	$\begin{array}{r} +1.\ 93\\ +1.\ 86\\ +1.\ 76\\ +1.\ 67\\ +1.\ 67\\ +1.\ 61\\ +1.\ 45\\ +1.\ 18\\ +1.\ 11\\ +1.\ 04\\ +0.\ 98\\ +0.\ 99\\ +0.\ 76\\ +0.\ 60\\ +0.\ 47\\ +0.\ 38\end{array}$	$\begin{array}{c} -13.\ 6\\ -12.\ 6\\ -11.\ 1\\ -9.\ 8\\ -8.\ 9\\ -6.\ 5\\ -2.\ 5\\ -1.\ 5\\ -0.\ 4\\ +0.\ 5\\ +1.\ 8\\ +3.\ 7\\ +6.\ 1\\ +8.\ 0\\ +9.\ 4\end{array}$	$-14 \\ -13 \\ -11 \\ -10 \\ -9 \\ -6 \\ -3 \\ -2 \\ 0 \\ +1 \\ +2 \\ +4 \\ +6 \\ +8 \\ +9 \\ +9 \\ -15 \\ -2 \\ -2 \\ -2 \\ -2 \\ -2 \\ -2 \\ -2 \\ -$

<sup>1</sup> Obtained from computation of the corrections below.

Normal equations

Ι	II	η
+16	$+17.69 \\ +24.53$	+23.0 +99.0

I	II	η
$^{+16}_{C_1}$	+17.69 -1.106	+23.0 -1.438
	$^{+24.53}_{-19.57}$	$^{+99.0}_{-25.44}$
	$+4.96 \\ C_2$	$+73.56 \\ -14.83$

Solution of normal equations

$C_2$	$C_1$
-14.83	-1.438 +16.402
	+14.964

Back solution

Computation of the corrections or V's

1	2	3	4	5	6	7	8
$^{+15.0}_{-28.6}$	$^{+15.0}_{-27.6}$	$^{+15.0}_{-26.1}$	$^{+15.0}_{-24.8}$	$+15.0 \\ -23.9$	$+15.0 \\ -21.5$	$+15.0 \\ -17.5$	$+15.0 \\ -16.5$
-13.6	-12.6	-11.1	-9.8	-8.9	-6.5	-2.5	-1.5
9	10	11	12	13	14	15	16
$+15.0 \\ -15.4$	$+15.0 \\ -14.5$	$+15.0 \\ -13.2$	$+15.0 \\ -11.3$	+15.0 -8.9	$+15.0 \\ -7.0$	$+15.0 \\ -5.6$	+15.0
-0.4	+0.5	+1.8	+3.7	+6.1	+8.0	+9.4	+15.0

The changes in the angles due to the corrections will affect the latitudes. The following method is used to determine the change in the total latitude due to the changes in the angles.

A change of  $V_1^{\prime\prime}$  in the azimuth of the first course of the traverse will change the latitude of this course by  $-V_1D_1 \sin 1^{\prime\prime}$ ; a change of  $(V_1^{\prime\prime} + V_2^{\prime\prime})$  in the azimuth of the second course will change the latitude of this course by  $-(V_1+V_2)D_2 \sin$  $1^{\prime\prime}$ ; and in general a change of  $(V_1^{\prime\prime} + V_2^{\prime\prime} + \ldots + V_n^{\prime\prime})$  in the  $n^{\text{th}}$  course will change the latitude of this course by  $-(V_1+V_2+\ldots,V_n)D_n \sin 1''$ . The total change in latitude will equal the sum of the changes of each course, or

$$\begin{bmatrix} -V_1D_1 - (V_1 + V_2)D_2 - (V_1 + V_2 + V_3)D_3 \dots \dots \\ -(V_1 + V_2 + V_3 + \dots + V_{15})D_{15} \end{bmatrix} \sin 1''$$
  
=total change in latitude (3)

Substituting the numerical values obtained from the latitude and departure computation and the solution of equations (1) and (2), this equation becomes:

$$\begin{bmatrix} -(-14)(-30) - (-27)(-20) - (-38)(-26) - (-48)(-46) - (-57)(-88) \\ -(-63)(+97) - (-66)(+9) - (-68)(+34) - (-68)(+20) \\ -(-67)(-26) - (-65)(+22) - (-61)(+21) - (-55)(-16) \\ -(-47)(+41) - (-38)(+8) \end{bmatrix} 0.0000048 \equiv +0.017$$

The fixed distance between  $T_1$  and  $T_{16}$  is 1,934.90 meters, and the sum of the latitudes, corrected for the changes caused by the changes in the angles to correct the angular error and error in departure, is 1,934.41 meters. Hence each course should be multiplied by  $\frac{1,934.90}{1,934.41}$  or 1.0002533, in order that the sum of the latitudes will equal the fixed distance between the ends of the traverse.

## MONUMENTS AND MONUMENTING

The international boundary from the source of the St. Croix River to the Atlantic Ocean is marked by 256 reference monuments set along the shores of the St. Croix River and its several connecting waterways, from the head of Monument Brook to the mouth of the river, and by 48 range marks placed on the shores and islands of Passamaquoddy Bay. The range marks are in pairs which range the successive straight-line courses of the boundary and cross-range the boundary turning points as shown by the diagram on the opposite page.

#### TYPES OF MONUMENTS

The boundary reference monuments and range marks include the three following types:

1. Bronze post reference monument. (Fig. 1.)

2. Bronze disk reference monument. (Fig. 2.)

3. Concrete range mark. (Fig. 3.)

The bronze post reference monuments (fig. 1) are made of manganese bronze containing 59 per cent copper, 38 per cent zinc, 2 per cent iron, and 1 per cent manganese. The part that projects above the surface of the concrete base, or the rock in which the monument is set, is in the form of a 2-inch square post 8 inches high and beveled at the top; and the part which extends below the surface consists of a 1-inch round shank 10 inches long, tapered at the top, and split at the lower end to take a metal wedge which, when the shank is driven into a drill hole, expands the end so as to hold the monument firmly in the rock. The number of the monument is outlined with drill holes about one-fourth inch in diameter and spaced about one-fourth inch apart on the smooth side of the post; and the words "REF. MARK," "INT.

## MONUMENTS AND MONUMENTING



DIAGRAM SHOWING METHOD OF RANGING AND CROSS-RANGING THE BOUNDARY THROUGH PASSAMAQUODDY BAY

47378°—34——7

### FIELD AND OFFICE METHODS AND RESULTS





BDRY.," and "CANADA" or "U. S." are cast in raised letters on the other three sides. In general these posts are set in solid ledge rock or in large bowlders along the banks of the waterways; and where such sites were not available, they were set either in granite blocks or in concrete bases 12 inches square extending to solid foundation below the frost line. Of the 256 boundary reference monuments between the source of the St. Croix River and its outlet in Passamaquoddy Bay, 243 are of this type.

The remaining few reference monuments are of the bronze disk type (fig. 2) except reference monument 233 which is the center of Whitlocks Mill Lighthouse. The disks are 2 inches in diameter and one-fourth inch thick and are firmly held in place by a 4-inch shank split to take a metal wedge which expands the shank as it is driven into a drill hole in the rock. Two-inch and three-inch disks of this type were also used to mark triangulation and traverse stations and, in the tables describing



Bronze post monuments used to reference the boundary along the St. Croix River

and defining the boundary line, many of these stations are included as additional boundary reference marks. Where ledge rock or large bowlders were not available, the disks were placed in the ends of granite posts 8 inches square and 3 feet long, set vertically so that the end containing the disk would be flush with the surface of the ground.

All of the above reference monuments are consecutively numbered from the head of Monument Brook to the mouth of the St. Croix River, and the monuments are so designated and shown on the boundary maps.

The range marks (fig. 3) on the shores of Passamaquoddy Bay consist of truncated pyramids of concrete which taper uniformly from a triangular base 6 feet on each side to a flat top of an area of about 1 square foot. The base extends 1 foot above and 3 feet below the surface of the ground, and the height of the pyramid above the top of the base is 6 feet.

The front side of each mark faces squarely in the direction of the boundary turning point or the boundary course which it ranges, and to increase its visibility has a coat of white cement. In the center of the front face is a manganese-bronze plate (figs. 4 and 5) which bears the words "UNITED STATES" or "CANADA" (depending on the location of the mark), the number of the range mark, the number of the boundary course or turning point which it ranges, and the words "TREATY OF 1908" (or "1910"). This plate is 4 feet below the top of the mark and is held in place by a pair of lug bolts screwed into the back of the plate and embedded in the concrete. The face of the plate is recessed into the concrete to a depth of 1 inch, and the concrete is beveled from the plate to the surface of the face of the mark.



Bronze disks used as triangulation station marks, bench marks, and in a few places as boundary reference monuments

The center of the range mark (the exact point to which the triangulation measurements refer) is marked by a hole in a copper plug set in the top of the mark flush with the surface of the con-

crete.

# Construction of Monu-Ments

Along the St. Croix River sites could be chosen for reference monuments as a rule on large bowlders or outcrops of solid rock. Under such conditions the setting of a reference monument of the bronze-post or bronze-disk type was a simple operation. A hole was



Setting bronze post reference monument 85 in bowlder on Spednik Lake

drilled in the rock of sufficient diameter and depth to receive the shank of the disk or post and was then filled with neat cement mortar. A metal wedge was started into the split shank, which was then inserted in the drill hole, and the disk or post was driven home, the wedge spreading the shank and the cement filling every interstice.

Where solid rock or large bowlders were not available for monument sites, the reference monuments were set either in granite blocks or concrete bases. Where the granite blocks were used, an excavation 3 feet deep was made in which the post, 3 feet long and 8 inches square, was set and the excavation was filled in. A



Typical concrete range mark on Passamaquoddy Bay

bronze post or disk reference monument was then set in the top of the granite post in the manner before described.

Where concrete was used, a base 1 foot square was constructed in which to set the bronze reference monument. In solid ground the excavation for the base was carried only to a depth of 3 or 4 feet; but where the ground was swampy the excavation was made 5 feet or more in depth, and into the bottom several spruce or cedar poles were driven to hardpan. The tops of the poles, left projecting up into the excavation, were then nailed or wired together and the concrete was poured around them. The part of each base projecting above the surface of the swamp was narrowed down to a cross section 1 foot square, and in the center of this the bronze disk or post was set.



Range mark construction; first panel of form in place

For the range marks on Passamaquoddy Bay a design for portable concrete forms was made by the United States Bureau of Lighthouses, and the forms, closely following these specifications, were built at Calais, Me.

When the site of a range mark had been determined, reference stakes were first set in pairs, one pair on the line to the boundary turning point and the other pair at right

angles to that line. Corner stakes were then set and the excavation for the foundation was dug, usually to a depth of not less than 3 feet. This excavation was filled with concrete to the level of the ground, when the baseboards were placed in position. As these inclosed the triangular base and thus fixed the position of the center of the structure, they had to be carefully centered, oriented, and leveled. When this had been completed, more concrete was added until it was flush with the top of the baseboards. The first panel of the form was then put in position on top of the baseboards,

bolted together, and tied down to the base, when it also was filled with concrete. The top panel was then put in position and filled with concrete.

For the typical range mark the proportions of the concrete were 1 part Portland cement, 2½ parts sand, and 4 parts gravel, a richer mixture being used where the mark was exposed to wave action or floating ice. Fresh water was always used in mixing the concrete. As the



Range mark construction; first panel filled and second panel being put in place
work progressed, large rocks were placed in the center of the concrete mass, care being taken that they did not come closer to the form than 3 inches. The concrete was thoroughly tamped into place and spaded on the sides.

When the concrete was in place, the copper bolt, three-fourths inch in diameter and 4 inches long, for marking the exact center of the range mark, was set at the intersection of the two lines determined by the two pairs of reference stakes, using a theodolite to project the lines to their intersection.

The bronze plate, on which was marked the number of the range mark and the course or turning



Range mark construction; filling top of form

point which it ranged, was put in place as the placing of the concrete progressed. A 1-inch board with beveled edges, slightly larger than the plate, was fastened to the inside of the lower panel facing the boundary, in the proper position. The plate was then fastened to the board by means of copper nails, allowing the lug bolts on the back of the plate to be fixed in the concrete. When the form was removed after the concrete had set, the copper nails were pulled through the board and were then cut off flush with the face of the plate.

After the form was removed any rough edges at the joints between the panels



Specially constructed range mark on site exposed to floating ice

of the form were trimmed and rubbed smooth, and a coat of neat cement was applied to the range mark, using white cement on the front side of the mark to make this face of the structure more conspicuous at a distance.

At two places, Dog Island and Lubec Breakwater, where the range marks are on sites which in winter, at high tide, are exposed to floating ice, special precautions were taken to make sure that the marks had sufficient strength to resist this destructive action. The top of the base was made hexagonal in shape and the concrete was sloped down at an angle of  $45^{\circ}$  to solid rock on all sides. On this base the range mark was built, using only the upper 4-foot section of the portable form. Small steel I-beams were used for reinforcement throughout, and wherever the rock was smooth, the structure was anchored to the foundation with steel tie rods.

Two other special marks were built of the same design as the others, but differing in size. One, range mark 8, on the Battery at Eastport, Me., incloses the old rubble-masonry range mark as a core. This mark as reconstructed is 12 feet high, and each side of the triangular base measures 12 feet. The other, range mark 28, at Lubec, Me., although located on the best available site for a rear range for the south end of boundary course 7–8, is hidden from view by buildings. It is about  $4\frac{1}{2}$  feet high. A white stripe 3 feet wide was painted on the side of the building facing range mark 27 of this pair to serve as an auxiliary range mark for this course.

#### TOPOGRAPHY

The character of the country along the boundary from the source of the St. Croix River to the Atlantic Ocean varies from the rolling farming country along the St. Croix River below Woodland, Me., to the wooded swamps of the upper part of the St. Croix River Valley. The valley of the St. Croix River between Woodland and Vanceboro, Me., is heavily wooded and rolling, with few knolls which rise more than 100 feet above the river. Above Vanceboro the boundary traverses the



Range mark before finishing-coat of cement was applied

Chiputneticook Lakes, whose outstanding features are their long narrow bays and numerous islands. Above North Lake the boundary follows Monument Brook, a narrow winding stream which drains a swamp.

When operations were begun on Passamaquoddy Bay and the St. Croix River in 1909, maps which were accurate and modern, in the sense intended in the treaty of 1908, had been made of part of this region, but they were based upon surveys made for purposes other than those of boundary demarcation. They included marine charts of Passamaquoddy Bay published by the British Admiralty and by the United States Coast and Geodetic Survey; a chart of the St. Croix River from its mouth to the head of navigation at Calais, Me., and St. Stephen, New Brunswick, published by the United States Coast

#### TOPOGRAPHY

and Geodetic Survey; and unpublished field maps, based upon surveys made by the United States Coast and Geodetic Survey, upon which were shown the shore line and soundings made to locate the channel from Calais to the mouth of Monu-

ment Brook. The published maps of the United States Coast and Geodetic Survey were contoured on the United States side of the boundary, from West Quoddy Head to Calais, and on the Canadian side from Warwig Creek to St. Stephen but above Calais and St. Stephen no contouring had been done.

The commissioners decided that the information furnished by these maps should be used in preparing the "accurate modern charts" required by the treaty, and that they would do such



A swamp in the upper St. Croix River Valley

additional topographic work as might be necessary to make the maps of this section of the boundary conform to the standards fixed for the maps of the other sections. Accordingly during the course of the surveys made for the determination of the geographic positions of the monuments and turning points of the boundary, topographic maps were made of a strip of country along each side of the boundary from the source of Monument Brook to the international bridge at Calais, Me., and St. Stephen, New Brunswick, and on the Canadian side of the boundary from Warwig Creek to Grand Manan Channel. The topography of the remaining territory, along Passamaquoddy Bay and the St. Croix River, was taken from the charts of the United States Coast and Geodetic Survey after a careful revision had been made of the semipermanent topographic features.

The field maps were made on various scales from 1: 5,000 to 1: 20,000, depending upon the scale upon which the final maps were to be published, and upon the detail necessary to show the relation of the boundary line and reference monuments to the topographic features. A 10-foot contour interval was used on the field maps north of Baring, Me.; a 20-foot interval south of that point.

In the field the plane-table-and-stadia method was used almost exclusively for mapping the topography, the area on each shore being mapped to a minimum width of one-fourth mile. The horizontal control for the topographic survey was furnished by the boundary triangulation and traverse, which determined the geographic positions of the reference monuments. The vertical control was furnished by a system of spirit levels run in closed circuits from precise-level bench marks, but for immediate control the elevation of the water in the lake or river was often used as a starting elevation for the plane-table traverses.

In open country the various natural and artificial topographic features were mapped by plane table, telescopic alidade, and stadia. In the more densely wooded areas this method was supplemented by the use of open-sight alidades, paraffined

#### FIELD AND OFFICE METHODS AND RESULTS

linen tapes, and aneroid barometers, in accordance with the method developed by the United States Geological Survey for filling in the topography of wooded areas around which control points had been established. White celluloid field sheets were used, and on these a projection was first laid down and then the positions of triangulation and traverse stations and monuments were plotted. The shore line as shown on the United States Coast and Geodetic Survey field maps was then transferred to the field sheets and was later checked in the field and corrected if necessary. Closed plane-table-and-stadia traverses were run between control stations, advantage being taken in the wooded regions of old logging roads and river drivers' trails. The contours, roads, streams, and other topographic features were located by numerous stadia readings taken from the traverse stations.

At the time the topographic maps were being made in the field hydrographic data were also obtained to determine the position of the main channel or thalweg of the St. Croix River in the vicinity of the numerous islands. These waterways were thoroughly sounded and the position of each sounding determined and plotted on the plane-table sheet by alidade and stadia. These hydrographic sheets were then used by the commissioners as the basis of information in laying down the boundary line.



Special type of dumpy level used on St. Croix River boundary

#### LEVELING

The vertical control for the topographic maps consists of lines of second-order <sup>5</sup> levels run in closed circuits and based upon the elevations above mean sea-level datum of first-order level bench marks of the United States Coast and Geodetic Survey and precise-level bench marks of the Geodetic Survey of Canada.

The elevation of a bench mark and of the water surface of Grand Lake at Butterfield Landing was determined by running a double line of levels from United States Coast and Geodetic Survey first-order level bench mark  $J_3$  (elevation 391.577

feet) at Danforth, Me. From Butterfield Landing a single line of levels was run to Orient, Me., where a bench mark was established. The elevation of this point was checked by running a side line to Grand Lake at Peters Landing. From Orient lines were run in closed circuits to a bench mark at The Thoroughfare and to the source of Monument Brook, where a bench mark was established in the base of Initial Monument.

The water level of North Lake was determined from the bench mark at The Thoroughfare; and, from the lake, levels for topographic work were carried up Monument Brook to the bench mark at Initial Monument.

Bench marks were established at the extreme southern end of Grand Lake and at Spruce Mountain Cove of Spednik Lake by running a line of levels in closed circuits along the highway from United States Coast and Geodetic Survey first-order level bench mark  $N_3$  (elevation 440.022 feet) at Forest Station, Me. Water-level gauges were established near these last two bench marks, and from them the daily variation in the elevation of the lakes was determined, so that the water surface could be used by the topographers as a reference plane.



Leveling rod with special type of stadia target used on St. Croix River boundary

<sup>5</sup> The requirement for closure of circuits for levels of this class at that time was that the discrepancy in closure in feet should not exceed  $0.05 \sqrt{M}$ , in which M is the length of the circuit in miles. This was the criterion for each small circuit of the line.

As a check on the elevation of the water surface of Spednik Lake, a gauge was established near Vanceboro at the southern end of the lake. The elevation of the zero mark of this gauge was determined by running a closed circuit of levels from United States Coast and Geodetic Survey first-order-level bench mark  $V_3$  (elevation 391.594 feet) at Vanceboro.

A line of second-order levels was run in circuits from this United States Coast and Geodetic Survey bench mark at Vanceboro down the St. Croix River, to Gleason Point. Thence the main line of levels was run along the roads on the Canadian side to Milltown, and, crossing the river, it was terminated at Calais, Me., at preciselevel bench mark 1–B (elevation, 53.578 feet) of the Geodetic Survey of Canada. From this main line of levels, various branch lines were run in closed circuits and permanent or temporary bench marks were established at points suitable for the vertical control of the maps.

Elevations for topographic use on the Canadian islands of Passamaquoddy Bay were based on a tidal bench mark of the United States Coast and Geodetic Survey stamped No. 3 (elevation 37.35 feet) at Eastport, Me. The elevation of a temporary bench mark at Welshpool, New Brunswick, was determined by readings of the water surface at high tide made simultaneously at Eastport and at Welshpool. From this temporary bench mark spirit levels were then run along the principal highways, and other temporary bench marks were established for the topographers. The elevation of a temporary bench mark on Deer Island was also determined in a similar manner from the bench mark at Eastport.

The leveling instrument used along the St. Croix River was a specially designed Bausch & Lomb dumpy level which had been used on the bogs along the Minnesota-Manitoba boundary. This level was equipped with a mirror, which enabled the observer to watch the level bubble while reading the rod and by means of a micrometer screw one end of the telescope could be slightly raised or lowered to keep it level while the reading was being made. A target rod was used with a vernier reading to thousandths of a foot. The target, which was designed by the engineer to the United States section of the commission, comprised, in addition to the regular form of target, a small scale on which the stadia distance was read by the upper stadia wire after the target was set at the correct elevation. To prevent the possible error of setting the target on one of the stadia wires instead of on the center wire, the lower stadia wire was removed from the instrument, thereby making it impossible to read the stadia distance if the target was improperly set. The target is shown in the illustration on page 91.

A list of the permanent bench marks established, together with their elevations and descriptions, is given in Appendix III (p. 166).

#### FIELD TRANSPORTATION

The transportation of equipment, supplies, and monumenting materials and the transfer of men to and from their work each day was not a particularly difficult problem for the parties which surveyed this portion of the international boundary, for Passamaquoddy Bay and the greater part of the St. Croix River are navigable either for motor boats or for rowboats and canoes.

#### TRANSPORTATION

For transportation on Passamaquoddy Bay and as far up the St. Croix River as St. Stephen, New Brunswick, dependence was placed principally upon motor boats; but a scow was also used for handling the large quantity of materials required

in the construction of the range marks on Passamaquoddy Bay. From St. Stephen to Woodland, where the river is obstructed by dams, transportation was by horse and wagon or motor truck over the good roads of that district. Between Woodland and Vanceboro the river is accessible at six or eight points by fairly good roads which run to the settled districts. Sites for the survey camps were usually chosen at the ends of these roads, which of course were used as routes of supply. Usu-



 $\begin{array}{c} {\rm Transportation \ of \ materials \ to \ range-mark \ site \ on \ Passamaquoddy} \\ {\rm Bay} \end{array}$ 

ally, however, camp was moved by boats or canoes on the river, though occasional use was made of the longer routes by land. Travel and transportation on this section of the river between Woodland and Vanceboro was quite difficult, for on account of the numerous rapids and shallow rips motor boats could not be used, and as no roads closely paralleled the river dependence had to be placed entirely upon small boats, canoes, and rafts.

On Spednik, Mud, Grand, and North Lakes transportation was a simple problem. Motor launches and scows were used to move camp, while the same launches or smaller boats and canoes equipped with outboard motors were used to take the men to and from their work.

On Monument Brook, launches could be used for the first 4 miles above North Lake; and from that point for 3 miles farther enough water could be secured to float loaded canoes by closing a small dam built for lumbering purposes. On the remaining 3 miles of Monument Brook materials had to be brought to the monument sites on the backs of the members of the survey parties.

#### MAPS

Article I of the treaty of 1908, pertaining to the boundary through Passamaquoddy Bay, stipulates that "the course of the said boundary line as defined and marked as aforesaid shall be laid down by said commissioners on quadruplicate sets of accurate modern charts prepared or adopted by them for that purpose, which charts shall be certified and signed by the commissioners, and two duplicate originals thereof shall be filed by them with each Government." Article II of the treaty of 1908 stipulates with regard to the boundary through the St. Croix River that "the commissioners so appointed shall jointly lay down upon accurate modern charts, to be prepared or adopted by them for that purpose, the line of boundary \* \* \* as defined and established by the existing treaty provisions and the proceedings thereunder, above referred to. \* \* \* The charts upon which the boundary is marked as aforesaid shall be in quadruplicate, and shall be certified and signed by said commissioners, and two duplicate originals thereof shall be filed by them with each Government."

The charts upon which the commissioners have marked the boundary line through Passamaquoddy Bay and the St. Croix River, in accordance with these provisions of the treaty of 1908, are topographic maps prepared chiefly from the surveys made by the field force of the commission, to which were added certain data from charts and maps of the British Admiralty and the United States Coast and Geodetic Survey, covering part of Passamaquoddy Bay and the St. Croix River below Calais, Me. The boundary maps comprise a series of 18 sheets arranged and numbered as shown on the accompanying index map. They have been engraved on copper plates and printed from stone, and the engraved plates will be preserved by the two Governments as permanent records of the work. The four official sets of maps, two sets for each Government, signed by the commissioners, are bound in atlas form and transmitted with this report. Copies of the maps for distribution to the public are identical with the originals, except that there appear on each map the word "Copy," the date of publication, and the commissioners' signatures in facsimile.

The size of each sheet is 23 by 35 inches inside the border. The belt of topography shown has an average width of 1 mile. The conventional signs used to represent the various topographic features are those adopted by the United States Board of Surveys and Maps. The boundary line, reference monuments, range marks, culture, and lettering appear in black; relief (contour lines) in brown; drainage in blue; and timber in green. The maps are constructed on the polyconic projection on scales of 1:6,000, 1:12,000, and 1:24,000, depending on the detail required to show clearly the location of the boundary line. At the top of each map are the title, the number of the sheet, the names of the commissioners, and copies of the seals of the two countries; and in the lower right-hand corner is the commissioners' certificate, which reads as follows:

Sheets 1-16 (Except for signatures, and slightly different wording for sheet 13)

We certify that this map is one of the quadruplicate set of eighteen (18) maps adopted under Articles I and II of the Treaty between Great Britain and the United States, signed at Washington April 11, 1908, and that we have marked thereon the Boundary Line as established by the Commissioners designated above, in accordance with the provisions of the said Articles. Signed April 3, 1924

(Signed) J. J. MCARTHUR	(Signed)	E.	LESTI	ER JONES
His Britannic Majesty's Commissioner		United	States	Commissioner

Sheet 17—

We certify that this map is one of the quadruplicate set of eighteen (18) maps prepared under Articles I and II of the Treaty between Great Britain and the United States of America, signed at Washington, April 11, 1908, and that we have marked hereon the Boundary Line as established by the Commissioners designated above, in accordance with the provisions of



THIS MAP BASED ON MAP OF NEW BRUNSWICK, DEPT OF THE INTERIOR, CANADA, 191

PRINTED BY THE U.S. GEOLOGICAL SURVEY



#### THE OFFICIAL MAPS

Article I of the Treaty of 1908 and of Articles I and II of the Treaty between Great Britain and the United States, signed at Washington, May 21, 1910.

Signed, July 21, 1925

(Signed)J. D. CRAIG(Signed)E. LESTER JONESHis Britannic Majesty's CommissionerUnited States Commissioner

Sheet 18—

We certify that this map is one of the quadruplicate set of eighteen (18) maps prepared under Articles I and II of the Treaty between Great Britain and the United States of America, signed at Washington, April 11, 1908, and that we have marked hereon the Boundary Line as established by the Commissioners designated above, in accordance with the provisions of Article I of the Treaty of 1908, of Articles I and II of the Treaty between Great Britain and the United States, signed at Washington, May 21, 1910, and of Article III of the Treaty between His Britannic Majesty, in respect of the Dominion of Canada, and the United States, signed at Washington, February 24, 1925.

Signed, January 16, 1928 (Signed) J. D. CRAIG (Signed) E. LESTER JONES His Britannic Majesty's Commissioner United States Commissioner

#### PREPARATION OF THE MAPS

The first step in the preparation of the maps, after the completion of the surveys in the field, was the inking of the penciled plane-table sheets. This was done in the office at the close of each field season, usually by the topographers who had done the mapping. After being inked, the field drawings on most of the plane-table sheets were photographed on transparent celluloid negatives, which were then treated with graphite. These celluloid sheets were then adjusted to projection lines drawn on 20 by 28 inch office sheets and the several field drawings were transferred to the large sheet by rubbing the celluloid negative with an oiled burnisher. The graphite lines which were thus transferred were then inked in the various colors, after which the large assembled map was delivered to the engraver. In many cases where there were ample control points on the large 18 by 24 inch field sheet, it was unnecessary to transfer the topography by the above process; instead, after the sheet was inked, it was delivered to the engraver who effected the transfer directly to the copper plate on which, of course, had been plotted the geographic positions of the control points, reference monuments, and turning points.

In preparing the engraved plates for each map the engraver first engraved on a copper plate the lines of the polyconic projection carefully laid down to the scale on which the finished map was to be made. From these parallels of latitude and meridians of longitude he then plotted the geographic positions of the control points, reference monuments, and turning points of the boundary. This was done under the supervision of the cartographer of the United States section of the commission, who verified the projection and checked the positions of the plotted points. By a wax transfer process the projection and control points were then transferred from this plate to two other copper plates, one for the brown lines (contours) of the map and one for the blue (hydrography, etc.). The topographic drawings which had been furnished to the engraver were photographed to the scale of the engraved projection and wax impressions were made of the negatives and these were transferred to the three plates. The features to be shown in brown were then engraved on one plate,

those to be shown in blue on the second, and those to be shown in black on the third, the plate on which the projection lines were engraved.

The three engraved plates were then delivered to the printer together with a timber sheet showing the outlines of the wooded areas, the character of the forest growth, and sufficient control points for fitting this outline to the map projection. The printer "pulled" an impression from each of these three plates and transferred each impression to a separate lithographic stone. Likewise from standard timber-symbol patterns, he transferred to a fourth stone the proper symbols for the wooded areas outlined on the timber sheet to be shown on the finished map in green. From these four stones the finished map was then printed, each map being run through the press four times to receive an impression from each of the four stones.

A limited edition of the maps has been printed for each Government for distribution to other governmental agencies having use for them, to libraries, and to others interested in the exact location of any part of the international boundary line. In the United States, copies of the report and maps are on file in the Library of Congress and in other libraries designated by the Government as "depository libraries," that is, those which receive all United States Government publications. In Canada, they are on file in the Dominion Archives, in the libraries of the Dominion Parliament and of the Provincial Legislative Assemblies, and in university and reference libraries throughout the country.

### DESCRIPTION AND DEFINITION OF THE INTERNATIONAL BOUNDARY LINE FROM THE SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN

The section of the international boundary line between the United States and the Dominion of Canada from the source of the St. Croix River to the Atlantic Ocean as now established is a water line throughout and consists of a series of 1,103 straight-line courses joining consecutively numbered "boundary turning points." It is referenced by 256 reference monuments along the St. Croix River and by 48 range marks on the shores of Passamaquoddy Bay. The total length of the line is 154.63 miles—129.39 miles in the St. Croix River and 25.24 through the waters of Passamaquoddy Bay.

In order henceforth to insure permanency of location of the boundary, the description and definition of this section of the line, as established by the commissioners and as marked by them on the 18 boundary maps which accompany this report, is set forth geodetically in terms of the latitudes and longitudes of the boundary turning points. The description and definition is given in tabular form on pages 98 to 131, inclusive.

The boundary tables give the latitudes and longitudes of all boundary turning points, boundary reference monuments and range marks, and of 93 boundary triangulation stations, together with the lengths and azimuths of the boundary courses and of the lines from selected boundary turning points to the boundary reference monuments, range marks, and triangulation stations. The azimuths are reckoned clockwise, true south being 0°, west 90°, north 180°, and east 270°. All distances given in the tables are mean sea-level distances expressed in meters. To obtain the actual horizontal distances between points at known elevations above sea level, the distances given in the tables should be increased by an amount equal to 0.0000000478 *LE*, in which *L* is the tabulated length of the course in meters and *E* the mean elevation of the ends of the course in feet. The maximum value of this increase for any course on this part of the international boundary is less than 1 part in 40,000.

All the geodetic positions given in the tables are on the original North American geodetic datum, which was the standard datum common to the two countries in interest at the time this section of the boundary line was laid down, monumented, and described. It should be stated that this datum will later be superseded, in the eastern half of North America, by the new North American geodetic datum of 1927. A description of the original North American datum is given in Special Publication 114 of the United States Coast and Geodetic Survey, and a description of the new North American datum of 1927 is set forth in Special Publication 175 of that bureau.

47378°-34-8

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Initial Mon	° ' '' 45 56 37.00 67 46 54.71	° ' '' 332 50	T. P. 2	24.1	T. P. 29	° ' '' 45 56 24.66 67 46 51.77	° ' '' 201 00 7 12	T. P. 28 T. P. 30	29. 7 15. 1
Т. Р. 2	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$152 50 \\ 339 33$	Initial Mon T. P. 3	$\begin{array}{c} 24.1\\ 21.1 \end{array}$	Т. Р. 30	$\begin{array}{c} 45 \ 56 \ 24. \ 18 \\ 67 \ 46 \ 51. \ 86 \end{array}$	$     187 \ 12 \\     336 \ 11   $	T. P. 29. T. P. 31.	$15.1 \\ 11.6$
Т. Р. 3	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{c}159&33\\24&10\end{array}$	T. P. 2. T. P. 4.	$\begin{array}{c} 21.1\\ 8.3 \end{array}$	Т. Р. 31	$\begin{array}{c} 45 \ 56 \ 23. \ 83 \\ 67 \ 46 \ 51. \ 64 \end{array}$	$\begin{array}{c}156 \\ 21 \\ 14\end{array}$	T. P. 30 T. P. 32	$   \begin{array}{c}     11.6 \\     20.0   \end{array} $
Т. Р. 4	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 204 \hspace{0.1cm} 10 \\ 348 \hspace{0.1cm} 16 \end{array}$	T. P. 3. T. P. 5.	8.3 8.1	T. P. 32	$\begin{array}{c} 45 \ 56 \ 23. \ 23 \\ 67 \ 46 \ 51. \ 97 \end{array}$	$\begin{array}{c} 201 \hspace{0.1cm} 14 \\ 353 \hspace{0.1cm} 16 \end{array}$	T. P. 31. T. P. 33.	20.0 6.1
т. р. 5	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{smallmatrix}168&16\\&6&21\end{smallmatrix}$	T. P. 4. T. P. 6.	8.1 12.9	т. р. 33	$\begin{array}{c} 45 \ 56 \ 23. \ 03 \\ 67 \ 46 \ 51. \ 94 \end{array}$	$173 \ 16 \\ 18 \ 41$	T. P. 32 T. P. 34	
т. Р. 6	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}186&21\\334&04\end{array}$	T. P. 5. T. P. 7.	12.9 24.5	т. р. 34	$\begin{array}{c} 45 \ 56 \ 22.02 \\ 67 \ 46 \ 52.44 \end{array}$	$     198 \ 41 \\     330 \ 26 $	T. P. 33. T. P. 35.	33.2 21.9
т. р. 7	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$154 \ 04 \\ 341 \ 00$	T. P. 6. T. P. 8.	24.5 17.8	т. р. 35	$\begin{array}{c} 45 \ 56 \ 21. \ 40 \\ 67 \ 46 \ 51. \ 93 \end{array}$	$150 \ 26 \\ 12 \ 47$	T. P. 34 T. P. 36	$21.9 \\ 17.5$
T. P. 8	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}161&00\\&2&27\end{array}$	T. P. 7. T. P. 9.	17.8 12.5	т. р. 36	$\begin{array}{c} 45 \ 56 \ 20.85 \\ 67 \ 46 \ 52.11 \end{array}$	192 47 357 01	T. P. 25 T. P. 37	17.5 26.2
Т. Р. 9	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     182 \ 27 \\     308 \ 19   $	T. P. 8. T. P. 10	12.5 9.1	T. P. 37	45 56 20.00 67 46 52.05	177 01 330 00	T. P. 36. T. P. 38.	26.2 25.8
т. Р. 10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 128 \ 19 \\ 338 \ 56 \end{array}$	T. P. 9. T. P. 11	9.1 16.4	T. P. 38	$\begin{array}{c} 45 \ 56 \ 19.\ 28 \\ 67 \ 46 \ 51.\ 45 \end{array}$	$     150 \ 00 \\     328 \ 17   $	T. P. 37. T. P. 39.	25. 8 26. 8
Т. Р. 11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$158 56 \\ 5 00$	T. P. 10 T. P. 12	16.4 29.0	Т. Р. 39	$\begin{array}{c} 45 \ 56 \ 18.54 \\ 67 \ 46 \ 50.80 \end{array}$	$148 \ 17$ $285 \ 58$	T. P. 38 T. P. 40	26.8 6.7
Т. Р. 12	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     185 \ 00 \\     14 \ 38     $	T. P. 11. T. P. 13.	29.0 22.7	Т. Р. 40	$\begin{array}{c} 45 \ 56 \ 18.  48 \\ 67 \ 46 \ 50.  50 \end{array}$	$     105 58 \\     314 09   $	T. P. 39 T. P. 41	
Т. Р. 13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	${ \begin{array}{c} 194 & 38 \\ 83 & 48 \end{array} } \\$	T. P. 12. T. P. 14	22.7 16.5	Т. Р. 41	45 56 18.15 67 46 50.01	$134 \ 09 \\ 267 \ 00$	T. P. 40 T. P. 42	$14.6 \\ 19.2$
Т. Р. 14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$263 \ 48 \\ 354 \ 21$	T. P. 13. T. P. 15.	16.5 7.3	T. P. 42	$\begin{array}{c} 45 \ 56 \ 18 \ 18 \\ 67 \ 46 \ 49 \ 12 \end{array}$	87 00 332 58	T. P. 41 T. P. 43	19.2 28.3
Т. Р. 15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$174 \ 21 \\ 343 \ 21$	T. P. 14 T. P. 16	7.3 10.2	T. P. 43	$45 56 17.36 \\ 67 46 48.52$	$152 58 \\ 17 45$	T. P. 42 T. P. 44	28.3 23.7
Т. Р. 16	45 56 3 <b>0</b> .16 67 46 53.69	$     \begin{array}{r}       163 & 21 \\       320 & 17     \end{array} $	T. P. 15 T. P. 17	$10.2 \\ 16.8$	Т. Р. 44	45 56 16.64 67 46 48.86	$     197 \ 45 \\     302 \ 38     $	T. P. 43 T. P. 45	23.7 10.8
Т. Р. 17	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}140 \hspace{0.1cm} 17\\342 \hspace{0.1cm} 00\end{array}$	T. P. 16. T. P. 18.	16. 8 9. 6	T. P. 45	45 56 16.45 67 46 48.44	$122 \ 38 \\ 344 \ 22$	T. P. 44 T. P. 46	$   \begin{array}{c}     10.8 \\     27.0   \end{array} $
T. P. 18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{r}       162 & 00 \\       284 & 13     \end{array} $	T. P. 17. T. P. 19	9.6 26.0	T. P. 46	$\begin{array}{c} 45 \ 56 \ 15. \ 61 \\ 67 \ 46 \ 48. \ 10 \end{array}$	$     164 22 \\     265 45 $	T. P. 45 T. P. 47	27.0 15.9
Т. Р. 19	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$104 \ 13 \\ 306 \ 12$	T. P. 18. T. P. 20.	26.0 14.3	T. P. 47	45 56 15.64 67 46 47.36	85 45 339 03	T. P. 46 T. P. 48	15.9 22.3
Т. Р. 20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}126&12\\&6&49\end{array}$	T. P. 19. T. P. 21.	$14.3 \\ 13.5$	Т. Р. 48	$\begin{array}{c} 45 & 56 & 14.97 \\ 67 & 46 & 46.99 \end{array}$	$159 \ 03 \\ 325 \ 12$	T. P. 47 T. P. 49	22.3 15.1
Т. Р. 21	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     186 \ 49 \\     348 \ 09     $	T. P. 20 T. P. 22	$13.5 \\ 13.6$	Т. Р. 49	45 56 14.57 67 46 46.59	$145 \ 12 \\ 6 \ 37$	T. P. 48 T. P. 50	15.1 20.0
Т. Р. 22	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}168&09\\8&41\end{array}$	T. P. 21 T. P. 23	$13.6 \\ 6.5$	т. р. 50	$\begin{array}{c} 45 & 56 & 13 & 92 \\ 67 & 46 & 46 & 70 \end{array}$	186 37 328 07	T. P. 49 T. P. 51	20.0 13.5
Т. Р. 23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     188 \ 41 \\     342 \ 50     $	T. P. 22. T. P. 24.	6.5 12.3	T. P. 51	$\begin{array}{c} 45 & 56 & 13.55 \\ 67 & 46 & 46.37 \end{array}$	$148 \ 07 \\ 347 \ 43$	T. P. 50 T. P. 52	13.5 24.0
т. р. 24	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{r}       162 50 \\       15 26     \end{array} $	T. P. 23 T. P. 25	$12.3 \\ 16.8$	T. P. 52	$\begin{array}{c} 45 & 56 & 12.79 \\ 67 & 46 & 46.13 \end{array}$	$   \begin{array}{c}     167 & 43 \\     311 & 29   \end{array} $	T. P. 51 T. P. 53	24.0 15.2
Т. Р. 25	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 195 \ 26 \\ 352 \ 56 \end{array}$	T. P. 24 T. P. 26	$\begin{array}{c} 16.8\\ 15.4 \end{array}$	T. P. 53	45 56 12.47 67 46 45.60	$     \begin{array}{r}       131 & 29 \\       324 & 53     \end{array} $	T. P. 52 T. P. 54.	15. 2 29. 6
Т. Р. 26	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$172 56 \\ 13 51$	T. P. 25 T. P. 27	$15.4 \\ 16.0$	т. Р. 54	45 56 11.68 67 46 44.82	$144 53 \\ 332 02$	T. P. 53 T. P. 55.	29.6 33.4
Т. Р. 27	45 56 25.99 67 46 51.47	$     193 51 \\     342 09   $	T. P. 26 T. P. 28	16. 0 13. 9	т. р. 55	45 56 10.73 67 46 44.09	$152 02 \\ 2 46$	T. P. 54 T. P. 56	33. 4 31. 5
T. P. 28	45 56 25.56 67 46 51.27	$     \begin{array}{c}       162 & 09 \\       21 & 00     \end{array} $	T. P. 27 T. P. 29	13.9 29.7	T. P. 56	45 56 09.71	182 46 354 40	T. P. 55	31.5

#### GEOGRAPHIC POSITIONS OF BOUNDARY TURNING POINTS DEFINING THE INTERNATIONAL BOUNDARY FROM THE SOURCE OF THE ST. CROIX RIVER THROUGH MONUMENT BROOK TO NORTH LAKE

#### BOUNDARY TURNING POINTS-MONUMENT BROOK-Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	'Fo station	Dis- tance (meters)
T. P. 57	$\circ$ , , , , 45 56 09.03 67 46 44.07	° ' '' 174 40 327 46	T. P. 56 T. P. 58	21. 0 32. 8	т. р. 87	° ' '' 45 56 04.04 67 46 33.48	° ' '' 2 43 263 53	T. P. 86 T. P. 88	10. 7 10. 2
T. P. 58	$\begin{array}{r} 45 \ 56 \ 08. \ 14 \\ 67 \ 46 \ 43. \ 26 \end{array}$	$\begin{array}{c}147 \hspace{0.1cm} 46\\ 3 \hspace{0.1cm} 13\end{array}$	T. P. 57 T. P. 59	32. 8 19. 5	T. P. 88	$\begin{array}{r} 45 \ 56 \ 04. \ 08 \\ 67 \ 46 \ 33. \ 01 \end{array}$	$\begin{array}{c} 83 & 53 \\ 184 & 12 \end{array}$	T. P. 87 T. P. 89	$\begin{array}{c} 10.2\\ 8.3\end{array}$
т. р. 59	$\begin{array}{r} 45 \ 56 \ 07. \ 50 \\ 67 \ 46 \ 43. \ 31 \end{array}$	$     183 \ 13 \\     311 \ 18   $	T. P. 58 T. P. 60	19.5 12.0	T. P. 89	45 56 04.35 67 46 32.98	$\begin{smallmatrix}&4&12\\219&35\end{smallmatrix}$	T. P. 88 T. P. 90	8.3 10.4
т. р. 60	$\begin{array}{c} 45 & 56 & 07. \ 25 \\ 67 & 46 & 42. \ 89 \end{array}$	$     131 \ 18 \\     352 \ 59     $	T. P. 59 T. P. 61	$12.0 \\ 13.6$	т. р. 90	45 56 04.60 67 46 32.67	$39 35 \\194 19$	T. P. 89. T. P. 91.	$10.4\\14.4$
т. р. 61	$\begin{array}{r} 45 \ 56 \ 06. \ 81 \\ 67 \ 46 \ 42. \ 81 \end{array}$	$172 59 \\ 22 56$	T. P. 60 T. P. 62	$13.6 \\ 5.9$	T. P. 91	45 56 05.06 67 46 32.51	$     \begin{array}{r}       14 & 19 \\       187 & 59     \end{array} $	T. P. 90 T. P. 92	$\begin{array}{c} 14.4\\ 16.6\end{array}$
Т. Р. 62	45 56 06.63 67 46 42.92	$202 56 \\ 346 40$	T. P. 61 T. P. 63	5.9 7.4	T. P. 92	45 56 05.59 67 46 32.40	$\begin{array}{c} 7 59 \\ 150 42 \end{array}$	T. P. 91. T. P. 93	16.6 7.2
т. Р. 63	45 56 06.40 67 46 42.84	$ \begin{array}{c} 166 & 40 \\ 11 & 55 \end{array} $	T. P. 62 T. P. 64	7.4 34.9	T. P. 93	45 56 05.79 67 46 32.56	$330 \ 42 \\ 207 \ 55$	T. P. 92 T. P. 94	7.2 13.7
т. р. 64	45 56 05.29 67 46 43.18	191 55 339 08	T. P. 63 T. P. 65	34 9 9.8	т. р. 94	$\begin{array}{c} 45 \ 56 \ 06. \ 18 \\ 67 \ 46 \ 32. \ 27 \end{array}$	$27 55 \\ 252 46$	T. P. 93 T. P. 95	$\begin{array}{c}13.7\\16.4\end{array}$
T. P. 65	45 56 04.99 67 46 43.01	$     159 \ 08 \\     276 \ 50     $	T. P. 64 T. P. 66	9.8 8.0	т. Р. 95	45 56 06.34 67 46 31.54	$72 \ 46 \\ 275 \ 32$	T. P. 94 T. P. 96	16. 4 12. 5
T. P. 66	45 56 04.96 67 46 42.64	96 50 308 46	T. P. 65 T. P. 67	8.0 6.7	т. Р. 96	45 56 06.30 67 46 30.96	95 32 228 09	T. P. 95 T. P. 97	12.5 15.9
T. P. 67	45 56 04.83 67 46 42.40	$128 \ 46 \ 18 \ 31$	T. P. 66 T. P. 68		т. Р. 97	$\begin{array}{c} 45 56 06.64 \\ 67 46 30.42 \end{array}$	48 09 330 56	T. P. 96 T. P. 98	15. 9 12. 4
T. P. 68	45 56 04.18 67 46 42.71	$198 \ 31 \\ 281 \ 56$	T. P. 67 T. P. 69	21.0 5.8	Т. Р. 98	45 56 06. 29 67 46 30. 14	$   \begin{array}{r}     150 56 \\     282 16   \end{array} $	T. P 97 T. P. 99	12.4 28.0
Т. Р. 69	45 56 04.14 67 46 42.45	$   \begin{array}{r}     101 56 \\     355 23   \end{array} $	T. P. 68 T. P. 70	5. 8 12. 8	T. P. \$9	45 56 06.10 67 46 28.87	$102 \ 16 \\ 305 \ 34$	T. P. 98. T. P. 100	28. 0 14. 7
T. P. 70	45 56 03.73 67 46 42.40	$175 23 \\ 310 37$	T. P. 69 T. P. 71	$12.8 \\ 34.2$	T. P. 100	45 56 05.82 67 46 28.31	$\begin{array}{c} 125 & 34 \\ 221 & 00 \end{array}$	T. P. 99. T. P. 101	14.7 11.0
T. P. 71	45 56 03.01 67 46 41.20	$130 \ 37 \\ 254 \ 55$	T. P. 70 T. P. 72	34. 2 22. 9	T. P. 101	45 56 06.09 67 46 27.98	$\begin{array}{c} 41 & 00 \\ 267 & 44 \end{array}$	T. P. 100 T. P. 102	11. 0 16. 0
		$     185 \ 00 \\     272 \ 10     $	Traverse Station 2. Ref. Mon. 2	$26.2 \\ 11.1$	T. P. 102	45 56 06.11 67 46 27.23		T. P. 101 T. P. 103	16. 0 13. 2
т. Р. 72	45 56 03.20 67 46 40.17	$     \begin{array}{r}       74 & 55 \\       285 & 10     \end{array} $	T. P. 71. T. P. 73	$\begin{array}{c} 22.9\\ 4.9\end{array}$	'Г. Р. 103	45 56 05.92 67 46 26.69	$\begin{array}{c} 116 \ 22 \\ 14 \ 47 \end{array}$	T. P. 102 T. P. 104	13. 2 15. 1
т. Р. 73	45 56 03.16 67 46 39.95	$\begin{array}{c} 105 \ 10 \\ 342 \ 16 \end{array}$	T. P. 72- T. P. 74	4.9 12.0	Т. Р. 104	$\begin{array}{c} 45 56 05.45 \\ 67 46 26.86 \end{array}$	$194 \ 47$ $308 \ 52$	T. P. 103 T. P. 105	15.1 22.3
т. р. 74	45 56 02.79 67 46 39.78	$     \begin{array}{r}       162 \ 16 \\       233 \ 36     \end{array} $	T. P. 73. T. P. 75	12. 0 12. 0	т. р. 105	45 56 05.00 67 46 26.06	$128 52 \\ 346 14$	T. P. 104 T. P. 106	22. 3 9. 6
T. P. 75	45 56 03.02 67 46 39.33	$53 \ 36 \\ 190 \ 59$	T. P. 74 T. P. 76	12. 0 9. 4	т. р. 106	45 56 04.70 67 46 25.95	$     166 14 \\     297 12 $	T. P. 105 T. P. 107	9. 6 16. 6
Т. Р. 76	45 56 03.31 67 46 39.25	$\begin{array}{c}10&59\\244&55\end{array}$	T. P. 75 T. P. 77	9.4 8.4	T. P. 107	45 56 04.45 67 46 25.27	$117 12 \\ 347 47$	T. P. 106 T. P. 108	16.6
T. P. 77	45 56 03.43 67 46 38.89	$\begin{array}{c} 64 & 55 \\ 280 & 03 \end{array}$	T. P. 76 T. P. 78	8. 4 25. 2	т. Р. 108	45 56 04.13 67 46 25.17	$167 \ 47$ 316 39	T. P. 107 T. P. 109	10.3 12.7
T. P. 78	45 56 03.29 67 46 37.74	$\begin{array}{ccc} 100 & 03 \\ 242 & 49 \end{array}$	T. P. 77. T. P. 79	25. 2 18. 1	T. P. 109	45 56 03.83 67 46 24.76	$136 39 \\ 327 19$	T. P. 108 T. P. 110	12.7 14.6
т. р. 79	45 56 03.55 67 46 36.99	$\begin{array}{ccc} 62 & 49 \\ 188 & 57 \end{array}$	T. P. 78 T. P. 80	18.1 8.4	т. Р. 110	45 56 03.43 67 46 24.40	$147 19 \\ 28 34$	T. P. 109 T. P. 111	14. 6 6. 0
Т. Р. 80	45 56 03.82 67 46 36.94	8 57 239 57	T. P. 79 T. P. 81	8.4 14.4	т. Р. 111	45 56 03.26 67 46 24.53	$208 34 \\ 10 46$	T. P. 110 T. P. 112	6.0
T, P. 81	45 56 04.05 67 46 36.36	59 57 271 11	T. P. 80 T. P. 82	$ \begin{array}{c}     14.4 \\     21.9 \end{array} $	т. р. 112	45 56 02.99	$     190 \ 46 \\     311 \ 57 $	T. P. 111 T. P. 113	8.5 15.5
T. P. 82	$\begin{array}{c} 45 56 04.04 \\ 67 46 35.34 \end{array}$	$\begin{array}{c} 91 \ 11 \\ 326 \ 00 \end{array}$	T. P. 81 T. P. 83	21. 9 16. 5	т. Р. 113	45 56 02.66	131 57 290 02	T. P. 112 T. P. 114	15.5 16.5
т. Р. 83	45 56 03.60 67 46 34.91	$\frac{146}{296} \frac{00}{30}$	T. P. 82 T. P. 84	16. 5 17. 6	T. P. 114	45 56 02.48	110 02 0 53	T. P. 113 T. P. 115	16.5 14.2
т. р. 84	45 56 03.34 67 46 34.18	$     \begin{array}{r}       116 & 30 \\       243 & 44     \end{array} $	T. P. 83 T. P. 85	17.6	T. P. 115	45 56 02.02	180 53 19 54	Ť. P. 114 T. P. 116	14.2
т. Р. 85	45 56 03.54 67 46 33.60	$\begin{array}{c} 63 & 44 \\ 203 & 16 \end{array}$	T. P. 84 T. P. 86	14.0	T. P. 116	45 56 01.60	199 54 317 09	T. P. 115 T. P. 117	13.9
T. P. 86	45 56 03.70	$   \begin{array}{c}     23 & 16 \\     182 & 43   \end{array} $	T. P. 85 T. P. 87	5.4	T. P. 117	45 56 01.10 67 46 22.91	137 09 343 51	T. P. 116 T. P. 118	21.0

	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
т	. P. 118	• , " 45 56 00.71 67 46 22.75	• / // 163 51 291 27	T. P. 117 T. P. 119	$\begin{array}{c} 12. \ 6\\ 22. \ 8\end{array}$	T. P. 149	° ' '' 45 55 55 96 67 46 12 23	° ' '' 60 50 193 03	T. P. 148 T. P. 150	6. 8 8. 2
Т	. P. 119	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}111&27\\64&01\end{array}$	T. P. 118 T. P. 120	$22.8 \\ 11.6$	T. P. 150	$\begin{array}{r} 45 & 55 & 56. \ 22 \\ 67 & 46 & 12. \ 14 \end{array}$	$\begin{array}{c}13&03\\265&23\end{array}$	T. P. 149 T. P. 151	$8.2 \\ 12.1$
Т	. P. 120	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}244 & 01\\24 & 44\end{array}$	T. P. 119 T. P. 121	$\begin{array}{c} 11.\ 6\\ 11.\ 6\end{array}$	T. P. 151	$\begin{array}{r} 45 & 55 & 56. \ 25 \\ 67 & 46 & 11. \ 58 \end{array}$	$\begin{array}{c}85&23\\218&14\end{array}$	T. P. 150 T. P. 152	12. 1 12. 0
т	. P. 121	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 204 & 44 \\ 346 & 55 \end{array}$	T.P.120 T.P.122	$\begin{array}{c} 11.\ 6\\ 16.\ 0\end{array}$	T. P. 152	$\begin{array}{c} 45 \ 55 \ 56. \ 55 \\ 67 \ 46 \ 11. \ 24 \end{array}$	$\begin{array}{c} 38 & 14 \\ 297 & 42 \end{array}$	T. P. 151 T. P. 153	$12.0 \\ 7.8$
Т	. P. 122	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{c}166&55\\9&29\end{array}$	T. P. 121 T. P. 123	16. 0 8. 4	T. P. 153	$\begin{array}{c} 45 \\ 55 \\ 57 \\ 46 \\ 10 \\ 92 \end{array}$	$   \begin{array}{c}     117 & 42 \\     244 & 40   \end{array} $	T. P. 152 T. P. 154	7. 8 5. 2
Т	. P. 123	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 189 \ 29 \\ 300 \ 16 \end{array}$	T. P. 122 T. P. 124	8.4 $10.9$	T. P. 154	$\begin{array}{c} 45 \\ 55 \\ 57 \\ 46 \\ 10 \\ 70 \end{array}$	$\begin{smallmatrix}&64&40\\276&59\end{smallmatrix}$	T. P. 153 T. P. 155	$5.2 \\ 13.7$
Т	. P. 124	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}120&16\\331&36\end{array}$	T. P. 123 T. P. 125	$\begin{array}{c} 10. \ 9 \\ 11. \ 3 \end{array}$	T. P. 155	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$96 59 \\ 260 21$	T. P. 154 T. P. 156	$\begin{array}{c}13.\ 7\\6.\ 9\end{array}$
т	. P. 125	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{151}{296}  \frac{36}{55}$	T. P. 124 T. P. 126	$\begin{array}{c} 11.3\\ 5.9\end{array}$	T. P. 156	$\begin{array}{c} 45 \\ 67 \\ 67 \\ 46 \\ 09. \\ 76 \end{array}$	$\begin{array}{c} 80 \ 21 \\ 270 \ 43 \end{array}$	T. P. 155 T. P. 157	
т	. P. 126	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 116 & 55 \\ 324 & 26 \end{array}$	T. P. 125 T. P. 127	5. 9 13. 9	T. P. 157	$\begin{array}{c} 45 \ 55 \ 56. \ 48 \\ 67 \ 46 \ 08. \ 26 \end{array}$	$\begin{array}{c}90&43\\300&20\end{array}$	T. P. 156 T. P. 158	$\begin{array}{c} 32.\ 2\\ 6.\ 3\end{array}$
т	. P. 127	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}144 \hspace{0.1cm} 26\\ 39 \hspace{0.1cm} 56\end{array}$	T. P. 126 T. P. 128	$\begin{array}{c}13.\ 9\\7.\ 1\end{array}$	T. P. 158	$\begin{array}{c} 45 \\ 55 \\ 57 \\ 46 \\ 08 \\ 01 \end{array}$	$120 \ 20 \\ 269 \ 50$	T. P. 157 T. P. 159	$\begin{array}{c} 6.3\\ 15.7\end{array}$
т	. P. 128	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 219 & 56 \\ 14 & 41 \end{array}$	T. P. 127 T. P. 129	$\begin{array}{c} 7.1\\ 18.5 \end{array}$	T. P. 159	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 89 \ 50 \\ 335 \ 10 \end{array}$	T. P. 158 T. P. 160	15.7 9.9
т	. P. 129	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}194 \hspace{0.1cm} 41\\17 \hspace{0.1cm} 36\end{array}$	T. P. 128 T. P. 130	18.5 20.3	T. P. 160	$\begin{array}{c} 45 & 55 & 56. & 09 \\ 67 & 46 & 07. & 08 \end{array}$	$   \begin{array}{c}     155 & 10 \\     288 & 13   \end{array} $	T. P. 159 T. P. 161	$9,9\\10,4$
т	, P. 130	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 197 \ \ 36 \\ 328 \ \ 13 \end{array}$	T. P. 129 T. P. 131	$20.3 \\ 23.1$	T. P. 161	$\begin{array}{c} 45 & 55 & 55. \\ 67 & 46 & 06. \\ 63 \end{array}$	$\frac{108}{309}\;\frac{13}{51}$	T. P. 160 T. P. 162	$\begin{array}{c} 10.\ 4\\ 25.\ 2\end{array}$
т	. P. 131	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	${}^{148\ 13}_{349\ 36}$	T. P. 130 T. P. 132	$23.1 \\ 18.9$	T. P. 162	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 129 & 51 \\ 346 & 16 \end{array}$	T. P. 161 T. P. 163	$25.2 \\ 22.3$
т	. P. 132	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}169&36\\271&08\end{array}$	T. P. 131 T. P. 133	$18.9 \\ 13.5$	T. P. 163	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{smallmatrix}166&16\\43&41\end{smallmatrix}$	T. P. 162 T. P. 164	$\begin{array}{c} 22.3\\ 8.9 \end{array}$
т	. P. 133	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	91 08 313 07	T. P. 132 T. P. 134	$13.5 \\ 27.0$	T. P. 164	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 163 T. P. 165	$\begin{array}{c} 8.9\\ 10.2 \end{array}$
т	. P. 134	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 133 & 07 \\ 263 & 46 \\ 192 & 18 \end{array}$	T. P. 133 T. P. 135	27.0 9.5	T. P. 165	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}131&51\\358&08\end{array}$	T. P. 164 T. P. 166	$\begin{array}{c} 10.\ 2\\ 15.\ 8\end{array}$
т	. P. 135	45 55 55.02	83 46	T. P. 134	9.5	T. P. 166	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{r}       178 & 08 \\       321 & 45     \end{array} $	T. P. 165 T. P. 167	$\begin{array}{c}15.8\\23.0\end{array}$
т	. P. 136	45 55 54.55 67 46 19.07	134 34 200 01	T. P. 135	20. 4 20. 4	T. P. 167	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}141&45\\&4&51\end{array}$	T. P. 166 T. P. 168	$23.0 \\ 15.5$
т	. P. 137	45 55 54.57 67 46 17 58	88 01 267 00	T. P. 136	17.5	T. P. 168	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 184 & 51 \\ 338 & 50 \end{array}$	T. P. 167 T. P. 169	$\begin{array}{c} 15.5\\10.9\end{array}$
т	. P. 138	67 46 17. 58 45 55 54. 96	37 22	T. P. 138	15.0	T. P. 169	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$   \begin{array}{r}     158 & 50 \\     269 & 26   \end{array} $	T. P. 168 T. P. 170	$\begin{array}{c} 10.9\\ 20.1 \end{array}$
т	. P. 139	45 55 55.09	62 00	T. P. 139	8. 6 10. 0	Т. Р. 170	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 89 \ 26 \\ 316 \ 52 \end{array}$	T. P. 169 T. P. 171	$20.1 \\ 16.5$
т	. P. 140	45 55 54.95	285 05 105 06	T. P. 139	16.8	T. P. 171	$\begin{array}{c} 45 \ 55 \ 52 \ 02 \\ 67 \ 46 \ 03 \ 16 \end{array}$	$\begin{array}{c}136&52\\338&56\end{array}$	T. P. 170 T. P. 172	$     \begin{array}{c}       16.5 \\       12.7     \end{array}   $
т	. P. 141	45 55 55.17 67 46 15 04	200 59 20 59	T. P. 140	7.2	T. P. 172	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{158}{260}  \frac{56}{39}$	T. P. 171 T. P. 173	$     \begin{array}{r}       12.7 \\       13.7     \end{array} $
т	. P. 142	45 55 55.34 67 46 15 21	68 08 207 20	T. P. 141	14. 6 18. 7	T. P. 173	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 80 & 39 \\ 339 & 22 \end{array}$	T. P. 172 T. P. 174	$13.7 \\ 7.9$
т	. P. 143	45 55 55.06	117 29 267 17	T. P. 142	18.7	T. P. 174	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 159 & 22 \\ 304 & 36 \end{array}$	T. P. 173 T. P. 175	$\begin{array}{c} 7.9\\17.0\end{array}$
т	. P. 144	45 55 55.08 67 46 14 09	87 17 87 17	T. P. 143	11. 2	T. P. 175	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}124&36\\219&18\end{array}$	T. P. 174 T. P. 176	$\begin{array}{c} 17.\ 0\\ 9.\ 1\end{array}$
т	. P. 145	45 55 55.58 67 46 19 51	35 36 209 19	T. P. 144	18. 9 18. 9	T. P. 176	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 39 \hspace{0.1cm} 18 \\ 302 \hspace{0.1cm} 12 \end{array}$	T. P. 175 T. P. 177	9.1 $16.1$
т	. P. 146	45 55 55.33 67 46 19 80	118 18 245 01	T. P. 145	16.1	T. P. 177	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}122&12\\312&40\end{array}$	T. P. 176 T. P. 178	$\begin{array}{c} 16.1\\ 13.8 \end{array}$
т	. P. 147	45 55 55.45 67 46 12 49	65 21 178 04	T. P. 146	8.9 8.9	T. P. 178	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$132 40 \\ 351 29 \\ 202 00$	T. P. 177 T. P. 179 Travarse Station 6	13.8 5.6
т	, P. 148	45 55 55 85 67 46 12, 50	358 04 240 50	T. P. 147 T. P. 147	12.4 12.4 6.8	T. P. 179	$45 55 50.62 \\ 67 46 00.13$	171 29 284 24	T. P. 178 T. P. 180	5. 6 12, 9

BOUNDARY TURNING POINTS-MONUMENT BROOK-Continued

#### BOUNDARY TURNING POINTS-MONUMENT BROOK-Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
T. P. 180	° ' '' 45 55 50,52 67 45 59,55	° ' '' 104 24 327 20	T. P. 179 T. P. 181	$\begin{array}{c} 12.9\\ 14.3 \end{array}$	Т. Р. 211	° / // 45 55 41.61 67 45 53.06	$\circ$ ' '' 96 45 257 46	T. P. 210 T. P. 212	30. 7 12. 3
T. P. 181	45 55 50.13 67 45 59.19	$147 \ 20 \\ 351 \ 50$	T. P. 180 T. P. 182	$\begin{array}{c} 14.3\\ 15.4 \end{array}$	T. P. 212	45 55 41.70 67 45 52.50	$\begin{array}{c} 77 \ 46 \\ 298 \ 53 \end{array}$	T. P. 211. T. P. 213.	$12.3 \\ 13.5$
т. р. 182	45 55 49.64 67 45 59.09	$\begin{array}{c}171 \hspace{0.1cm} 50\\ 43 \hspace{0.1cm} 43\end{array}$	T. P. 181 T. P. 183	15.4 7.9	T. P. 213	45 55 41.49 67 45 51.95	$     118 53 \\     340 58   $	T. P. 212 T. P. 214	13. 5 20. 6
Т. Р. 183	45 55 49.45 67 45 59.35	$\begin{array}{ccc} 223 & 43 \\ 6 & 11 \end{array}$	T. P. 182 T. P. 184	7.9 13.5	Т. Р. 214	$\begin{array}{c} 45 \ 55 \ 40. \ 86 \\ 67 \ 45 \ 51. \ 64 \end{array}$	$\begin{array}{ccc} 160 & 58 \\ 252 & 22 \end{array}$	T. P. 213. T. P. 215.	20.6 11.6
т. р. 184	45 55 49.01 67 45 59.41	$\frac{186\ 11}{326\ 15}$	T. P. 183 T. P. 185	13. 5 11. 9	Т. Р. 215	45 55 40.97 67 45 51.12	$\begin{array}{ccc} 72 & 22 \\ 270 & 02 \end{array}$	T. P. 214 T. P. 216	$     \begin{array}{c}       11.6 \\       20.7     \end{array} $
T. P. 185	45 55 48.69 67 45 59.11	$\begin{array}{c}146 \hspace{0.1cm}15\\ \hspace{0.1cm}6 \hspace{0.1cm}35\end{array}$	T. P. 184 T. P. 186	$\begin{array}{c} 11.9\\ 14.7\end{array}$	Т. Р. 216	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 90 \ 02 \\ 241 \ 00 \end{array}$	T. P. 215 T. P. 217	20.7 11.0
T. P. 186	$\begin{array}{c} 45 \ 55 \ 48. \ 22 \\ 67 \ 45 \ 59. \ 19 \end{array}$	$\frac{186}{309} \frac{35}{12}$	T. P. 185 T. P. 187	$\begin{array}{c} 14.7\\17.3\end{array}$	Т. Р. 217	45 55 41.14 67 45 49.72	$\begin{array}{c} 61 & 00 \\ 281 & 13 \end{array}$	T. P. 216. T. P. 218	11. 0 20. 2
<b>T</b> . P. 187	45 55 47.87 67 45 58.56	$129 \ 12 \\ 27 \ 48$	T. P. 186 T. P. 188	$\begin{array}{c}17.3\\11.3\end{array}$	T. P. 218	45 55 41.02 67 45 48.79	$\frac{101}{278} \frac{13}{53}$	T. P. 217. T. P. 219	$20.2 \\ 33.8$
T. P. 188	45 55 47.54 67 45 58.81	$207 \ 48 \\ 346 \ 53$	T. P. 187 T. P. 189	$\begin{array}{c}11.\ 3\\14.\ 3\end{array}$	Т. Р. 219	$\begin{array}{c} 45 & 55 & 40.85 \\ 67 & 45 & 47.24 \end{array}$	98 53 336 39	T. P. 218. T. P. 220.	33. 8 12. 9
Т. Р. 189	45 55 47.09 67 45 58.66	$\begin{smallmatrix}166&53\\47&21\end{smallmatrix}$	T. P. 188 T. P. 190	$\begin{array}{c} 14.3\\11.0\end{array}$	Т. Р. 220	45 55 40.46 67 45 47.00	$\frac{156}{296}  \frac{39}{47}$	T. P. 219. T. P. 221.	$12.9 \\ 17.5$
т. Р. 190	45 55 46.85 67 45 59.03	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 189 T. P. 191	$\begin{array}{c} 11.0\\ 13.3\end{array}$	Т. Р. 221	$\begin{array}{c} 45 \ 55 \ 40. \ 21 \\ 67 \ 45 \ 46. \ 28 \end{array}$	$     116 \ 47 \\     278 \ 57     $	T. P. 220 T. P. 222	17.5 18.8
т. Р. 191	$\begin{array}{c} 45 \\ 67 \\ 67 \\ 45 \\ 58 \\ 63 \end{array}$	$\begin{array}{c} 139 \ 24 \\ 36 \ 59 \end{array}$	T. P. 190 T. P. 192	$\begin{array}{c}13.3\\29.7\end{array}$	Т. Р. 222	$\begin{array}{r} 45 \ 55 \ 40. \ 11 \\ 67 \ 45 \ 45. \ 42 \end{array}$	98 57 303 26	T. P. 221. T. P. 223	18.8 32,9
Т. Р. 192	$\begin{array}{c} 45 \ 55 \ 45.\ 76 \\ 67 \ 45 \ 59.\ 46 \end{array}$	$\begin{array}{c} 216 \hspace{0.1cm} 59 \\ 67 \hspace{0.1cm} 21 \end{array}$	T. P. 191 T. P. 193	$29.7 \\ 23.5$	Т. Р. 223	$\begin{array}{r} 45 \ 55 \ 39. \ 53 \\ 67 \ 45 \ 44. \ 14 \end{array}$	$\begin{array}{cccc} 123 & 26 \\ 215 & 58 \end{array}$	T. P. 222. T. P. 224	$32.9 \\ 14.0$
Т. Р. 193	$\begin{array}{c} 45 \ 55 \ 45. \ 46 \\ 67 \ \ 46 \ \ 00. \ 47 \end{array}$	$\begin{array}{c} 247 \hspace{0.1cm} 21 \\ 15 \hspace{0.1cm} 19 \end{array}$	T. P. 192 T. P. 194	$23.5 \\ 15.9$	T. P. 224	$\begin{array}{r} 45 \ 55 \ 39. \ 89 \\ 67 \ 45 \ 43. \ 76 \end{array}$	$\begin{array}{c} 35 \\ 235 \\ 41 \end{array}$	T. P. 223. T. P. 225	$14.0 \\ 12.4$
Т. Р. 194	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}195 \hspace{0.1cm}19\\ 34 \hspace{0.1cm}00\end{array}$	T. P. 193 T. P. 195	15. 9 9. 7	т. р. 225	$\begin{array}{c} 45 & 55 & 40. \ 12 \\ 67 & 45 & 43. \ 29 \end{array}$	$\begin{array}{c} 55 \hspace{0.1cm} 41 \\ 301 \hspace{0.1cm} 24 \end{array}$	T. P. 224 T. P. 226	$12.4^{\circ}$ 9,2
т. р. 195	45 55 44.71 67 46 00.91	$\begin{array}{c}214 \\ 10 \\ 34\end{array}$	T. P. 194 T. P. 196	9.7 9.3	Т. Р. 226	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 121 & 24 \\ 268 & 35 \end{array}$	T. P. 225 T. P. 227	9.2 <sup>•</sup> 17.7
Т. Р. 196	45 55 44.41 67 46 00.99	$\begin{array}{c}190&34\\294&42\end{array}$	T. P. 195 T. P. 197	$9.3 \\ 13.2$	Т. Р. 227	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	88 35 300 13	T. P. 226. T. P. 228.	17. 7 29. 7
T. P. 197	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 114 & 42 \\ 358 & 53 \end{array}$	T. P. 196 T. P. 198	$\begin{array}{c}13.\ 2\\21.\ 7\end{array}$	т. р. 228	45 55 39.50	26 04 120 13	Traverse Station 8. T. P. 227	11. 6 29. 7
Т. Р. 198	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}178&53\\47&50\end{array}$	T. P. 197 T. P. 199	$21.7 \\ 23.6$	Т. Р. 229	45 55 38.72 47 45 20 78	134 24 134 24	T. P. 228	34.3
т. Р. 199	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 227 & 50 \\ 327 & 17 \end{array}$	T. P. 198 T. P. 200	$23.6 \\ 30.2$	Т. Р. 230	45 55 37.41 67 45 20 48	170 58	T. P. 229	40.9
Т. Р. 200	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}147&17\\&9&34\end{array}$	T. P. 199 T. P. 201	$30.2 \\ 21.6$	T. P. 231	45 55 36.59 67 45 20 59	1 47 181 47 281 02	T. P. 230	25. 6 12. 0
Т. Р. 201	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 189 & 34 \\ 299 & 21 \end{array}$	T. P. 200 T. P. 202	$21.6 \\ 15.8$	Т. Р. 232	45 55 36.50 67 45 28 80	101 02 212 42	T. P. 231	13. 9 13. 9 26. 9
Т. Р. 202	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 119 & 21 \\ 266 & 41 \end{array}$	T. P. 201 T. P. 203	15.8 8.3	Т. Р. 233	45 55 35.71 67 45 27 65	132 42 276 42	T. P. 232	36. 2 12. 8
Т. Р. 203	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 86 & 41 \\ 298 & 06 \end{array}$	T. P. 202 T. P. 204	$\begin{array}{c} 8.3\\10.3\end{array}$	Т. Р. 234	45 55 35 66 67 45 37 06	96 43 218 17	T. P. 233	12.8
Т. Р. 204	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 118 & 06 \\ 267 & 25 \\ 298 & 06 \end{array}$	T. P. 203. T. P. 205. Ref. Mon. 3	$10.3 \\ 34.1 \\ 11.6$	T. P. 235	45 55 35.92 67 45 36 77	38 17 261 05	T. P. 234 T. P. 234	10.3
T. P. 205	45 55 41.16	87 25 247 59	T. P. 204 T. P. 206	34. 1 22. 1	T. P. 236	45 55 35.99 67 45 36 16	81 05 217 10	T. P. 235 T. P. 235	13. 4 7. 2
T. P. 206	45 55 41.42 67 45 56 66	67 59 226 36	T. P. 205 T. P. 207.	22. 1 14. 3	T. P. 237	45 55 36.17 67 45 35.96	$37 10 \\ 252 44$	T. P. 236 T. P. 238	7.2
T. P. 207	45 55 41.74 67 45 56 18	46 36 259 42	T. P. 206 T. P. 208	14. 3 13. 5	T. P. 238	45 55 36.32 67 45 35.27	72 44 297 35	T. P. 237 T. P. 239.	15.6 19.2
T. P. 208	45 55 41.82	79 42 283 17	T. P. 207 T. P. 209	13.5	Т. Р. 239	45 55 36.04 67 45 34 47	117 35 288 42	T. P. 238. T. P. 240	19. 2 13. 8
T. P. 209	45 55 41.76 67 45 55 18	$   \begin{array}{c}     103 & 17 \\     272 & 56   \end{array} $	T. P. 208 T. P. 210	8.3 15.2	т. р. 240	45 55 35.89 67 45 33.87	108 42 298 13	T. P. 239 T. P. 241	13. 8 21. 8
T. P. 210	45 55 41.73 67 45 54.48	92 56 276 45	T. P. 209 T. P. 211	15. 2 30. 7	T. P. 241	45 55 35, 56 67 45 32, 98	$\begin{array}{c}118&13\\346&33\end{array}$	T. P. 240 T. P. 242	21. 8 20. 5

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Т. Р. 242	° ' '' 45 55 34.91 67 45 32.76	° / ″ 166 33 318 39	T. P. 241 T. P. 243	20. 5 22. 9	Т. Р. 273	° ' '' 45 55 19.38 67 45 23.86	$\circ$ ' '' 139 35 252 34	T. P. 272 T. P. 274	$26.3 \\ 18.5$
т. р. 243	$\begin{array}{r} 45 & 55 & 34.  36 \\ 67 & 45 & 32.  05 \end{array}$	$\begin{array}{c}138&39\\5&11\end{array}$	T. P. 242 T. P. 244	$22.9 \\ 26.4$	T. P. 274	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 72 & 34 \\ 284 & 23 \end{array}$	T. P. 273 T. P. 275	$     18.5 \\     22.6 $
т. р. 244	$\begin{array}{r} 45 & 55 & 33. \ 51 \\ 67 & 45 & 32. \ 17 \end{array}$	$     185 11 \\     40 35   $	T. P. 243 T. P. 245	$   \begin{array}{c}     26.4 \\     23.0   \end{array} $	т. р. 275	$\begin{array}{c} 45 & 55 & 19.  38 \\ 67 & 45 & 22.  02 \end{array}$	$\begin{array}{ccc} 104 & 23 \\ 331 & 51 \end{array}$	T. P. 274 T. P. 276	$22.6 \\ 24.0$
т. р. 245	45 55 32.94 67 45 32.86	$220 \ 35 \\ 323 \ 26$	T. P. 244 T. P. 246	23.0 15.3	Т. Р. 276	$\begin{array}{c} 45 \ 55 \ 18. \ 69 \\ 67 \ 45 \ 21. \ 50 \end{array}$	$   \begin{array}{ccccccccccccccccccccccccccccccccccc$	T. P. 275 T. P. 277	24. 0 18. 0
т. Р. 246	45 55 32.54 67 45 32.44	$143 \ 26 \\ 50 \ 17$	T. P. 245 T. P. 247	$15.3 \\ 10.6$	T. P. 277	$\begin{array}{c} 45 \ 55 \ 18. \ 66 \\ 67 \ 45 \ 20. \ 66 \end{array}$	$92 \ 46 \\ 333 \ 15$	T. P. 276 T. P. 278	18.0 $16.6$
т. р. 247	$\begin{array}{r} 45 & 55 & 32.32 \\ 67 & 45 & 32.82 \end{array}$	$230 \ 17 \\ 11 \ 25$	T. P. 246 T. P. 248	10.6 9.7	T. P. 278	$\begin{array}{c} 45 \ 55 \ 18. \ 18 \\ 67 \ 45 \ 20. \ 32 \end{array}$	$\begin{array}{ccc} 153 & 15 \\ 334 & 43 \end{array}$	T. P. 277. T. P. 279	$\begin{array}{c} 16. \ 6 \\ 15. \ 4 \end{array}$
т. р. 248	45 55 32.01 67 45 32.91	$     191 25 \\     353 03     $	T. P. 247 T. P. 249	9.7 32.1	T. P. 279	$\begin{array}{c} 45 \ 55 \ 17.\ 73 \\ 67 \ 45 \ 20.\ 01 \end{array}$	$   \begin{array}{r}     154 & 43 \\     269 & 27   \end{array} $	T. P. 278 T. P. 280	$15.4 \\ 39.8$
т. р. 249	45 55 30.98 67 45 32.73	$173 \ 03 \\ 30 \ 03$	T. P. 248 T. P. 250	$32.1 \\ 24.9$	T. P. 280	45 55 17.75 67 45 18.17	89 27 296 11	T. P. 279. T. P. 281	$39.8 \\ 31.4$
т. Р. 250	45 55 30.28 67 45 33.31	210 03 318 08	T. P. 249 T. P. 251	$24.9 \\ 18.7$	T. P. 281	$\begin{array}{c} 45 \ 55 \ 17. \ 30 \\ 67 \ 45 \ 16. \ 86 \end{array}$	$\begin{array}{c} 116 \hspace{0.1cm} 11 \\ 249 \hspace{0.1cm} 44 \end{array}$	T. P. 280 T. P. 282	$\begin{array}{c} 31.4\\ 9.6\end{array}$
т. Р. 251	45 55 29.83 67 45 32.73	$138 \ 08 \\ 34 \ 04$	T. P. 250 T. P. 252	18.7 13.0	T. P. 282	45 55 17.41 67 45 16.44	$\begin{array}{c} 69 \ 44 \\ 281 \ 20 \end{array}$	T. P. 281 T. P. 283	9.6 8.7
т. Р. 252	45 55 29.48 67 45 33.07	$214 \ 04 \\ 6 \ 52$	T. P. 251 T. P. 253	13.0 24,5	Т. Р. 283	$\begin{array}{c} 45 \ 55 \ 17. \ 35 \\ 67 \ 45 \ 16. \ 04 \end{array}$	$   \begin{array}{cccc}     101 & 20 \\     333 & 16   \end{array} $	T. P. 282 T. P. 284	8.7 27.8
Т. Р. 253	45 55 28.69 67 45 33.21	$186 52 \\ 64 50$	T. P. 252 T. P. 254	24.5 22.0	Т. Р. 284	$\begin{array}{c} 45 \ 55 \ 16, 55 \\ 67 \ 45 \ 15, 46 \end{array}$	$     153 \ 16 \\     313 \ 44 $	T. P. 283 T. P. 285	$27.8 \\ 15.4$
т. р. 254	45 55 28.39 67 45 34.13	$244 50 \\ 6 15$	T. P. 253 T. P. 255	22.0 34.7	Т. Р. 285	45 55 16.21 67 45 14.95	$     133 \ 44 \\     354 \ 15     $	T. P. 284 T. P. 286	15.4 17.7
т. р. 255	45 55 27.27 67 45 34.31	$186 \ 15 \\ 329 \ 41$	T. P. 254 T. P. 256	34.7 27.7	T. P. 286	$\begin{array}{c} 45 \ 55 \ 15. \ 64 \\ 67 \ 45 \ 14. \ 86 \end{array}$	$174 \ 15 \\ 57 \ 42$	T. P. 285 T. P. 287	17.7 18.6
т. Р. 256	45 55 26.50 67 45 33.66	149 41 301 33	T. P. 255 T. P. 257	27.7 17.3	Т. Р. 287	$\begin{array}{c} 45 \ 55 \ 15. \ 32 \\ 67 \ 45 \ 15. \ 59 \end{array}$	$237 \ 42 \\ 347 \ 57$	T. P. 286 T. P. 288	18.6 18.6
T. P. 257	$\begin{array}{c} 45 & 55 & 26.  21 \\ 67 & 45 & 32.  98 \end{array}$	$     \begin{array}{c}       121 & 33 \\       333 & 06     \end{array} $	T. P. 256 T. P. 258	17.3 26.6	т. р. 288	45 55 14.73 67 45 15.41	$     \begin{array}{r}       167 & 57 \\       296 & 15     \end{array} $	T. P. 287. T. P. 289	$     18.6 \\     24.1 $
Т. Р. 258	45 55 25.44	84 09 153 06	Traverse Station 10 T. P. 257	10. 5 26. 6	Т. Р. 289	$\begin{array}{c} 45 \ 55 \ 14.38 \\ 67 \ 45 \ 14.41 \end{array}$	$     \begin{array}{r}       116 \ 15 \\       346 \ 31     \end{array} $	T. P. 288. T. P. 290.	24. 1 7. 3
T. P. 259	67 45 32,42 45 55 24.58	355 59 175 59	T. P. 259 T. P. 258	26.8 26.8	т. р. 290	$\begin{array}{c} 45 \ 55 \ 14. 15 \\ 67 \ 45 \ 14. 33 \end{array}$	$   \begin{array}{c}     166 & 31 \\     308 & 26   \end{array} $	T. P. 289 T. P. 291	7.3 40.9
Т. Р. 260	67 45 32.33 45 55 24.28	294 16 114 16	T. P. 260 T. P. 259	22, 1 22, 1	Т. Р. 291	45 55 13.33 67 45 12.84	$128 \ 26 \\ 346 \ 05$	T. P. 290 T. P. 292	40. 9 47. 0
T. P. 261	67 45 31.40 45 55 23.77	0 56 180 56	T. P. 261 T. P. 260	15, 9 15, 9	Т. Р. 292	45 55 11.85 67 45 12.32	$166 \ 05 \\ 7 \ 03$	T. P. 291 T. P. 293	47. 0 7. 0
T P 262	67 45 31.41 45 55 23.18	314 34 134 34	T. P. 262 T. P. 261	26.0 26.0	Т. Р. 293	45 55 11.63 67 45 12.36	$     187 03 \\     295 30   $	T. P. 292 T. P. 294	7.0 39.7
т. Р. 263	67 45 30.55 45 55 22.88	344 58 164 58	T. P. 263 T. P. 262	9.6 9.6	Т. Р. 294	45 55 11.07 67 45 10.69	$     115 30 \\     336 02   $	T. P. 293 T. P. 295	39.7 16.4
T P 264	67 45 30.43 45 55 22.67	309 46 129 46	T. P. 264 T. P. 263	10.0 10.0	т. р. 295	45 55 10, 59 67 45 10, 38	$156 02 \\ 79 34$	T. P. 294 T. P. 296	$\begin{array}{c} 16.4\\ 20.6\end{array}$
T P 265	67 45 30.07 45 55 22.02	353 58 173 58	T. P. 265 T. P. 264	20.1 20.1	Т. Р. 296	45 55 10.47 67 45 11.31	$259 34 \\ 356 26$	T. P. 295 T. P. 297	20. 6 16. 9
T P. 266	67 45 29.98 45 55 21.94	277 57 97 57	T. P. 266 T. P. 265	18.1 18.1	т. р. 297	$\begin{array}{c} 45 \ 55 \ 09. \ 92 \\ 67 \ 45 \ 11. \ 26 \end{array}$	$176\ 26\ 19\ 03$	T. P. 296 T. P. 298	16. 9 32. 2
'Т Р 267	67 45 29.15 45 55 21.88	274 39 94 39	T. P. 267 T. P. 266.	21.6 21.6	T. P. 298	45 55 08.94	255 22 199 03	Traverse Station 11 T. P. 297	42. 6 32. 2
"T P 268	67 45 28.15 45 55 21.78	273 11 93 11	T. P. 268 T. P. 267	54.9 54.9	Т. Р. 299	67 45 11.75 45 55 08.49	324 47 144 47	T. P. 299	17.1 17.1
T. P. 269	67 45 25.60 45 55 21 15	339 00 159 00	T. P. 269 T. P. 268.	21.0	T. P. 300	67 45 11.29 45 55 08.43	276 15 96 15	T. P. 300 T. P. 299	16. 8 16. 8
FD D 070	67 45 25.25	290 34	T. P. 270	11.7	T P 201	67 45 10.51 45 55 07 70	295 37 115 37	T. P. 301	46.2
T. P. 2/0	45 55 21.01 67 45 24.74	305 40	T. P. 271	11.7 16.6	1.1.001	67 45 08.58	319 00	T. P. 302	26.1
Т. Р. 271	45 55 20.70 67 45 24.12	$125 \ 40 \\ 28 \ 43$	T. P. 270. T. P. 272	$     \begin{array}{c}       16.6 \\       23.7     \end{array} $	T. P. 302	45 55 07.15 67 45 07.79	$     \begin{array}{r}       139 & 00 \\       38 & 26     \end{array} $	T. P. 301	26. 1 12. 3
Т. Р. 272	45 55 20.03	208 43	T. P. 271 T. P. 273	23.7 26.3	T. P. 303	45 55 06.84 67 45 08.14	$218 \ 26 \\ 340 \ 05$	T. P. 302 T. P. 304	12.3 14.8

#### BOUNDARY TURNING POINTS-MONUMENT BROOK-Continued

## BOUNDARY TURNING POINTS-MONUMENT BROOK-Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
T. P. 304	° / ″ 45 55 06.39 67 45 07 91	° / // 160 05 306 50	T. P. 303 T. P. 305	14. 8 14. 9	T. P. 335	° ' '' 45 54 50.52 67 45 17.90	° / // 216 44 334 10	T. P. 334 T. P. 336	$\begin{array}{c} 15.1\\ 45.0\end{array}$
T. P. 305	45 55 06. 10 67 45 07 36	126 50 336 16	T. P. 304	$     \begin{array}{r}       14.9 \\       20.1     \end{array} $	т. Р. 336	45 54 49.20 67 45 16.99	$154 \ 10 \\ 17 \ 50$	T. P. 335 T. P. 337	$45.0 \\ 37.2$
т. Р. 306	45 55 05. 51	156 16 231 11	T. P. 305	20.1 27.8	т. Р. 337	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$197 50 \\ 47 13$	T. P. 336 T. P. 338	37. 2 33. 9
T. P. 307	45 55 04.72	151 11 283 27	T. P. 306	27. 8 30. 8	т. р. 338	$\begin{array}{r} 45 & 54 & 47.  31 \\ 67 & 45 & 18.  68 \end{array}$	$227 \ 13 \\ 25 \ 51$	T. P. 337 T. P. 339	$33.9 \\ 21.0$
T. P. 308	45 55 04.49 67 45 04 98	103 27 316 22	T. P. 307 T. P. 309	$30.8 \\ 17.4$	т. Р. 339	45 54 46.70 67 45 19.10	$205 51 \\ 350 06$	T. P. 338 T. P. 340	$21.0 \\ 24.0$
T. P. 309	45 55 04.08 67 45 04 42	136 22 5 20	T. P. 308 T. P. 310	17.4 $18.4$	т. р. 340	45 54 45.93 67 45 18.91	$\begin{array}{c}170 \hspace{0.1cm} 06\\15 \hspace{0.1cm} 11\end{array}$	T. P. 339 T. P. 341	$24.0 \\ 16.3$
т. Р. 310	45 55 03.49 67 45 04 50	185 20 49 37	T. P. 309 T. P. 311	$18.4 \\ 14.9$	T. P. 341	45 54 45.42 67 45 19.11	$195 \ 11 \\ 39 \ 03$	T. P. 340 T. P. 342	$16.3 \\ 26.4$
T. P. 311	45 55 03.18 67 45 05.02	229 37 39 32	T. P. 310	$14.9 \\ 17.5$	Т. Р. 342	45 54 44.76 67 45 19.88	$219 \ 03 \\ 90 \ 26$	T. P. 341 T. P. 343	$ \begin{array}{c} 26.4 \\ 43.9 \end{array} $
т. Р. 312	45 55 02.74 67 45 05.54	$219 32 \\ 109 47$	T. P. 311	17.5 39.4	Т. Р. 343	45 54 44.77 67 45 21.92	$270 \ 26 \\ 20 \ 11$	T. P. 342 T. P. 344	43. 9 22. 9
T. P. 313	45 55 03.18 67 45 07.26	289 47 59 39	T. P. 312 T. P. 314	39.4 22.4	т. р. 344	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 200 \hspace{0.1cm} 11 \\ 324 \hspace{0.1cm} 17 \end{array}$	T. P. 343 T. P. 345	22. 9 25. 2
т. Р. 314	45 55 02.81 67 45 08.16	$239 \ 39 \ 5 \ 27$	T. P. 313 T. P. 315	22. 4 24. 0	T. P. 345	45 54 43.41 67 45 21.60	$\frac{144}{355} \frac{17}{14}$	T. P. 344 T. P. 346	25. 2 26. 6
T. P. 315	45 55 02.04 67 45 08.26	$     185 \ 27 \\     326 \ 01     $	T. P. 314 T. P. 316	24. 0 39. 2	Т. Р. 346	45 54 42.55 67 45 21.50	$175 \ 14 \\ 95 \ 52$	T. P. 345 T. P. 347	26. 6 31. 8
T. P. 316	45 55 00.99 67 45 07.25	146 01 356 37	T. P. 315 T. P. 317	39. 2 32. 6	T. P. 347	45 54 42.66 67 45 22.97	$275 52 \\ 123 44$	T. P. 346 T. P. 348	31. 8 31. 5
т. р. 317	45 54 59.93 67 45 07.16	$176 \ 37$ 22 33	T. P. 316 T. P. 318	32. 6 25. 6	T. P. 348	45 54 43.23 67 45 24.18	$\begin{array}{c} 303 & 44 \\ 110 & 20 \end{array}$	T. P. 347 T. P. 349	31.5 62.1
T. P. 318	$\begin{array}{c} 45 & 54 & 59. 17 \\ 67 & 45 & 07. 62 \end{array}$	$202 \ 33 \\ 84 \ 23$	T. P. 317 T. P. 319	25. 6 16. 2	Т. Р. 349	45 54 43.92 67 45 26.88	290 20 79 15	T. P. 348 T. P. 350	62. 1 30. 3
T. P. 319	45 54 59.12 67 45 08.36	$264 \ 23 \\ 119 \ 34$	T. P. 318 T. P. 320	16. 2 37. 0	Т. Р. 350	45 54 43.74 67 45 28.26	$259\ 15\ 128\ 08$	T. P. 349 T. P. 351	- 30. 3 44. 0
T. P. 320	45 54 59.71 67 45 09.85	299 34 90 44	T. P. 319 T. P. 321	- 37. 0 25. 4	T. P. 351	45 54 44.62 67 45 29.87	$308 & 08 \\ 94 & 59$	T. P. 350 T. P. 352	44.0 18.5
T. P. 321	45 54 59.72 67 45 11.03	270 44 2 33	T. P. 320 T. P. 322	25.4	Т. Р. 352	- 45 54 44.68 67 45 30.74	$274 59 \\ 28 34$	T. P. 351 T. P. 353	18.5 14.2
т. р. 322	45 54 59.10 67 45 11.07	$     182 \ 33 \\     321 \ 46     $	T. P. 321 T. P. 323	19. 2	T. P. 353	- 45 54 44.27 67 45 31.05	$208 \ 34 \\ 11 \ 34$	T. P. 352 T. P. 354	14. 2 30. 7
		$     \begin{array}{r}       308 58 \\       329 43     \end{array} $	Ref. Mon. 4 Ref. Mon. 5	- 43.0	T. P. 354	- 45 54 43.30 67 45 31.34	$\begin{array}{c}191&34\\&41&23\end{array}$	T. P. 353 T. P. 355	30.7 20.8
Т. Р. 323	45 54 57.09 67 45 08.81	$     \begin{array}{r}       141 \ 46 \\       357 \ 12     \end{array} $	T. P. 322 T. P. 324	25.7	T. P. 355	- 45 54 42.80 67 45 31.98	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 354 T. P. 356	20. 8 26. 8
T. P. 324	45 54 56.26 67 45 08.75	$177 12 \\ 57 14$	T. P. 323 T. P. 325		T. P. 356	- 45 54 41.94 67 45 32.28	$\begin{array}{c c} 191 & 47 \\ 52 & 19 \end{array}$	T. P. 355 T. P. 357	26. 8 21. 6
Т. Р. 325	- 45 54 55.49 67 45 10.46	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 324 T. P. 326	- 43. 9 18. 4	T. P. 357	45 54 41. 52 67 45 33. 05	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 356 T. P. 358	21. 6 21. 9
T. P. 326	- 45 54 54.93 67 45 10.72	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 325 T. P. 327	18.4	Т. Р. 358	45 54 40.83 67 45 33.25	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 357 T. P. 359	21. 9 15. 2
T. P. 327	45 54 54, 13 67 45 09, 78	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 326 T. P. 328	31. 8 16. 3	T. P. 359	45 54 40.48 67 45 33.70	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 358 T. P. 360	
T. P. 328	- 45 54 53.60 67 45 09.80	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 327 T. P. 329	16.3 14.4			82 11	14.	94.7
т. Р. 329	$\begin{array}{c} - & 45 & 54 & 53. \ 26 \\ 67 & 45 & 10. \ 26 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 328 T. P. 330	14.4 52.4	T. P. 360	45 54 39.6 67 45 33.7	8 180 57 8 42 20	T. P. 361	70.5
т. Р. 330	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	8 267 23 9 59 06	T. P. 329 T. P. 331	52.4	T. P. 361	45 54 38.0 67 45 35.9	$     \begin{array}{ccccccccccccccccccccccccccccccccc$	T. P. 362	22.1
T. P. 331	- 45 54 51.90 67 45 15.65	$     \begin{array}{ccccccccccccccccccccccccccccccccc$	T. P. 330 T. P. 332	73.	5 T. P. 362	45 54 37.5 67 45 36.8	8 233 58 1 24 02	T. P. 361 T. P. 363	8.3
T. P. 332	- 45 54 50.8 67 45 15.1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 331. T. P. 333	36. 16.	6 T. P. 363	45 54 37.3 67 45 36.9	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 364	- 11.5
T. P. 333	45 54 50.4 67 45 15.6	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 332. T. P. 334	16.	8 T. P. 364	45 54 37.1 67 45 37.4	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 363 T. P. 365	21.0
T. P. 334	- 45 54 50.9 67 45 17.4	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 333 T. P. 335	41. 15.	$\begin{bmatrix} 3 \\ 1 \end{bmatrix}$ T. P. 365	45 54 36.5 67 45 37.9	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 364 T. P. 366	21.0

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
т. Р, 366	• / // 45 54 36.42 67 45 38.31	° ' '' 247 32 20 49	T. P. 365. T. P. 367	9.1 11.8	Т. Р. 397	° / // 45 54 12.04 67 46 09.39	° / // 192 24 331 47	T. P. 396 T. P. 398	$156.2 \\ 54.0$
т. р. 367	45 54 36.06 67 45 38.50	$\begin{array}{c} 200 \hspace{0.1cm} 49 \\ 42 \hspace{0.1cm} 20 \end{array}$	T. P. 366 T. P. 368	11. 8 35. 0	Т. Р. 398	45 54 10.50 67 46 08.20	$151 \ 47 \\ 0 \ 40$	T. P. 397 T. P. 399	54.0 40.3
T. P. 368	45 54 35.23 67 45 39.60	$\begin{array}{cccc} 222 & 20 \\ 103 & 07 \end{array}$	T. P. 367 T. P. 369	35.0 72.0	T. P. 399	45 54 09.19 67 46 08.22	$     180 \ 40 \\     40 \ 24   $	T. P. 398 T. P. 400	40.3
T. P. 369	45 54 35.76 67 45 42.85	$283 \ 07 \\ 167 \ 23$	T. P. 368 T. P. 370	72. 0 51. 5	T. P. 400	45 54 08.49	$220 24 \\ 4 46$	T. P. 399	28. 2 75. 3
т. р. 370	45 54 37.38 67 45 43.37	$347 23 \\ 140 10$	T. P. 369 T. P. 371	51.5 35.7	т Р. 401	45 54 06.06 67 46 09.36	$     184 \ 46 \\     41 \ 38   $	T. P. 400 T. P. 402	75.3 14.0
т. р. 371	45 54 38.27 67 45 44.43	$320 \ 10 \\ 95 \ 17$	T. P. 370 T. P. 372	35. 7 13. 1	т. р. 402	45 54 05.70 67 46 09 82	221 38 61 47	T. P. 401 T. P. 403	14. 9 47. 2
т. р. 372	45 54 38.31 67 45 45.04	$\begin{array}{c} 275 \hspace{0.1cm} 17 \\ 41 \hspace{0.1cm} 43 \end{array}$	T. P. 371 T. P. 373	$13.1 \\ 17.0$	Т. Р. 403	45 54 04.98 67 46 11 75	$241 \ 47 \\ 18 \ 20$	T. P. 402 T. P. 404	47.2
Т. Р. 373	45 54 37.90 67 45 45.56	$\begin{array}{ccc} 221 & 43 \\ 13 & 34 \end{array}$	T. P. 372 T. P. 374	17.0 26.1	Т. Р. 404	$45 54 03.48 \\ 67 46 12.46$	198 20 345 41	T. P. 403 T. P. 405	48.6
т. р. 374	45 54 37.08 67 45 45.85	$\begin{array}{c}193&34\\50&22\end{array}$	T. P. 373 T. P. 375	26.1 18.5	Т. Р. 405	45 54 01.81 67 46 11 85	165 41 269 37	T. P. 404	53. 5 55. 6
Т. Р. 375	45 54 36.70 67 45 46.51	$230 \ 22 \\ 113 \ 14$	T. P. 374 T. P. 376	18.5 11.8	Т. Р. 406	45 54 01.82 67 46 09 27	89 37 346 13	T. P. 405 T. P. 407	55. 6 56. 8
T. P. 376	45 54 36.84 67 45 47.01	$\begin{array}{c} 293 \hspace{0.1cm} 14 \\ 144 \hspace{0.1cm} 03 \end{array}$	T. P. 375 T. P. 377	$   \begin{array}{c}     11.8 \\     23.1   \end{array} $			133 14	Traverse Station 18-F.	6.7
T. P. 377	$\begin{array}{r} 45 & 54 & 37.45 \\ 67 & 45 & 47.64 \end{array}$	$324 \ 03 \\ 169 \ 44$	T. P. 376 T. P. 378	23.1 15.0	Т. Р. 407	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{smallmatrix}166&13\\37&37\end{smallmatrix}$	T. P. 406 T. P. 408	$56.8 \\ 37.2$
T. P. 378	$\begin{array}{r} 45 & 54 & 37. \\ 67 & 45 & 47. \\ 76 \end{array}$	$349 44 \\ 144 03$	T. P. 377 T. P. 379	15. 0 16. 0	Т. Р. 408	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{smallmatrix}217&37\\&4&03\end{smallmatrix}$	T. P. 407 T. P. 409	$\begin{array}{c} 37.\ 2\\77.\ 1\end{array}$
T. P. 379	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	324 03 100 32	T. P. 378 T. P. 380	16. 0 89. 0	Т. Р. 409	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}184&03\\273&08\end{array}$	T. P. 408 T. P. 410	$\begin{array}{c} 77.\ 1\\ 40.\ 3\end{array}$
т. р. 380	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	280 32 36 27	T. P. 379 T. P. 381	89. 0 26. 4	T. P. 410	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 93 & 08 \\ 307 & 04 \end{array}$	T. P. 409 T. P. 411	40. 3 22. 5
т. Р. 381	45 54 38.19 67 45 52.98	216 27 355 32	T. P. 380 T. P. 382	26. 4 77 3	T. P. 411	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$127 \ 04 \\ 331 \ 21$	T. P. 410 T. P. 412	22, 5 27, 7
T. P. 382	45 54 35 69 67 45 52 70	$   \begin{array}{c}     175 & 32 \\     27 & 19   \end{array} $	T. P. 381 T. P. 383	77.3	Т. Р. 412	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}151&21\\352&04\end{array}$	T. P. 411 T. P. 413	27.7 23.6
Т. Р. 383	$\begin{array}{r} 45 & 54 & 34. \\ 67 & 45 & 53. \\ 27 \end{array}$	207 19 113 58	T. P. 382 T. P. 384	26. 8 70. 1	т. р. 413	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}172&04\\32&05\end{array}$	T. P. 412 T. P. 414	$23.6 \\ 27.6$
т. Р. 384	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	293 58 78 44	T. P. 383 T. P. 385	70. 1 24 1	Т. Р. 414	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}212 \\ 65 \\ 35\end{array}$	T. P. 413 T. P. 415	27.6 78.7
		$     37 10 \\     113 58   $	Ref. Mon. 7 Ref. Mon. 6	$     \begin{array}{c}       24.1 \\       13.3 \\       29.9     \end{array} $	T. P. 415	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 245 & 35 \\ 127 & 09 \end{array}$	T. P. 414 T. P. 416	- 78.7 9.3
T. P. 385	45 54 35.69 67 45 57.34	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 384 T. P. 386	$\begin{array}{c} 24.\ 1\\ 83.\ 4\end{array}$	т. р. 416	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$307  ext{ } 09 \\ 71  ext{ } 18$	T. P. 415 T. P. 417	$9.3 \\ 29.3$
T. P. 386	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}149&49\\0&58\end{array}$	T. P. 385 T. P. 387	$\begin{array}{c} 83.\ 4 \\ 125.\ 2 \end{array}$	Т. Р. 417	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	251 18 44 10	T. P. 416 T. P. 418	29.3 82.3
T. P. 387	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}180&58\\60&41\end{array}$	T. P. 386 T. P. 388	$\begin{array}{c}125.\ 2\\35.\ 0\end{array}$	T. P. 418	45 53 50.69	130 34 224 10	T. P. 417	24.0 82.3
Т. Р. 388	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 240 \hspace{0.1cm} 41 \\ 38 \hspace{0.1cm} 58 \end{array}$	T. P. 387 T. P. 389	$35.0 \\ 105.0$	т. р. 419	45 53 50.77	92 26 272 26	T. P. 419	55. 4
Т. Р. 389	45 54 26.10 67 45 59.98	$\begin{array}{cccc} 218 & 58 \\ 358 & 16 \end{array}$	T. P. 388. T. P. 390	105.0 97.5	т. Р. 420	67 46 17.35 45 53 52.24	122 47 302 47	T. P. 420	83. 9 83. 9
Т. Р. 390	45 54 22.95 67 45 59.85	${}^{178\ 16}_{38\ 19}$	T. P. 389 T. P. 391	$97.5 \\ 48.2$	T. P. 421	67 46 20. 62 45 53 52. 42	94 38 274 38	T. P. 421	69. 9 69. 9
Т. Р. 391	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 390 T. P. 392	$\begin{array}{c} 48.2\\ 34.0 \end{array}$	T. P. 422	67 46 23.86 45 53 49.78	29 49 209 49	T. P. 422 T. P. 421	94. 1 94. 1
Т. Р. 392	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}163&54\\30&12\end{array}$	T. P. 391 T. P. 393	$34.0 \\ 24.2$		07 46 26.03	106 04 106 04	Traverse Station 19–B.	$     \begin{array}{r}       41.4 \\       23.5     \end{array} $
T. P. 393	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$210 \ 12 \\ 56 \ 18$	T: P. 392 T. P. 394	$\begin{array}{c} 24.2\\ 28.7\end{array}$	Т. Р. 423	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	286 04 7 37	T. P. 422 T. P. 424	$\begin{array}{c} 41.\ 4\\ 46.\ 4\end{array}$
T. P. 394	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	236 18 108 18 50 42	T. P. 393 T. P. 395	28.7 64.8	Т. Р. 424	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{smallmatrix}187&37\\66&33\end{smallmatrix}$	T. P. 423 T. P. 425	$46.4 \\ 218.7$
Т Р 205	45 54 90 12	999 10	17. T. P. 204	23.1	T. P. 425	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	246 33 165 34	T. P. 424 T. P. 426	218.7 197.8
T D 306	45 54 20, 13 67 46 05, 33	28 58	T. P. 394 T. P. 396	64.8 111.2	T. P. 426	45 53 52.05 67 46 39.75	345 34 81 22	T. P. 425 T. P. 427	$197.8 \\ 76.5$
1.1.000	67 46 07.83	12 24	T. P. 395	111.2			339 17 357 21	Ref. Mon. 8	120.1 129.2

## BOUNDARY TURNING POINTS-MONUMENT BROOK-Continued

#### BOUNDARY TURNING POINTS-MONUMENT BROOK-Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
т. р. 427	° ' '' 45 53 51.68 67 46 43.26	$^{\circ}$ , , , , , , , , , , , , , , , , , , ,	T. P. 426 T. P. 428	76. 5 98. 4	т. р. 456	° ' '' 45 53 22.31 67 47 39.41	。 , " 220 36 62 20 190 21	T. P. 455 T. P. 457 Pickerel tablet	39. 9 57. 4 40. 2
Т. Р. 428	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 222 & 10 \\ 1 & 00 \end{array}$	T. P. 427 T. P. 429	98. 4 120. 7	T. P. 457	45 53 21.45 67 47 41.77	$242 \ 20 \ 7 \ 33$	T. P. 456 T. P. 458	$57.4 \\ 54.0$
T. P. 429	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}181 & 00\\9 & 43\end{array}$	T. P. 428 T. P. 430	$120.7 \\ 135.8$	T D 458	45 53 10 71	221 15	Pickerel tablet	88.1 54.0
Т. Р. 430	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}189&43\\87&06\end{array}$	T. P. 429 T. P. 431	$135.8 \\ 245.8$	1.1.100	67 47 42.10	$     \begin{array}{r}       30 & 46 \\       180 & 52 \\       220 & 28     \end{array} $	T. P. 459 Ref. Mon. 11 Ref. Mon. 10	50.7 23.6 24.7
Т. Р. 431	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$267 \ 06 \\ 132 \ 12$	T. P. 430 T. P. 432	$245.8 \\ 205.9$	T. P. 459	45 53 18.30 67 47 43.30	$210 \ 46 \ 35 \ 32$	T. P. 458 T. P. 460	50.7 61.3
Т. Р. 432	45 53 45.15 67 47 05.94	$\begin{array}{ccc} 312 & 12 \\ 71 & 18 \\ 66 & 01 \end{array}$	T. P. 431 T. P. 433 Acheron tablet	$205.9 \\ 119.9 \\ 32.0$	T. P. 460	45 53 16.69	39 39 215 32	Trout tablet T. P. 459	71. 5 61. 3
Т. Р. 433	45 53 43.90 67 47 11.21	$\begin{array}{c}251&18\\32&34\end{array}$	T. P. 432 T. P. 434	119. 9 89. 2		67 47 44,95	91 17 62 37	T. P. 461 Trout tablet	15.7
т. р. 434	$\begin{array}{c} 45 \ 53 \ 41. \ 47 \\ 67 \ 47 \ 13. \ 44 \end{array}$	$\begin{array}{c}212&34\\58&15\end{array}$	T. P. 433 T. P. 435	89. 2 26. 8	T. P. 461	45 53 16.70 67 47 45.68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 460 T. P. 462 Trout tablet	15.7 82.6 7.9
т. р. 435	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 238 \ 15 \\ 102 \ 01 \end{array}$	T. P. 434 T. P. 436	$26.8 \\ 60.3$	Т. Р. 462	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 314 \hspace{0.1cm} 20 \\ 85 \hspace{0.1cm} 36 \end{array}$	T. P. 461 T. P. 463	82. 6 12. 5
Т. Р. 436	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 282 \hspace{0.1cm} 01 \\ 38 \hspace{0.1cm} 24 \end{array}$	T. P. 435 T. P. 437	60. 3 31. 7	т. Р. 463	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$265 \ 36 \\ 19 \ 14 \\ 37 \ 47$	T. P. 462. T. P. 464. Camp Collier mark	12.5 16.3 57.3
т. р. 437	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 218 & 24 \\ 45 & 07 \end{array}$	T. P. 436 T. P. 438	31. 7 39. 5	T. P. 464	45 53 18.04 67 47 49.25	$\begin{array}{c}199 \hspace{0.1cm}14\\\hspace{0.1cm}44 \hspace{0.1cm}51\end{array}$	T. P. 463 T. P. 465	$16.3 \\ 53.4$
Т. Р. 438	45 53 39.71 67 47 19.44	$\begin{array}{ccc} 225 & 07 \\ 52 & 46 \end{array}$	T. P. 437 T. P. 439	39. 5 181. 2	T. P. 465	45 53 16.81	44 52 224 51	Camp Collier mark	42. 2 53. 4
Т. Р. 439	45 53 36.16 67 47 26.13	$232 \ 46 \\ 342 \ 22$	T. P. 438 T. P. 440	$     \begin{array}{r}       181.2 \\       65.1     \end{array} $		67 47 51.00	$\begin{array}{ccc} 16 & 49 \\ 224 & 49 \end{array}$	T. P. 466 Camp Collier mark	71. 2 11. 3
Т. Р. 440	45 53 34.15 67 47 25.22	$     \begin{array}{r}       162 & 22 \\       359 & 48     \end{array} $	T. P. 439 T. P. 441		Т. Р. 466	45 53 14.60 67 47 51.95	$\begin{array}{c} 196 \ 49 \\ 32 \ 14 \\ 200 \ 32 \end{array}$	T. P. 465 T. P. 467 Camp Collier mark	71. 2 49. 7 81. 3
Т. Р. 441	45 53 31.93 67 47 25.20	$179 \ 48 \\ 23 \ 09$	T. P. 440 T. P. 442		T. P. 467	45 53 13.24 67 47 53.18	$212 \ 14 \\ 0 \ 02$	T. P. 466 T. P. 468	$49.7 \\ 43.2$
Т. Р. 442	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$203 & 09 \\ 38 & 21$	T. P. 441 T. P. 443	$25.4 \\ 75.2$	T. P. 468	45 53 11.84	6 27 180 02	Twist tablet T. P. 467	17.3 43.2
Т. Р. 443	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 218 & 21 \\ 67 & 02 \end{array}$	T. P. 442. T. P. 444	75. 2 27. 3		67 47 53.18	$\begin{array}{ccc} 27 & 44 \\ 175 & 47 \end{array}$	T. P. 469 Twist tablet	83.7 26.1
Т. Р. 444	45 53 28.92 67 47 29.00	247 02 99 11	T. P. 443 T. P. 445	$27.3 \\ 25.4$	T. P. 469= Curve tab- let.	45 53 09.44 67 47 54.99	$\begin{array}{c} 207 \ 44 \\ 357 \ 16 \\ 200 \ 18 \end{array}$	T. P. 468. T. P. 470. Twist tablet	83.7 43.9 106.7
Т. Р. 445	45 53 29.05 67 47 30.16	$279 \ 11 \\ 82 \ 31$	T. P. 444 T. P. 446	$25.4 \\ 42.7$	т. Р. 470	45 53 08.02 67 47 54.89	$177 \ 16 \\ 65 \ 35$	T. P. 469 T. P. 471	43. 9 108. 8
Т. Р. 446	45 53 28.87 67 47 32.12	$262 \ 31 \\ 61 \ 51 \\ 49 \ 01$	T. P. 445. T. P. 447. Sucker tablet	$\begin{array}{c} 42.7 \\ 22.7 \\ 86.1 \end{array}$	T. P. 471	45 53 06.56 67 47 59.49	245 35 323 10	T. P. 470. T. P. 472.	108.8 60.1
т. р. 447	45 53 28.52 67 47 33.04	$\begin{array}{ccc} 241 & 51 \\ 349 & 09 \end{array}$	T. P. 446 T. P. 448	$22.7 \\ 21.7$	T. P. 472	45 53 05.00	143 10	T. P. 471	60. 1 97. 0
Т. Р. 448	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}169&09\\31&46\end{array}$	T. P. 447 T. P. 449	$21.7 \\ 14.7$		07 47 57.81	35 09	Spring tablet	50.9
т. Р. 449	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}211&46\\98&57\end{array}$	T. P. 448 T. P. 450	$14.7 \\ 14.8$	T. P. 4/3	45 53 04.12 67 47 58.08	$   \begin{array}{r}     192 & 16 \\     74 & 30 \\     58 & 29   \end{array} $	T. P. 472 T. P. 474 Spring tablet	90. 6 27. 4
T. P. 450	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 278 & 57 \\ 129 & 07 \end{array}$	T. P. 449 T. P. 451	14. 8 12. 0	Т. Р. 474	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$254 \ 30 \\ 10 \ 20 \\ 261 \ 13$	T. P. 473. T. P. 475. Spring tablet	90. 6 54. 8 64. 7
Т. Р. 451	45 53 27.75 67 47 34.33	$309 \ 07 \\ 51 \ 33 \\ 38 \ 44$	T. P. 450. T. P. 452. Sucker tablet	12.0 16.6 27.9	т. р. 475	45 53 01.59 67 48 02.59	190 20 41 11	T. P. 474 T. P. 476	54. 8 24. 4
T. P. 452	45 53 27.41 67 47 34.93	$231 \ 33 \ 58 \ 45 \ 21 \ 11$	T. P. 451. T. P. 453. Sucker tablet	16. 6 77. 9 12. 2	т. р. 476	45 53 00.99 67 48 03.34	$221 \ 11 \\ 72 \ 44 \\ 59 \ 33$	T. P. 475 T. P. 477 Ley	24. 4 100. 7 67. 4
T. P. 453	45 53 26.10 67 47 38.02	$\begin{array}{c} 238 \ 45 \\ 17 \ 04 \\ 245 \ 03 \end{array}$	T. P. 452 T. P. 454 Sucker tablet	77. 9 30. 1 68. 6	т. р. 477	45 53 00.02 67 48 07.79	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 476 T. P. 478 Ley	$100.7 \\ 16.1 \\ 38.2$
Т. Р. 454	45 53 25.17 67 47 38.43	$\begin{array}{c} 197 & 04 \\ 355 & 15 \\ 15 & 57 \end{array}$	T. P. 453. T. P. 455. Pickerel tablet	$\begin{array}{c} 30.\ 1 \\ 58.\ 1 \\ 50.\ 6 \end{array}$	Т. Р. 478	45 53 00.23 67 48 08.48	$293 \ 13 \\ 151 \ 44 \\ 281 \ 22$	T. P. 477 T. P. 479 Ley	16. 1 54. 6 53. 8
T. P. 455	45 53 23.29 67 47 38.21	$175 \ 15 \\ 40 \ 36 \\ 116 \ 24$	T. P. 454. T. P. 456. Pickerel tablet.	58.1 39.9 20.9	Т. Р. 479	45 53 01.79 67 48 09.68	331 44 118 43	T. P. 478. T. P. 480.	54.6 52.1

Station	Latitude and longitude	Azimuth	To station	Dis- tance (ineters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
T. P. 480	° ' '' 45 53 02.60 67 48 11.80	° ' '' 298 43 74 11	T. P. 479 T. P. 481	52. 1 23. 4	Т. Р. 505	° ' '' 45 52 09.42 67 48 17.68	° ' " 146 29 293 44	T. P. 504 T. P. 506	33. 4 68. 8
Т. Р. 481	45 53 02.39 67 48 12.84	$\begin{array}{ccc} 254 & 11 \\ 18 & 16 \end{array}$	T. P. 480 T. P. 482	$23.4 \\ 41.2$	T. P. 506	45 52 08.52	113 44 200 92	T. P. 505	91. 0 68. 8
Т. Р. 482	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}198 \hspace{0.1cm} 16 \\ 42 \hspace{0.1cm} 51\end{array}$	T. P. 481 T. P. 483	$\begin{array}{c} 41.\ 2\\ 90.\ 0\end{array}$		07 48 14.70	309 23 116 20	Leaf.	52.4 159.7
Т. Р. 483	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 222 & 51 \\ 6 & 07 \end{array}$	T. P. 482 T. P. 484	90. 0 47. 3	Т. Р. 507	45 52 07.45 67 48 12.88	$\begin{array}{c} 129 \ 23 \\ 359 \ 04 \\ 119 \ 33 \end{array}$	T. P. 506 T. P. 508 Leaf	$52.4 \\ 62.3 \\ 211.1$
Т. Р. 484	45 52 57.46 67 48 16.50	$\begin{array}{c} 186 & 07 \\ 325 & 24 \\ 284 & 40 \end{array}$	T. P. 483 T. P. 485 Dan	$\begin{array}{c} 47.\ 3\\ 46.\ 8\\ 60.\ 2\end{array}$	T. P. 508	45 52 05.43 67 48 12.84	$\begin{array}{cccc} 179 & 04 \\ 312 & 21 \\ 265 & 02 \end{array}$	T. P. 507. T. P. 509. Ref. Mon. 15	$\begin{array}{c} 62.\ 3\\ 99.\ 3\\ 56.\ 9\end{array}$
Т. Р. 485	45 52 56.22 67 48 15.27	$\begin{array}{c} 145 \ 24 \\ 20 \ 31 \\ 233 \ 42 \end{array}$	T. P. 484 T. P. 486 Dan	46.8     88.4     39.2	т. р. 509	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 132 \ 21 \\ 258 \ 34 \\ 50 \ 31 \\ 166 \ 59 \end{array}$	T. P. 508 T. P. 510 Ref. Mon. 14 Ref. Mon. 15	$99.3 \\100.9 \\54.7 \\72.7$
Т. Р. 486	45 52 53.53 67 48 16.70	$200 \ 31$ 2 55 311 08	T. P. 485 T. P. 487 Ref. Mon. 13	88. 4 74. 7 27. 3	T. P. 510	45 52 03.91 67 48 04.85	78 34 318 38	T. P. 509 T. P. 511	100. 9 73. 3
т. р. 487	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	182 55 346 07 166 46	T. P. 486 T. P. 488 Ref. Mon. 12	74.7 118.6 55.7	T. P. 511	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{138}{286}  \frac{38}{35}$	T. P. 510 T. P. 512	73. 3 82. 1
Т. Р. 488	45 52 47.38	166 07	T. P. 487	118.6	T. P. 512	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 106 & 35 \\ 312 & 09 \end{array}$	T. P. 511 T. P. 513	82. 1 115. 0
<b>T D</b> 100	07 48 15, 50	30 32 311 53	Joe	92. 7 20. 4	T. P. 513	45 51 58.87 67 47 55.00	$\begin{array}{c} 132 \ 09 \\ 294 \ 57 \end{array}$	T. P. 512 T. P. 514	$     \begin{array}{c}       115.0 \\       117.2     \end{array} $
T. P. 489	45 52 44.80 67 48 17.74	$\begin{array}{c} 210 & 32 \\ 346 & 51 \\ 299 & 51 \end{array}$	T. P. 488 T. P. 490 Tom	$92.7 \\ 65.4 \\ 49.5$	T. P. 514	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 114 & 57 \\ 326 & 10 \end{array}$	T. P. 513 T. P. 515	$\begin{array}{c}117.\ 2\\68.\ 1\end{array}$
Т. Р. 490	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 166 & 51 \\ 15 & 20 \\ 215 & 43 \end{array}$	T. P. 489 T. P. 491 Tom	$\begin{array}{c} 65.\ 4\\ 54.\ 6\\ 48.\ 1\end{array}$	T. P. 515	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	${\begin{array}{*{20}c} 146 & 10 \\ 7 & 46 \\ 55 & 41 \end{array}}$	T. P. 514 T. P. 516 Hardwood tablet	$68.1 \\ 49.2 \\ 259.5$
Т. Р. 491	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 195 & 20 \\ 351 & 01 \\ 44 & 35 \end{array}$	T. P. 490 T. P. 492 Phil	$54.\ 6\\118.\ 3\\19.\ 4$	T. P. 516	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 187 \ \ 46 \\ 47 \ \ 25 \\ 64 \ \ 49 \end{array}$	T. P. 515 T. P. 517 Hardwood tablet	$\begin{array}{r} 49.\ 2\\ 69.\ 0\\ 229.\ 5\end{array}$
Т. Р. 492	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 171 & 01 \\ 337 & 09 \\ 316 & 03 \end{array}$	T. P. 491 T. P. 493 Pete	$118.\ 3\\65.\ 5\\60.\ 3$	Т. Р. 517	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 227 & 25 \\ 88 & 12 \\ 72 & 01 \end{array}$	T. P. 516. T. P. 518. Hardwood tablet	$69.0 \\ 85.7 \\ 164.9$
Т. Р. 493	45 52 35.29 67 48 15.68	$\begin{array}{ccc} 157 & 09 \\ 11 & 18 \\ 224 & 06 \end{array}$	T. P. 492 T. P. 494 Pete		T. P. 518	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$268 \ 12 \\ 48 \ 47 \\ 55 \ 53$	T. P. 517 T. P. 519 Hardwood tablet	
Т. Р. 494	45 52 34.37 67 48 15.94	$\begin{array}{ccc} 191 & 18 \\ 48 & 20 \\ 206 & 03 \end{array}$	T. P. 493 T. P. 495 Pete	$28.8 \\ 70.9 \\ 50.3$	т. р. 519	45 51 51.14 67 47 56.79	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 518. T. P. 520 Hardwood tablet	52.6 97.4 34.4
Т. Р. 495	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 494 T. P. 496 Pete	$70.9 \\ 46.2 \\ 119.0$	T. P. 520	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 163 & 08 \\ 307 & 45 \\ 143 & 03 \end{array}$	T. P. 519 T. P. 521 Hardwood tablet	$97.\ 4\\181.\ 6\\99.\ 6$
Т. Р. 496	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 210 & 42 \\ 358 & 25 \\ 216 & 45 \end{array}$	T. P. 495 T. P. 497 Pete	$\begin{array}{c} 46.\ 2\\ 239.\ 6\\ 164.\ 8\end{array}$	T. P. 521	45 51 44.52 67 47 48.83	$\begin{array}{c} 127 \ 45 \\ 328 \ 05 \\ 133 \ 10 \end{array}$	T. P. 520 T. P. 522 Hardwood tablet	$181. \ 6 \ 53. \ 0 \ 279. \ 0$
Т. Р. 497	45 52 23.80 67 48 19.19	$\begin{array}{cccc} 178 & 25 \\ 319 & 58 \end{array}$	T. P. 496 T. P. 498	$239.\ 6\\139.\ 9$	T. P. 522	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	148 05 16 35 125 22	T. P. 521 T. P. 523	53. 0 44. 0
T. P. 498	45 52 20.33 67 48 15.01	$\begin{array}{c}139&58\\24&29\end{array}$	T. P. 497 T. P. 499	$\begin{array}{c}139.\ 9\\86.\ 4\end{array}$	Т. Р. 523	45 51 41.70	196 35 58 06	T. P. 522	44. 0
Т. Р. 499	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	204 29 358 29 25 20	T. P. 498 T. P. 500	86.4 57.1	/ D F04	17 71 40 90	141 46	Hardwood tablet.	353. 8
T. P. 500	45 52 15.94	178 29 217 59	T. P. 499	238. 2 57. 1	T. F. 024	45 51 40.36 67 47 51.18	238 06 26 15	T. P. 525	63. 0
T D 501	45 59 19 70	33 11	Leaf	189, 1	T. P. 525	45 51 38.53 67 47 52.47	206 15 345 58	T. P. 524 T. P. 526	63. 0 59. 7
1 . 1 . 001	67 48 13.78	30 30 61 01	T. P. 502 Leaf	90, 7 29, 7 187, 8	T. P. 526	45 51 36.66 67 47 51.80	165 58 299 37	T. P. 525 T. P. 527	59. 7 75. 4
T. P. 502	45 52 12.93 67 48 14.48	$210 \ 30 \\ 57 \ 46 \\ 66 \ 21$	T. P. 501 T. P. 503	29.7 80.6	T. P. 527	45 51 35.45 67 47 48.76	119 37 327 30	T. P. 526 T. P. 528	75. 4 91. 0
T. P. 503	45 52 11.54	237 46	T. P. 502	80.6	Т. Р. 528	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{147}{305} \frac{30}{31}$	T. P. 527 T. P. 529	91. 0 93. 9
T. D. 504	15 50 10 00	74 38	Leaf	42.3 84.0	T. P. 529	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 125 \ \ 31 \\ 327 \ \ 40 \end{array}$	T. P. 528 T. P. 530	93. 9 66. 9
I. F. 004	45         52         10.32           67         48         18.54	207 10 326 29 103 55	T. P. 503	42.3 33.4	T. P. 530	45 51 29.37	147 40	T. P. 529	66. 9

#### BOUNDARY TURNING POINTS-MONUMENT BROOK-Continued

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#### BOUNDARY TURNING POINTS-MONUMENT BROOK-Continued

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Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
T. P. 531	° ' '' 45 51 26.34 67 47 41.35	° ' '' 180 43 330 45	T. P. 530 T. P. 532	93. 6 66. 6	т. р. 548	° ' '' 45 50 26.75 67 46 18.45	° / // 161 41 330 03 317 32 20	T. P. 547 T. P. 549 Calf	66. 5 101. 5 530. 5
Т. Р. 532	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{r}       150 & 45 \\       320 & 05     \end{array} $	T. P. 531 T. P. 533		T P 549	45 50 23 90	336 03 00 150 03	Fawn	600. 2 101. 5
Т. Р. 533	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}140 \hspace{0.1cm} 05 \\280 \hspace{0.1cm} 48\end{array}$	T. P. 532 T. P. 534	$300.4 \\ 122.4$		67 46 16.10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 550 Calf Fawn	162.0 432.0 499.4
Т. Р. 534	45 51 13.10 67 47 29.84	$\begin{array}{cccc} 100 & 48 \\ 333 & 41 \\ 306 & 03 \\ 344 & 37 \end{array}$	T. P. 533. T. P. 535. Ref. Mon. 17. Ref. Mon. 16	$122.\ 4\\192.\ 8\\145.\ 5\\151.\ 2$	т. Р. 550	45 50 20.98 67 46 09.87	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 549 T. P. 551 Calf Fawn	162.0 95.4 274.6 374.9
Т. Р. 535	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 534. T. P. 536. Ref. Mon. 16. North Stump	$192.8 \\ 334.2 \\ 52.8 \\ 28.8 \\$	T. P. 551	45 50 18.13 67 46 11.57	$\begin{array}{c} 202 & 33 \\ 326 & 01 \\ 300 & 49 \\ 341 & 23 \end{array}$	T. P. 550 T. P. 552 Calf Fawn	95.4 134.0 244.1 297.8
Т. Р. 536	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 535 T. P. 537 Ref. Mon. 16 North Stump	$\begin{array}{c} 334.\ 2\\ 177.\ 2\\ 383.\ 8\\ 316.\ 5\end{array}$	T. P. 552	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 146 \ 01 \\ 307 \ 08 \\ 275 \ 54 \\ 353 \ 16 \end{array}$	T. P. 551 T. P. 553 Calf Fawn	$134.0 \\ 164.7 \\ 135.4 \\ 172.3$
Т. Р. 537	45 50 55.46 67 47 09.86	$\begin{array}{c} 127 \ 27 \\ 317 \ 08 \\ 91 \ 31 \\ 309 \ 40 \end{array}$	T. P. 536 T. P. 538 Raspberry Cropley	177. 2343. 141. 6224. 1	T. P. 553	45 50 11.31 67 46 02.01	$\begin{array}{c} 127 \ 08 \\ 347 \ 41 \\ 57 \ 12 \\ 182 \ 16 \end{array}$	T. P. 552 T. P. 554 Fawn Calf	164.7 60.4 132.2 85.6
т. р. 538	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 137 \ 08 \\ 291 \ 09 \\ 150 \ 40 \\ 267 \ 59 \end{array}$	T. P. 537 T. P. 539 Cropley Landing tablet	$343.1 \\ 93.9 \\ 124.4 \\ 73.1$	T. P. 554	45 50 09.40 67 46 01.41	$167 \ 41 \\ 14 \ 11 \\ 84 \ 11 \\ 176 \ 14$	T. P. 553. T. P. 555. Fawn Calf	60.4 110.8 124.7 144.8
Т. Р. 539	45 50 46.22 67 46 54.99	$\begin{array}{c} 111 & 09 \\ 309 & 17 \\ 133 & 47 \\ 158 & 13 \end{array}$	T. P. 538 T. P. 540 Cropley Landing tablet	93. 9 182. 0 205. 7 39. 3	T. P. 555	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     194 11 \\     289 53 \\     134 22 \\     184 00 $	T. P. 554 T. P. 556 Fawn	$ \begin{array}{c} 110.8\\ 130.1\\ 135.5\\ 252.5 \end{array} $
т. Р. 540	45 50 42.49 67 46 48.46	$\begin{array}{c} 129 \ 17 \\ 318 \ 06 \\ 40 \ 00 \\ 134 \ 18 \end{array}$	T. P. 539 T. P. 541 Cedar Landing tablet	$182. 0 \\ 230. 6 \\ 33. 2 \\ 217. 2$	T. P. 556	45 50 04.48 67 45 57.00	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 555 T. P. 557 Fawn. Calf	130.1 40.2 259.6 314.1
Т. Р. 541	45 50 36.93 67 46 41.32	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 540 T. P. 542 Cedar Ref. Mon. 19	$230. \ 6 \\ 40. \ 8 \\ 228. \ 3 \\ 136. \ 9$	T. P. 557	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 168 \ 24 \\ 14 \ 57 \\ 128 \ 08 \\ 161 \ 26 \end{array}$	T. P. 556 T. P. 558 Fawn. Calf	40. 2 107. 1 289. 0 354. 0
Т. Р. 542	45 50 36.44 67 46 39.57	$\begin{array}{c} 111 \ 48 \\ 265 \ 14 \\ 127 \ 06 \\ 264 \ 54 \end{array}$	T. P. 541 T. P. 543 Cedar Ref. Mon, 19	$\begin{array}{r} 40.8\\59.8\\267.4\\99.3\end{array}$	T. P. 558	45 49 59.86 67 45 57.91	$     194 57 \\     0 34 \\     259 42 \\     319 12 20 $	T. P. 557 T. P. 559 Buck Ref. Mon 20	$     \begin{array}{r}       107.1 \\       116.3 \\       47.3 \\       501.0     \end{array} $
Т. Р. 543	45 50 36.60 67 46 36.80	$\begin{array}{c} 85 \ 14 \\ 308 \ 59 \\ 264 \ 25 \\ 345 \ 05 \end{array}$	T. P. 542 T. P. 544 Ref. Mon. 19 Ref. Mon. 18	$59.8 \\ 169.3 \\ 39.5 \\ 46.7$	T. P. 559	45 49 56.09 67 45 57.96	180 34 302 44 200 55 308 41	T. P. 558 T. P. 560 Buck. Ref. Mon 20	$ \begin{array}{c} 116.3\\ 127.7\\ 133.6\\ 420.8 \end{array} $
Т. Р. 544	45 50 33.15 67 46 30.71	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 543. T. P. 545. Ref. Mon. 18. Ref. Mon. 19.	$169.\ 3\\77.\ 7\\134.\ 4\\143.\ 8$	т. Р. 560	45 49 53.86 67 45 52.99	$\begin{array}{c} 122 \ 44 \\ 348 \ 26 \\ 162 \ 52 \\ 311 \ 16 \end{array}$	T. P. 559 T. P. 561 Buck. Ref. Mon. 20	127.7 43.7 202.8 294.1
Т. Р. 545	45 50 31.23 67 46 28.37	$\begin{array}{c} 139 \ 37 \\ 282 \ 18 \\ 125 \ 22 \\ 139 \ 56 \end{array}$	T. P. 544 T. P. 546 Ref. Mon. 18 Ref. Mon. 19	$\begin{array}{c} 77.\ 7\\ 159.\ 5\\ 208.\ 3\\ 221.\ 5\end{array}$	T. P. 561	45 49 52.47 67 45 52.58	168 26 8 17 163 51 305 27	T. P. 560. T. P. 562. Buck Ref. Mon. 20.	$ \begin{array}{r}     43.7 \\     65.0 \\     246.3 \\     260.6 \\ \end{array} $
Т. Р. 546	45 50 30.13 67 46 21.15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 545 T. P. 547 Calf Fawn	$159.5 \\ 55.8 \\ 647.5 \\ 719.4$	T. P. 562	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	188 17 351 39 168 53 291 24	T. P. 561 T. P. 563 Buck. Ref. Mon. 20	65. 0 187. 6 306. 6 238. 0
T. P. 547	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 137 \ 45 \\ 341 \ 41 \\ 320 \ 10 \ 10 \\ 336 \ 36 \ 40 \end{array}$	T. P. 546 T. P. 548 Calf Fawn	55.8 66.5 591.8 666.4			LUL AT	and manufactory and	200, 0

#### GEOGRAPHIC POSITIONS OF BOUNDARY TURNING POINTS DEFINING THE INTERNA-TIONAL BOUNDARY THROUGH NORTH LAKE, THE THOROUGHFARE, AND GRAND, MUD, AND SPEDNIK LAKES

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
т. Р. 563	° / // 45 49 44.38 67 45 51.75	° ' '' 34 21 20 171 39 00 243 04 40 312 53 00	Ref. Mon. 21 T. P. 562 Ref. Mon. 20 T. P. 564	198.3 187.6 218.0 896.7	Т. Р. 581	° ' " 45 46 03 03 67 48 35 70	<pre></pre>	T. P. 580. Ref. Mon. 38 T. P. 582.	382. 6 276. 8 1, 367. 0
T. P. 564	$\begin{array}{c} 45 \ 49 \ 24. \ 61 \\ 67 \ 45 \ 21. \ 32 \end{array}$	$\begin{array}{c} 56 & 46 & 50 \\ 63 & 29 & 00 \\ 120 & 08 & 50 \\ 132 & 53 & 30 \end{array}$	Ref. Mon. 22 T. P. 565 Ref. Mon. 21 T. P. 563	521. 9 523. 9 889. 2 896. 7	T. P. 582	45 45 19.42 67 48 24.75	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Ref. Mon. 40 T. P. 581 Ref. Mon. 39 T. P. 583	$\begin{array}{r} 305.\ 0\\ 1,367.\ 0\\ 669.\ 2\\ 1,146.\ 8\end{array}$
Т. Р. 565	45 49 17.04 67 45 43.03	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Ref. Mon. 23 T. P. 566 T. P. 564 Ref. Mon. 22	$182. 1 \\ 122. 6 \\ 523. 9 \\ 61. 1$	T. P. 583	45 45 02,40 67 47 37.59	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 40 T. P. 582 Ref. Mon. 41 T. P. 584	$1, 229. 2 \\1, 146. 8 \\922. 0 \\2, 329. 0$
T. P. 566	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 79 \ 10 \ 20 \\ 114 \ 10 \ 10 \\ 217 \ 42 \ 40 \\ 247 \ 11 \ 40 \end{array}$	T. P. 567. Ref. Mon, 23. T. P. 565. Ref. Mon, 22.	$\begin{array}{r} 86.2 \\ 109.0 \\ 122.6 \\ 116.3 \end{array}$	T. P. 584	45 43 52.44 67 46 57.31	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 44 T. P. 585 Ref. Mon. 42 T. P. 583	$\begin{array}{c} 1,830.0\\ 2,166.7\\ 1,305.5\\ 2,329.0 \end{array}$
T. P. 567	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$33 \ 36 \\ 66 \ 29 \\ 259 \ 10$	Watson. T. P. 568 T. P. 566	$32.0 \\ 65.9 \\ 86.2$	T. P. 585	45 43 46.55 67 48 37.17	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 43 T. P. 584 Ref. Mon. 44 T. P. 586	$\begin{array}{c} 1,209.3\\ 2,166.7\\ 823.0\\ 3,748.4 \end{array}$
T. P. 568	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 35 \ 01 \\ 246 \ 29 \\ 270 \ 31 \end{array}$	T. P. 569. T. P. 567. Watson	$197. \ 5 \\ 65. \ 9 \\ 42. \ 7$	т. Р. 586	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	T. P. 587 Ref. Mon. 45 T. P. 585 Ref. Mon. 48	1, 195. 1 1, 175. 1 3, 748. 4 804. 2
T. P. 569	45 49 07.28 67 45 58.48	85 55 215 01 235 36	T. P. 570 T. P. 568 Piedra	147. 2 197. 5 109. 7	Т. Р. 587	45 41 37.98 67 49 07.30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 46 Ref. Mon. 45 T. P. 586	831.8 959.0 1,195.1
T. P. 570	45 49 06.94 67 46 05.28	$\begin{array}{c} 90 & 32 \\ 107 & 02 \\ 132 & 03 \\ 265 & 55 \end{array}$	Ref. Mon. 24 T. P. 571 Ref. Mon. 25 T. P. 569	53.6 377.5 93.1 147.2	T. P. 588	$\begin{array}{c} 45 \ 40 \ 40. \ 08 \\ 67 \ 48 \ 15. \ 22 \end{array}$	$\begin{array}{c} 327 \ 46 \ 00 \\ 23 \ 48 \ 00 \\ 147 \ 46 \ 40 \\ 203 \ 48 \ 00 \end{array}$	Ref. Mon. 47 T. P. 587 Ref. Mon. 48	2, 113. 4 375. 7 2, 113. 4 1, 725. 6
T. P. 571	45 49 10.52 67 46 22.00	$\begin{array}{c} 86 & 56 \\ 287 & 01 \\ 337 & 27 \end{array}$	T. P. 572. T. P. 570. Difficile	$461.3 \\ 377.5 \\ 20.7$	T. P. 589	45 40 39.49 67 46 09.55	270 22 00 19 44 40 90 23 40	T. P. 589 Ref. Mon. 50 T. P. 588	2, 719. 9 1, 082. 0 2, 719. 9
Т. Р. 572	45 49 09.72 67 46 43.34	$\begin{array}{c} 51 & 15 \\ 247 & 16 \\ 266 & 56 \\ 276 & 40 \end{array}$	T. P. 573 Ref. Mon. 26 T. P. 571 Ref. Mon. 27	$\begin{array}{c} 258.\ 0\\ 180.\ 2\\ 461.\ 3\\ 174.\ 2\end{array}$	T. P. 590	45 40 03.77	$\begin{array}{c} 199 \ 44 \ 40 \\ 314 \ 25 \ 00 \\ 42 \ 57 \ 40 \\ 124 \ 95 \ 20 \end{array}$	Ref. Mon. 49 T. P. 590 Ref. Mon. 51	807.4 1,575.7 697.5
Т. Р. 573	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 11 \ 17 \\ 231 \ 15 \\ 329 \ 27 \\ 352 \ 47 \end{array}$	Ref. Mon. 29 T. P. 572. Ref. Mon. 28 T. P. 574	89.0 258.0 89.5 218.2	T. P. 591	45 40 14 69	$\begin{array}{c} 134 & 25 & 30 \\ 222 & 57 & 40 \\ 239 & 32 & 00 \\ 14 & 33 & 20 \end{array}$	Ref. Mon. 52 Ref. Mon. 52	1, 575, 7 455, 0 664, 7
т. Р. 574	45 48 57.48 67 46 51.39	38 24 55 15 172 47	T. P. 575 Ref. Mon. 31 T. P. 573	63. 7 95. 9 218. 2		67 44 51.09	59 32 20 194 33 20 217 03 10	T. P. 590 Ref. Mon. 54 T. P. 592	664.7 632.7 322.8
т. Р. 575	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	186 15 83 07 105 03 197 58	Fox Ref. Mon. 31 T. P. 576 Fox	109, 5 39, 5 49, 9	T. P. 592	45 40 23.04 67 44 42.10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 591. Ref. Mon. 52. Ref. Mon. 54 T. P. 593	$322.8 \\ 527.1 \\ 356.4 \\ 731.8$
Т. Р. 576	$\begin{array}{c} 45 \ 48 \ 56. \ 28 \\ 67 \ 46 \ 55. \ 45 \end{array}$	218 24 49 15 30 159 48 50	T. P. 574 T. P. 577. Ref. Mon. 30	63. 7 2, 119. 0 112. 6	Т. Р. 593	45 40 04.18 67 44 21.61	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 52 T. P. 592 T. P. 594 Ref. Mon. 57	956.3 731.8 251.6 601.8
T. P. 577	45 48 11.48	$\begin{array}{c} 285 & 03 & 00 \\ 333 & 10 & 50 \\ 19 & 28 & 50 \\ 128 & 14 & 20 \end{array}$	T. P. 575 Ref. Mon. 31 T. P. 578 Ref. Mon. 22	49. 9 19. 8 1, 017. 5	Т. Р. 594	45 40 01.45 67 44 10.65	68 05 30 109 34 30 109 34 30 289 34 30	Ref. Mon. 55 Ref. Mon. 52 T. P. 593 Ref. Mon. 57	120.1 1, 207.9 251.6 350.2
T P 578	45 47 40 42	$\begin{array}{c} 138 & 14 & 20 \\ 229 & 14 & 40 \\ 318 & 14 & 20 \\ 64 & 30 & 10 \end{array}$	Ref. Mon. 35	403, 2 2, 119, 0 374, 6	т. р. 595	45 39 53 28 67 44 04 93	333 50 40 64 55 153 51	T. P. 595 Ref. Mon. 56 T. P. 594	281. 1 44. 8 281. 1
	67 48 25.51	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 577 Ref. Mon. 34 T. P. 579	1,017.5 113.6 1,492.7	T. P. 596	45 39 48.70 67 43 59.08	318 09 138 09 235 09 254 02	T. P. 596 T. P. 595 Ref. Mon. 58 T. P. 597	189.8 189.8 100.6 97.1
T. P. 579	45 46 52.52 67 48 16.05	5 44 00 5 44 00 54 29 10 172 07 50 234 20 10	Ref. Mon. 38 T. P. 580. Ref. Mon. 37 T. P. 578. Ref. Mon. 26	$1, 624. 5 \\1, 291. 5 \\435. 0 \\1, 492. 7 \\232. 0$	T. P. 597	45 39 49.56 67 43 54.77	74 02 160 43 287 28	T. P. 596 Ref. Mon. 58 T. P. 598	97. 1 32. 6 174. 2
т. р. 580	45 46 10.90 67 48 22.02	$\begin{array}{c} 5 & 43 & 50 \\ 50 & 34 & 50 \\ 185 & 43 & 50 \end{array}$	Ref. Mon. 38 T. P. 581 T. P. 579	333.0 382.6 1.291.5	T. P. 598	45 39 47.87 67 43 47.10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 597 Ref. Mon. 58 Ref. Mon. 59 T. P. 599	174. 2195. 4129. 6124. 6

## BOUNDARY TURNING POINTS-NORTH, GRAND, MUD, AND SPEDNIK LAKES-Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Т. Р. 599	° , " 45 39 46.87 67 43 41.53	° / // 104 29 203 49 301 29 311 36	T. P. 598. Ref. Mon. 59 Ref. Mon. 60 T. P. 600.	$124. \ 6 \\ 20. \ 7 \\ 61. \ 2 \\ 38. \ 6$	T. P. 622	° ' '' 45 40 04.12 67 43 06.77	° / ″ 2 29 40 120 54 30 120 54 30 283 09 30	T. P. 621. T. P. 623. Ref. Mon. 65 Ref. Mon. 64	216. 4 504. 2 689. 8 137. 8
T. P. 600	45 39 46.04 67 43 40.19	$\begin{array}{c} 131 \ 36 \\ 155 \ 18 \\ 234 \ 24 \\ 285 \ 13 \end{array}$	T. P. 599 Ref. Mon. 59 T. P. 601 Ref. Mon. 60	38.6 49.0 141.1 24.2	T. P. 623	$\begin{array}{c} 45 \ 40 \ 12.50 \\ 67 \ 43 \ 26.75 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 65 T. P. 624 T. P. 622	$185.\ 6\\245.\ 1\\504.\ 2$
Т. Р. 601	45 39 48.70 67 43 34.89	$\begin{array}{c} 54 & 24 \\ 229 & 28 \\ 231 & 50 \end{array}$	T. P. 600 Ref. Mon. 61 T. P. 602	141. 1 155. 0 55. 4	T. P. 624	45 40 20.43 67 43 27.51	$\begin{array}{r} 43 \ 43 \ 30 \\ 124 \ 27 \ 20 \\ 144 \ 06 \ 30 \\ 356 \ 08 \ 20 \end{array}$	Ref. Mon. 65 T. P. 625 Ref. Mon. 66 T. P. 623	$206.5 \\ 257.6 \\ 565.9 \\ 245.1$
T. P. 602	45 39 49.81 67 43 32.88	$\begin{array}{ccc} 51 & 50 \\ 187 & 30 \\ 228 & 09 \end{array}$	T. P. 601 T. P. 603 Ref. Mon. 61	55. 4 22. 9 99. 7	T. P. 625	45 40 25.15 67 43 37.33	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 626 Ref. Mon. 66 T. P. 624 Ref. Mon. 65	446.9 334.7 257.6
T. P. 603	45 39 50 54 67 43 32 74	$\begin{array}{c} 7 & 30 \\ 208 & 31 \\ 238 & 24 \end{array}$	T. P. 602 T. P. 604 Ref. Mon. 61	22. 9 35. 0 83. 7	T. P. 626	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 153 & 54 & 40 \\ 161 & 21 & 00 \\ 284 & 26 & 40 \end{array}$	Ref. Mon. 67 T. P. 627 Ref. Mon. 66	$541.4 \\ 863.2 \\ 160.2$
T. P. 604	45 39 51.54 67 43 31.97	$\begin{array}{c} 28 \ 31 \\ 256 \ 32 \\ 284 \ 25 \end{array}$	T. P. 603 Ref. Mon. 61 T. P. 605	35.0 56.1 94.3	T. P. 627	45 41 03.06	322 06 10 171 24 30	T. P. 625 T. P. 628	446. 9 549. 3
T. P. 605	45 39 50.78 67 43 27.75	$\begin{array}{c} 104 \ 25 \\ 134 \ 50 \\ 326 \ 07 \end{array}$	T. P. 604 Ref. Mon. 61 T. P. 606	$94.3 \\ 51.8 \\ 62.7$		67 11 02.77	$\begin{array}{c} 245 & 23 & 10 \\ 341 & 20 & 50 \\ 353 & 28 & 10 \end{array}$	Ref. Mon. 68 T. P. 626 Ref. Mon. 67	48.3 863.2 333.8
T. P. 606	45 39 49.09 67 43 26.14	$\begin{array}{c} 141 \ 01 \\ 146 \ 07 \\ 314 \ 35 \end{array}$	Ref. Mon. 61 T. P. 605 T. P. 607	114. 0 62. 7 90. 5	T. P. 628	45 41 20.66 67 44 06.56	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 69 Ref. Mon. 70 T. P. 629 T. P. 627	96. 1 300. 4 297. 5 549. 3
Т. Р. 607	45 39 47.03 67 43 23.16	$\begin{array}{c} 134 \ \ 35 \\ 138 \ \ 10 \\ 324 \ \ 35 \end{array}$	T. P. 606 Ref. Mon. 61 T. P. 608	90, 5 204, 2 53, 8	T. P. 629	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	89 18 195 25 255 03 345 55	T. P. 628 Ref. Mon. 70 T. P. 630 Ref. Mon. 71	$297.5 \\ 9.8 \\ 110.4 \\ 38.7$
T. P. 608	45 39 45.61 67 43 21.72	$\begin{array}{c} 144 \ 35 \\ 326 \ 36 \\ 328 \ 07 \end{array}$	T. P. 607. Ref. Mon. 62 T. P. 609.	$53.8 \\ 146.6 \\ 28.7$	т. Р. 630	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	75 03 79 38 272 02	T. P. 629 Ref. Mon. 70 T. P. 631	110.4 105.8 36.9
Т. Р. 609	45 39 44.83 67 43 21.02	$\begin{array}{c} 148 \ 07 \\ 306 \ 43 \\ 326 \ 14 \end{array}$	T. P. 608 T. P. 610 Ref. Mon. 62	28.7 36.2 118.0	T. P. 631	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	82 50 92 02 264 11	Ref. Mon. 70 T. P. 630 T. P. 622	142. 0 36. 9
Т. Р. 610	45 39 44.13 67 43 19.68	$\begin{array}{c} 126 \ 43 \\ 281 \ 11 \\ 334 \ 26 \end{array}$	T. P. 609. T. P. 611. Ref. Mon. 62	$36.2 \\ 35.9 \\ 84.7$	T. P. 632	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	83 11 84 11 227 00	Ref. Mon. 70 T. P. 631	191. 9 49. 9
Т. Р. 611	$\begin{array}{c} 45 \ 39 \ 43, 90 \\ 67 \ 43 \ 18, 05 \end{array}$	$\begin{array}{cccc} 101 & 11 \\ 251 & 24 \\ 358 & 52 \end{array}$	T. P. 610 T. P. 612 Ref. Mon. 62	$35.9 \\ 40.8 \\ 69.5$	т. Р. 633	$\begin{array}{c} 45 \ 41 \ 20. \ 38 \\ 67 \ 43 \ 43. \ 02 \end{array}$	157 09 275 59	T. P. 632 Ref. Mon. 72	48. 2 58. 8
T. P. 612	45 39 44.32 67 43 16.27	$24  ext{ 19} \\ 71  ext{ 24} \\ 254  ext{ 24} \\ 24$	Ref. Mon. 62 T. P. 611 T. P. 613	$90.\ 5\\40.\ 8\\41.\ 4$	Т. Р. 634	$\begin{array}{c} 45 \ 41 \ 20. \ 06 \\ 67 \ 43 \ 40. \ 91 \end{array}$	102 19 253 22 217 19	T. P. 633 Ref. Mon. 72	46. 7 13. 4
Т. Р. 613	45 39 44.68 67 43 14.43	$\begin{array}{c} 39 \ 29 \\ 74 \ 24 \\ 223 \ 56 \end{array}$	Ref. Mon. 62 T. P. 612 T. P. 614	$121.\ 3\\41.\ 4\\29.\ 3$	T. P. 635	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	137 18 135 00 353 14	T. P. 634 Ref. Mon. 72	43.6 39.6 46.8
T. P. 614	45 39 45.37 67 43 13.49	$\begin{array}{c} 40 \ 21 \\ 43 \ 56 \\ 191 \ 47 \end{array}$	Ref. Mon. 62 T. P. 613 T. P. 615	150.6 29.3 58.3	T. P. 636	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	164 53 173 14 327 38	Ref. Mon. 72 T. P. 635 T. P. 637	85.3 46.8 24.3
Т. Р. 615	45 39 47.22 67 43 12.94	$\begin{array}{ccc} 11 & 47 \\ 193 & 13 \\ 203 & 44 \end{array}$	T. P. 614 Ref. Mon. 63 T. P. 616	58.3 214.0 45.2	Т. Р. 637	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	147 38 161 05 221 47	T. P. 636 Ref. Mon. 72 T. P. 638	24.3 108.8 70.0
Т. Р. 616	45 39 48.56 67 43 12.10	$\begin{array}{cccc} 23 & 44 \\ 190 & 26 \\ 211 & 56 \end{array}$	T. P. 615 Ref. Mon. 63 T. P. 617	$45.2 \\ 169.8 \\ 61.0$	T. P. 638	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	141 47 337 05	T. P. 637 Ref. Mon. 73	70. 0 237. 7
Т. Р. 617	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 31 \ 56 \\ 179 \ 15 \\ 194 \ 44 \end{array}$	T. P. 616 Ref. Mon. 63 T. P. 618	$\begin{array}{c} 61,0\\ 115,2\\ 69,7\end{array}$	т. р. 639	$\begin{array}{c} 45 \ 41 \ 13. \ 86 \\ 67 \ 43 \ 36. \ 17 \end{array}$	163 08 335 15 225 54	T. P. 638 T. P. 638 T. P. 640 Per Mon 72	39.0 39.4 49.4
T. P. 618	45 39 52.42 67 43 09.79	$\begin{array}{ccc} 14 & 44 \\ 158 & 04 \\ 220 & 04 \end{array}$	T. P. 617 Ref. Mon. 63 T. P. 619	$69.7 \\ 51.5 \\ 41.8$	т. р. 640	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	155 15 324 50	T. P. 639 T. P. 641	199.0 49.4 55.6
Т. Р. 619	45 39 53,46 67 43 08,55	$\begin{array}{ccc} 40 & 04 \\ 108 & 55 \\ 233 & 19 \end{array}$	T. P. 618 Ref. Mon. 63 T. P. 620	${}^{41.8}_{48.8}_{81.1}$	т. Р. 641	45 41 10.94 67 43 33.73	144 50 342 39	T. P. 640 Ref. Mon. 73	149.7 55.6 95.7
Т. Р. 620	45 39 55.03 67 43 05.54	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	T. P. 619 Ref. Mon. 63 T. P. 621 Ref. Mon. 64	$81.1 \\ 115.9 \\ 73.6 \\ 271.4$	T. P. 642	$\begin{array}{c} 45 \ 41 \ 10. \ 47 \\ 67 \ 43 \ 33. \ 61 \end{array}$	350 15 170 15 341 16	T. P. 642 T. P. 641 Ref. Mon. 73	14. 8 14. 8 81. 1
т. Р. 621	45 39 57.11 67 43 07.20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 63 T. P. 622 Ref. Mon. 64 T. P. 620	122. 7 216. 4 234. 1 73. 6	T. P. 643	$\begin{array}{c} 45 \ 41 \ 08. \ 38 \\ 67 \ 43 \ 33. \ 25 \end{array}$	353 05 173 05 303 56 314 24	T. P. 643 T. P. 642 Ref. Mon. 73 T. P. 644	65. 0 65. 0 21. 9 166. 9

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### BOUNDARY TURNING POINTS-NORTH, GRAND, MUD, AND SPEDNIK LAKES-Continued

				1	11				
Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Т. Р. 644	° ′ ′′ 45 41 04.59 67 43 27.74	$\circ$ , , , , , , , , , , , , , , , , , , ,	Ref. Mon. 74 T. P. 643 Ref. Mon. 73 T. P. 645	$131. \ 4 \\ 166. \ 9 \\ 145. \ 4 \\ 62. \ 0$	Т. Р. 663	° ' " 45 37 30.93 67 38 22.95	°         '         ''           59         58         30           59         58         30           239         58         30           306         09         20	T. P. 662 Ref. Mon. 91 Ref. Mon. 92 T. P. 664	437, 3 781, 1 231, 7 706, 4
Т. Р. 645	45 41 03.36 67 43 25.48	$\begin{array}{r} 6 & 51 & 20 \\ 127 & 48 & 10 \\ 236 & 43 & 30 \\ 333 & 09 & 30 \end{array}$	Ref. Mon. 76 T. P. 644 Ref. Mon. 75 T. P. 646	$129.\ 0\\62.\ 0\\46.\ 0\\211.\ 3$	т. Р. 664	45 37 17.43 67 37 56.62	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 93 T. P. 663 Ref. Mon. 94 T. P. 665	$247. \ 3 \\706. \ 4 \\185. \ 7 \\2, \ 489. \ 2$
т. Р. 646	45 40 57.26 67 43 21.07	$\begin{array}{c} 118 \ 36 \ 40 \\ 153 \ 09 \ 30 \\ 165 \ 05 \ 10 \\ 316 \ 20 \ 00 \end{array}$	Ref. Mon. 76 T. P. 645 Ref. Mon. 75 T. P. 647	$126. 2 \\ 211. 3 \\ 221. 2 \\ 462. 7$	т. Р. 665	45 36 22.65 67 36 32.33	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 96 T. P. 664 Ref. Mon. 95 T. P. 666	503.12,489.2 $661.41,446.3$
Т. Р. 647	$\begin{array}{c} 45 \ 40 \ 46. \ 42 \\ 67 \ 43 \ 06. \ 31 \end{array}$	$\begin{array}{c} 132 \ 33 \ 50 \\ 136 \ 20 \ 10 \\ 228 \ 21 \ 20 \\ 241 \ 49 \ 40 \end{array}$	Ref. Mon. 76 T. P. 646 Ref. Mon. 77 T. P. 648	$584.\ 2\\462.\ 7\\284.\ 3\\418.\ 9$	T. P. 666	45 36 24.95 67 35 25.67	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 97 T. P. 665 Ref. Mon. 98 T. P. 667	$375. \ 6 \\ 1, 446. \ 3 \\ 545. \ 7 \\ 720. \ 8$
Т. Р. 648	45 40 52.82 67 42 49.24	$\begin{array}{cccc} 61 & 49 & 50 \\ 86 & 46 & 00 \\ 266 & 46 & 00 \end{array}$	T. P. 647. Ref. Mon. 77. T. P. 649	$\begin{array}{c} 418.\ 9\\ 157.\ 1\\ 273.\ 2\end{array}$	т. Р. 667	45 36 08.70 67 35 01.79	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 666 Ref. Mon. 98 T. P. 668 Ref. Mon. 99	$720.8 \\ 1,023.4 \\ 1,879.4 \\ 295.3$
Т. Р. 649	45 40 53.32 67 42 36.64	$\begin{array}{c} 17 \ 41 \ 50 \\ 49 \ 27 \ 50 \\ 86 \ 46 \ 10 \\ 86 \ 46 \ 10 \end{array}$	T. P. 650 Ref. Mon. 78 T. P. 648 Ref. Mon. 77	247. 8344. 4273. 2430. 3	т. р. 668	45 35 41.43 67 33 44.26	$\begin{array}{c} 116 \ 37 \ 20 \\ 146 \ 06 \ 40 \\ 267 \ 21 \ 10 \\ 267 \ 21 \ 10 \end{array}$	T. P. 667 Ref. Mon. 100 T. P. 669 Ref. Mon. 101	1,879.4 653.9 306.1 616.3
Т. Р. 650	45 40 45.67 67 42 40.12	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Ref. Mon. 78 T. P. 649 T. P. 651 Ref. Mon. 80	$186.8 \\ 247.8 \\ 715.9 \\ 841.2$	T. P. 669	45 35 41.89 67 33 30.15	$\begin{array}{r} 87 \ 21 \ 20 \\ 192 \ 43 \ 30 \\ 267 \ 21 \ 20 \end{array}$	T. P. 668 T. P. 670 Ref. Mon. 101	$\begin{array}{c} 306.\ 1\\ 245.\ 1\\ 310.\ 2\end{array}$
Т. Р. 651	45 40 25.28 67 42 24.39	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 80 T. P. 650 Ref. Mon. 79 T. P. 652	$\begin{array}{c} 217.\ 0\\ 715.\ 9\\ 517.\ 5\\ 621.\ 8\end{array}$	T. P. 670	45 35 49.63 67 33 27.66	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 669 Ref. Mon. 100 T. P. 671 Ref. Mon. 101	$\begin{array}{r} 245.\ 1\\ 780.\ 1\\ 715.\ 4\\ 340.\ 6\end{array}$
Т. Р. 652	45 40 09.15 67 42 07.18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 80 T. P. 651 Ref. Mon. 81 T. P. 653	584. 1621. 8178. 11,090. 0	Т. Р. 671	45 35 52 78 67 32 54 96	$\begin{array}{r} 54 & 35 & 20 \\ 82 & 11 & 40 \\ 222 & 35 & 20 \\ 234 & 35 & 20 \\ 287 & 21 & 20 \end{array}$	Ref. Mon. 101 T. P. 670 Ref. Mon. 102-A Ref. Mon. 102 T. P. 672	555.7715.4522.8552.0 $1.045.1$
Т. Р. 653	45 39 34.93 67 41 54.76	$\begin{array}{cccccccc} 101 & 03 & 00 \\ 165 & 43 & 10 \\ 281 & 03 & 00 \\ 322 & 19 & 00 \end{array}$	Ref. Mon. 82 T. P. 652 Ref. Mon. 83 T. P. 654	$570. \ 4 \\ 1, 090. \ 0 \\ 243. \ 1 \\ 845. \ 3$	т. Р. 672	45 35 42.68 67 32 08.94	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 671 Ref. Mon. 102-A. Ref. Mon. 102 T. P. 673.	1,045.1948.6836.01,490.6
Т.Р. 654	45 39 13.26 67 41 30.90	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 655 Ref. Mon. 85 T. P. 653 Ref. Mon. 84	$394.3 \\ 566.9 \\ 845.3 \\ 210.5$	T. P. 673	45 35 16.17 67 31 11.46	319 04 50 39 36 10 123 18 10 274 08 10	Ref. Mon. 103 Ref. Mon. 103 T. P. 672 T. P. 674	1, 502, 1 411, 2 1, 490, 6 1, 582, 2
Т. Р. 655	45 39 00.79 67 41 34.81	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 85 T. P. 654 Ref. Mon. 84 T. P. 656	$172. \ 6 \\ 394. \ 3 \\ 604. \ 8 \\ 1, \ 643. \ 9$	T. P. 674	45 35 12.47 67 29 58.66	$\begin{array}{c} 219 \ 36 \ 10 \\ 6 \ 13 \ 20 \\ 94 \ 09 \ 00 \\ 186 \ 13 \ 20 \end{array}$	Ref. Mon. 104 Ref. Mon. 105 T. P. 673 Ref. Mon. 106	1, 431. 6 $492. 7$ $1, 582. 2$ $662. 7$
T. P. 656	45 38 18.12 67 40 49.40	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 87 T. P. 655 Ref. Mon. 86 T. P. 657	$\begin{array}{r} 453.\ 9\\1,\ 643.\ 9\\158.\ 0\\904.\ 0\end{array}$	т. Р. 675	45 35 27.76 67 29 31.59	231 10 40 51 11 00 171 03 50 186 23 40	T. P. 675 T. P. 674 Ref. Mon. 107 T. P. 676	753. 1 753. 1 272. 2 261. 3
Т. Р. 657	45 37 51,20 67 40 33,00	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 87 T. P. 656 T. P. 658 Ref. Mon. 88	$\begin{array}{c} 1,163.0\\904.0\\1,008.4\\1,514.4\end{array}$	T. P. 676	45 35 36.17 67 29 30.25	$\begin{array}{c} 6 \\ 6 \\ 97 \\ 22 \\ 30 \\ 248 \\ 20 \\ 10 \\ 277 \\ 29 \\ 20 \end{array}$	Ref. Mon. 108           T. P. 675           Ref. Mon. 107           T. P. 677           Bef. Mon. 108	442. 5 261. 3 72. 0 141. 4 261. 6
T. P. 658	45 37 27.73 67 40 00.62	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 657 Ref. Mon. 87 T. P. 659. Ref. Mon. 89 Ref. Mon. 88	$1,008.4 \\ 2,171.4 \\ 262.9 \\ 504.0 \\ 506.1$	T. P. 677	45 35 37.86 67 29 24.19	$\begin{array}{c} 68 & 20 & 10 \\ 78 & 02 & 20 \\ 204 & 35 & 20 \\ 293 & 28 & 00 \end{array}$	T. P. 676 Ref. Mon. 107 T. P. 678 Ref. Mon. 108	$ \begin{array}{r}     141.4 \\     207.3 \\     164.6 \\     247.7 \\ \end{array} $
Т. Р. 659	45 37 31.82 67 39 49.97	$\begin{array}{cccc} 61 & 19 & 40 \\ 241 & 19 & 40 \\ 314 & 02 & 20 \end{array}$	T. P. 658 Ref. Mon. 89 T. P. 660	$\begin{array}{c} 262.\ 9\\ 241.\ 1\\ 1,\ 921.\ 6\end{array}$	T. P. 678	45 35 42.71 67 29 21.03	$\begin{array}{c} 24 \ 35 \ 30 \\ 147 \ 25 \ 20 \\ 209 \ 06 \ 20 \\ 327 \ 25 \ 20 \end{array}$	T. P. 677. Ref. Mon. 110 T. P. 679. Ref. Mon. 108	164.6 998.4 98.1 294.7
T. P. 660	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 90 T. P. 659 T. P. 661 Ref. Mon. 93	284.51,921.6545.01,184.7	T. P. 679	45 35 45.49 67 29 18.83	$\begin{array}{c} 29 & 06 & 20 \\ 48 & 53 & 40 \\ 187 & 35 & 20 \\ 341 & 37 & 20 \end{array}$	T. P. 678 Ref. Mon, 107 T. P. 680 Ref. Mon, 108	98. 1 423. 4 128. 0 352. 0
T. P. 661	45 36 58 42 67 38 25 36	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 660 Ref. Mon. 90 T. P. 662 Ref. Mon. 93	$545. 0 \\829. 5 \\850. 2 \\639. 7$	Т. Р. 680	45 35 49.60 67 29 18.05	$\begin{array}{r} 7 & 35 & 20 \\ 92 & 10 & 40 \\ 139 & 51 & 40 \\ 185 & 27 & 20 \end{array}$	T. P. 679 T. P. 681 Ref. Mon. 109 Ref. Mon. 111	128. 0205. 5551. 4307. 2
T. P. 662	$\begin{array}{c} 45 & 37 & 23.85 \\ 67 & 38 & 40.42 \end{array}$	59 58 20 239 58 20 239 58 20 239 58 20 337 25 40	Ref. Mon. 91 T. P. 663 Ref. Mon. 92 T. P. 661.	$343.8 \\ 437.3 \\ 669.0 \\ 850.2$	T. P. 681	45 35 49 85 67 29 27 52	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 682 Ref. Mon. 110 T. P. 680 Ref. Mon. 108	193. 9736. 9205. 5556. 2

## BOUNDARY TURNING POINTS-NORTH, GRAND, MUD, AND SPEDNIK LAKES-Continued

Station	Latitude and longitude	Azimuth	To station	• Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Т. Р. 682	° ' '' 45 35 55 14 67 29 32 34	$ \begin{smallmatrix} \circ & \prime & \prime \\ 104 & 26 & 10 \\ 147 & 25 & 20 \\ 327 & 25 & 20 \\ 327 & 25 & 20 \\ \end{smallmatrix} $	T. P. 683. Ref. Mon. 110 T. P. 681. Ref. Mon. 108	193. 0 543. 0 193. 9 750. 1	T. P. 693	° , , , , 45 36 09,40 67 27 02,23	<pre></pre>	Ref. Mon. 115 Ref. Mon. 115-A T. P. 692 Ref. Mon. 116 T. P. 694.	$\begin{array}{r} 485.\ 6\\ 490.\ 6\\ 561.\ 7\\ 451.\ 5\\ 684.\ 2\end{array}$
Т. Р. 683	45 35 56.70 67 29 40.96	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 110 T. P. 684 T. P. 682 Ref. Mon. 107	$\begin{array}{r} 422.\ 8\\ 274.\ 8\\ 193.\ 0\\ 644.\ 9\end{array}$	т. Р. 694	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 693 T. P. 695 Ref. Mon. 118 Ref. Mon. 117	$684.2 \\ 163.5 \\ 391.9 \\ 164.1$
T. P. 684	45 36 05.36 67 29 38.02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 683 Ref. Mon. 110 T. P. 685 Ref. Mon. 109	$\begin{array}{c} 274.\ 8\\ 221.\ 0\\ 153.\ 2\\ 101.\ 2\end{array}$	т. Р. 695	$\begin{array}{c} 45 & 35 & 47.  48 \\ 67 & 26 & 45.  09 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 117 T. P. 694 Ref. Mon. 118 T. P. 696	$118.5 \\ 163.5 \\ 228.5 \\ 327.6$
Т. Р. 685	45 36 05.29 67 29 30.96	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 109 T. P. 684 Ref. Mon. 112 T. P. 686	98. 5 153. 2 994. 5 72. 3	т. р. 696	$\begin{array}{c} 45 & 35 & 38 & 32 \\ 67 & 26 & 37 & 47 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 117 T. P. 695 Ref. Mon. 118 T. P. 697	287.7 327.6 243.8 1,162.9
т. Р. 686	45 36 03.33 67 29 29.14	$\begin{array}{c} 88 \ 50 \ 50 \\ 147 \ 01 \ 20 \\ 259 \ 19 \ 10 \\ 293 \ 38 \ 30 \end{array}$	Ref. Mon. 109 T. P. 685 T. P. 687 Ref. Mon. 111	$115.\ 1\\72.\ 3\\381.\ 8\\294.\ 3$	т. Р. 697	$\begin{array}{c} 45 & 35 & 09. \ 34 \\ 67 & 26 & 03. \ 20 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 696 Ref. Mon. 119-A Ref. Mon. 119 T. P. 698 Ref. Mon. 120	$1,162.9 \\ 260.6 \\ 228.3 \\ 277.9 \\ 421.9$
Т. Р. 687	45 36 05.62 67 29 11.83	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 111 T. P. 686 Ref. Mon. 112 T. P. 688	216. 3 381. 8 717. 2 742. 7	т. Р. 698	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 3 53 10 \\ 132 14 50 \\ 183 53 10 \\ 190 21 10 \end{array}$	Ref. Mon. 120 T. P. 697 Ref. Mon. 119 Ref. Mon. 119-A	$     188.8 \\     277.9 \\     240.6 \\     257.5     $
т. Р. 688	45 36 14.60 67 28 40.03	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 687 Ref. Mon. 112 T. P. 689 Ref. Mon. 113	$\begin{array}{c} 742.7\\ 486.4\\ 525.9\\ 747.4\end{array}$	T. P. 699	45 34 42.89 67 25 34.08	325         57         50           92         21         20           145         58         00           200         53         00	T. P. 699 Ref. Mon. 121 T. P. 698. Ref. Mon. 122	760.0 111.4 760.0 112.2
т. Р. 689	45 36 02.38 67 28 23.12	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 688. Ref. Mon. 112 T. P. 690. Ref. Mon. 113	$\begin{array}{c} 525. \ 9 \\ 1, 012. \ 3 \\ 312. \ 3 \\ 221. \ 5 \end{array}$	T. P. 700	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 121 T. P. 699 Ref. Mon. 122 T. P. 701	216. 5 173. 8 279. 6 358. 0
Т. Р. 690	45 36 02.97 67 28 08.74	$\begin{array}{ccccccc} 41 & 38 & 20 \\ 86 & 39 & 00 \\ 221 & 38 & 20 \\ 221 & 38 & 20 \end{array}$	Ref. Mon. 113 T. P. 689 T. P. 691 Ref. Mon. 114	$\begin{array}{c} 237.\ 0\\ 312.\ 3\\ 409.\ 9\\ 1, 204.\ 6\end{array}$	T. P. 701	45 34 26, 22 67 25 28, 52	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 123 T. P. 700 Ref. Mon. 124 T. P. 702	$\begin{array}{c} 84.2\\ 358.0\\ 56.5\\ 253.1\end{array}$
Т. Р. 691	45 36 12.89 67 27 56.17	$\begin{array}{r} 41 \ 38 \ 30 \\ 41 \ 38 \ 30 \\ 221 \ 38 \ 30 \\ 261 \ 10 \ 30 \end{array}$	T. P. 690 Ref. Mon. 113 Ref. Mon. 114 T. P. 692	409.9 646.9 794.7 655.1	т. р. 702	45 34 18.27 67 25 25.67	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 703 Ref. Mon. 125 T. P. 701 Ref. Mon. 124	433. 5 447. 0 253. 1 233. 7
Т. Р. 692	45 36 16.15 67 27 26.30	$\begin{array}{c} 81 \ 10 \ 50 \\ 166 \ 24 \ 40 \\ 291 \ 46 \ 20 \\ 346 \ 24 \ 40 \\ 347 \ 00 \ 00 \end{array}$	T. P. 691 Ref. Mon. 114 T. P. 693 Ref. Mon. 115 Ref. Mon. 115-A	$\begin{array}{c} 655.1 \\ 507.6 \\ 561.7 \\ 486.2 \\ 487.0 \end{array}$	Т. Р. 703	. 45 34 09.98 67 25 41.81	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	T. P. 704 Ref. Mon. 125 T. P. 702 Ref. Mon. 126	$\begin{array}{c} 116.6\\ 77.1\\ 433.5\\ 104.3\end{array}$

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
0 D 704	0 / //	0 / //	T D 700			0 / 11	0 / //		
T. P. 704	45 34 07.78 67 25 46.18	234 21 357 35	T. P. 703 T. P. 705	116. 6 38. 3	T. P. 729	45 32 09.72 67 26 07.23	$   \begin{array}{c}     213 & 45 \\     355 & 06   \end{array} $	T. P. 728 T. P. 730	$140.0 \\ 347.8$
T. P. 705	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}177&35\\323&48\end{array}$	T. P. 704 T. P. 706	38.3 101.0	Т. Р. 730	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}175&06\\24&39\end{array}$	T. P. 729 T. P. 731	$347.8 \\ 144.4$
T. P. 706	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{smallmatrix}143&48\\1&06\end{smallmatrix}$	T. P. 705 T. P. 707	$101.\ 0\\276.\ 1$	Т. Р. 731	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 204 & 39 \\ 356 & 52 \end{array}$	T. P. 730 T. P. 732	144.4 384.1
Т. Р. 707	45 33 54,96 67 25 43,60	$\begin{array}{cccc} 181 & 06 \\ 337 & 01 \\ 97 & 17 \\ 271 & 25 \end{array}$	T. P. 706 T. P. 708 Ref. Mon. 129 Ref. Mon. 127	$276.\ 1\\135.\ 5\\113.\ 2\\85.\ 8$	T. P. 732	45 31 41.83 67 26 07.67	$\begin{array}{cccc} 176 & 52 \\ 338 & 24 \\ 162 & 47 \\ 183 & 02 \end{array}$	T. P. 731. T. P. 733. Ref. Mon. 136 Ref. Mon 135	$\begin{array}{r} 384.\ 1\\ 390.\ 7\\ 160.\ 9\\ 125.\ 0\end{array}$
T. P. 708	45 33 50.92 67 25 41,16	$\begin{array}{c} 157 \ 01 \\ 326 \ 08 \\ 63 \ 35 \\ 243 \ 35 \end{array}$	T. P. 707 T P. 709 West Abutment East Abutment	135. 5124. 924. 124. 1	T. P. 733 T. P. 734	45 31 30.06 67 26 01.04 45 31 26.19	158 24 320 07 140 07	T. P. 732 T. P. 734	390.7 155.6 155.6
T. P. 709	45 33 47.56	146 08	T. P. 708	124.9	T D 725	67 25 56.44	2 11	T. P. 735.	135. 5
	01 20 01.00	$     \begin{array}{r}       79 & 49 \\       233 & 28     \end{array}   $	Ref. Mon. 130 Ref. Mon. 128	64. 6 99. 1	1. F. 135	45 31 21.80 67 25 56.68	182 11 20 07	T. P. 734 T. P. 736	$135.5 \\ 153.3$
Т. Р. 710	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	198 08 350 20	T. P. 709 T. P. 711 Por Mar. 190	88. 0 192, 6	T. P. 736	45 31 17.14 67 25 59.11	$     200 \ 07 \\     5 \ 40 $	T. P. 735 T. P. 737	$153.3 \\ 167.7$
T. P. 711	45 33 38.70 67 25 37.72	170 20 315 27	T. P. 710 T. P. 712	192. 6 188. 0	1. 1. 1. 1.01	45 31 11.74 67 25 59.87	$     185 40 \\     324 34 \\     19 04 \\     255 07 $	T. P. 736. T. P. 738. Ref. Mon. 136-A Ref. Mon. 125-A	$     \begin{array}{r}       167.7 \\       78.8 \\       32.3 \\       37.0 \\     \end{array} $
T. P. 712	$\begin{array}{c} 45 & 33 & 34, 36 \\ 67 & 25 & 31, 64 \end{array}$	$     \begin{array}{r}       135 & 27 \\       320 & 51     \end{array} $	T. P. 711 T. P. 713	188. 0 200, 3	T. P. 738	45 31 09.66 67 25 57 77	144 34 274 09	T. P. 737	78. 8 280 1
Т. Р. 713	45 33 29.33 67 25 25.80	$     \begin{array}{r}       140 51 \\       330 32     \end{array} $	T. P. 712 T. P. 714	200.3 187.2	Т. Р. 739	45 31 09.00 67 25 44.90	94 09 313 28	T. P. 738 T. P. 740	280. 1 306. 8
Т. Р. 714	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$150 \ 32 \\ 9 \ 01 \\ 0 \ 07$	T. P. 713 T. P. 715	187. 2 311. 1	Т. Р. 740	$\begin{array}{c} 45 & 31 & 02. 17 \\ 67 & 25 & 34. 64 \end{array}$	$\begin{array}{c}133&28\\14&39\end{array}$	T. P. 739 T. P. 741	306. 8 222. 5
		101 45	Ref. Mon. 131 Ref. Mon. 132	210.4 116.6	T. P. 741	45 30 55.20	194 39	T. P 740	222.5
T. P. 715	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 189 & 01 \\ 340 & 56 \end{array}$	T. P. 714 T. P. 716	$\begin{array}{c}311.\ 1\\481.\ 1\end{array}$	T. P. 742	45 30 50.49	143 09	T. P 741	181. 5
Т. Р. 716	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc}160&56\\40&32\end{array}$	T. P. 715. T. P. 717	$\begin{array}{c} 481.\ 1\\ 388.\ 6\end{array}$		67 25 32.21	$     \begin{array}{r}       306 & 00 \\       119 & 10 \\       222 & 15     \end{array} $	T. P. 743 Ref. Mon. 138 Ref. Mon. 137	394. 7 115. 8 88. 7
Т. Р. 717	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 220 \hspace{0.1cm} 32 \\ 351 \hspace{0.1cm} 43 \end{array}$	T. P. 716 T. P. 718	$388.6 \\ 94.7$	Т. Р. 743	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{126}{337}  \frac{00}{21}   20$	T. P. 742 T. P. 744	394. 7 899. 7
T. P. 718	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}171&43\\&7&15\end{array}$	T. P. 717 T. P. 719	94. 7 357. 4	Т. Р. 744	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{157}{356}  \frac{21}{11}  \frac{30}{11}$	T. P. 743 T. P. 745	899. 7 336. 9
Т. Р. 719	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}187 \hspace{0.1cm} 15\\28 \hspace{0.1cm} 38\end{array}$	T. P. 718 T. P. 720	$357.4 \\ 192.8$	T. P. 745	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}176&11\\85&44\end{array}$	T. P. 744 T P. 746	$336.9 \\ 141.1$
Т. Р. 720	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 208 \ \ 38 \\ 346 \ \ 36 \end{array}$	T. P. 719 T. P. 721	192. 8 137. 7	т. р. 746	$\begin{array}{c} 45 \\ 67 \\ 25 \\ 07 \\ 07 \\ 07 \\ 07 \\ 00 \\ \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 745 T. P. 747	$\begin{array}{c} 141.\ 1\\ 607.\ 4\end{array}$
T. P. 721	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{c}       166 & 36 \\       55 & 08     \end{array}   $	T. P. 720 T. P. 722	$137.7 \\ 76.8$			$\begin{array}{ccc}2&57\\138&06\end{array}$	Ref. Mon. 137-A Ref. Mon. 137-B	35.9 424.2
т. р. 722	45 32 24.04 67 25 35.34	235 08 113 53	T. P. 721 T. P. 723	76.8 123.5	Т. Р. 747	45 30 20.31 67 25 24.30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 746 T. P. 748	$\begin{array}{c} 607.\ 4 \\ 199.\ 7 \end{array}$
т. р. 723	45 32 25.66 67 25 40.55	293 53 60 12	T. P. 722 T. P. 724	123.5 112.0	T. P. 748	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$250 \ 29 \\ 336 \ 56$	T. P. 747 T. P. 749	$199.\ 7\\150.\ 0$
т. р. 724	45 32 23.86 67 25 45.03	240 12 138 09	T. P. 723 T. P. 725	112.0 73.9	Т. Р. 749	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}156&56\\45&13\end{array}$	T. P. 748 T. P. 750	$150.0 \\ 229.8$
T. P. 725	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	318 09 108 51	T. P. 724 T. P. 726	73. 9 134. 7	T. P. 750	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 749 T. P. 751 Ref. Mon. 140	$229.8 \\ 154.7 \\ 96.0$
T. P. 726	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 725 T. P. 727 Ref. Mon. 134 Ref. Mon. 133	$134.7 \\ 131.7 \\ 80.2 \\ 67.6$	T. P. 751	45 30 03.83 67 25 40.57	239 01 203 06 93 06	Ref. Mon. 139 T. P. 750 T. P. 752	85. 6 154. 7 217. 0
T. P. 727	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 255 & 46 \\ 14 & 27 \end{array}$	T. P. 726 T. P. 728	131. 7 398. 7	Т. Р. 752	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 273 \ 06 \\ 125 \ 26 \end{array}$	T. P. 751. T. P. 753	$\begin{array}{c} 217.\ 0\\ 65.\ 4\end{array}$
T. P. 728	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	194 27 33 45	T. P. 727. T. P. 729	398.7 140.0	T. P. 753	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$305 \ 26 \\ 184 \ 10$	T. P. 752 T. P. 754	65.4 191.1

#### GEOGRAPHIC POSITIONS OF BOUNDARY TURNING POINTS DEFINING THE INTERNA-TIONAL BOUNDARY THROUGH THE ST. CROIX RIVER FROM THE OUTLET OF SPEDNIK LAKE TO WOODLAND, ME.

## BOUNDARY TURNING POINTS-ST. CROIX RIVER, FROM SPEDNIK LAKE TO WOODLAND, ME.-Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
T. P. 754	° , " 45 30 11.61 67 25 52.37	° ' '' 4 10 120 45	T. P. 753 T. P. 755	191.1     162.2	т. Р. 783	° ' " 45 29 54.45 67 27 54.61	° ' '' 92 05 334 57	T. P. 782 T. P. 784	$239.6 \\ 154.3$
T. P. 755	45 30 14.30 67 25 58.79	$\begin{array}{c} 300 \hspace{0.1cm} 45 \\ 74 \hspace{0.1cm} 12 \end{array}$	T. P. 754 T. P. 756	$     \begin{array}{r}       162. \ 2 \\       168. \ 5     \end{array} $	Т. Р. 784	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}154&57\\54&55\end{array}$	T. P. 783 T. P. 785	$154.3 \\ 363.8$
T. P. 756	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$254 \ 12 \\ 132 \ 51$	T. P. 755 T. P. 757	168. 5 277. 1	T. P. 785	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 234 \ 55 \\ 127 \ 19 \\ 116 \ 29 \\ 116 \ 49 \end{array}$	T. P. 784 T. P. 786 Ref. Mon. 147	363. 8 378. 5 110. 3
Т. Р. 757	45 30 18.91 67 26 15.61	$312 51 \\ 92 13$	T. P. 756 T. P. 758	277.1 379.6	Т. Р. 786	45 29 50.58	144 43 307 19	T. P. 785	115. 4 378. 5
Т. Р. 758	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 757 T. P. 759	379. 6 694. 9	T. P. 787	67 28 19.17 45 29 46.35	48 47 228 47	T. P. 787 T. P. 786	198. 4 198. 4
т. р. 759	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 316 & 56 & 00 \\ 106 & 56 \end{array}$	T. P. 758 T. P. 760	$694.9 \\ 175.4$	T D 799	67 28 26.04 45 20 46 58	95 59 275 59	T. P. 788	69.1 69.1
Т. Р. 760	45 30 37.49 67 27 02.67	$\begin{array}{ccc} 286 & 56 \\ 62 & 52 \end{array}$	T. P. 759 T. P. 761	$175.4 \\ 247.0$	T. D. Foo	67 28 29.21	116 37	T. P. 789	187.7
T. P. 761	45 30 33.84 67 27 12.80	$\begin{array}{c} 242 \hspace{0.1cm} 52 \\ 41 \hspace{0.1cm} 01 \end{array}$	T. P. 760 T. P. 762	$247.0 \\ 59.8$	1. P. 789	45 29 49.31 67 28 36.93	296 37 100 24	T. P. 790	187.7
		$221 \ 01 \\ 255 \ 46$	Ref. Mon. 142 Ref. Mon. 141	46. 9 41. 6	T. P. 790	45 29 49.90 67 28 41.50	$     280 24 \\     59 05 $	T. P. 789 T. P. 791	100. 8 180. 5
Т. Р. 762	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 221 \hspace{0.1cm} 01 \\ 352 \hspace{0.1cm} 42 \end{array}$	T. P. 761 T. P. 763	59. 8 193. 6	Т. Р. 791	45 29 46.89 67 28 48.63	$     \begin{array}{r}       239 & 05 \\       19 & 45     \end{array} $	T. P. 790 T. P 792	180, 5 172, 9
Т. Р. 763	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}172&42\\310&47\end{array}$	T. P. 762 T. P. 764	$193.\ 6\\326.\ 2$	Т. Р. 792	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}199&45\\45&28\end{array}$	T. P. 791 T. P. 793	$172.9 \\ 149.6$
Т. Р. 764	$\begin{array}{c} 45 & 30 & 19.\ 26 \\ 67 & 27 & 02.\ 05 \end{array}$	$\begin{array}{c}130&47\\346&20\end{array}$	T. P. 763 T. P. 765	$326.\ 2\ 351.\ 9$	Т. Р. 793	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 225 & 28 \\ 106 & 40 \end{array}$	T. P. 792. T. P. 794	$149.6 \\ 111.2$
Т. Р. 765	$\begin{array}{c} 45 & 30 & 08.  18 \\ 67 & 26 & 58.  27 \end{array}$	$166 \ 20 \\ 10 \ 26$	T. P. 764 T. P. 766	351.9 343.4	т. Р. 794	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$286 \ 40 \\ 157 \ 22$	T. P. 793 T. P. 795	$     \begin{array}{c}       111.2 \\       158.1     \end{array} $
Т. Р. 766	45 29 57.24 67 27 01.13	$190\ 26\ 89\ 19$	T. P. 765 T. P. 767	$343.4 \\ 146.4$	T. P. 795	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 337 & 22 \\ 99 & 29 \end{array}$	T. P. 794 T. P. 796	$158.1 \\ 131.6$
Т. Р. 767	45 29 57.18 67 27 07.87	$   \begin{array}{c}     269 & 19 \\     126 & 00   \end{array} $	T. P. 766 T. P. 768	146.4 217.7	т. Р. 796	45 29 44.68 67 29 09.92	$279 \ 29 \\ 32 \ 01$	T. P. 795 T. P. 797	131.6 114.8
		189 22 306 00	Ref. Mon. 144 Ref. Mon. 143	31. 3 24, 4	Т. Р. 797	45 29 41.53 67 29 12.72	212 01	T. P. 796 T. P. 798	114.8 295.8
T. P. 768	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 306 \ 00 \\ 140 \ 48 \ 20 \end{array}$	T. P. 767 T. P. 769	217.7 855.8			$\begin{array}{r} 36 & 56 \\ 154 & 36 \end{array}$	Ref. Mon. 149 Ref. Mon. 150	30, 6 33, 5
Т. Р. 769	45 30 22 81 67 27 40 90	$\begin{array}{cccc} 320 & 48 & 00 \\ 132 & 46 \end{array}$	T. P. 768 T. P. 770	855. 8 128. 5	T. P. 798	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 231 & 11 \\ 337 & 16 \end{array}$	T. P. 797 T. P. 799	$295.8 \\ 223.3$
Т. Р. 770	45 30 25.64 67 27 45.25	$312 \ 46 \\ 169 \ 11 \\ 152 \ 47$	T. P. 769 T. P. 771 Ref. Mon. 145	$128.\ 5\\119.\ 7\\59.\ 8$	T. P. 799	45 29 28.86 67 29 19.37	$157 \ 16 \\ 25 \ 58$	T. P. 798 T. P. 800	223. 3 253. 3
T. P. 771	45 30 29, 45	255 47 349 11	Ref. Mon. 146 T. P. 770	19.8 119.7	Т. Р. 800	45 29 21.48 67 29 24.47	205 58 93 08	T. P. 801	253. 3 126. 0
T D 779	67 27 46.28 45 30 30 61	109 19 289 10	T. P. 772	108.8	T. P. 801	45 29 21.70 67 29 30.26	$   \begin{array}{c}     273 & 08 \\     79 & 15   \end{array} $	T. P. 800 T. P. 802	126.0 314.8
D D 770	67 27 51.01	52 13	T. P. 773	295.6	T. P. 802	45 29 19.80 67 29 44.51	$\begin{array}{cccc} 259 & 15 \\ 137 & 35 \end{array}$	T. P. 801 T. P. 803	$314.8 \\ 241.6$
T. F. (13	45 30 24.75 67 28 01.78	14 56	T. P. 774	107.7	Т. Р. 803	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 317 & 35 \\ 106 & 40 \end{array}$	T. P. 802 T. P. 804	$241.6 \\ 235.2$
т. Р. 774	45 30 21.38 67 28 03.05	$     194 56 \\     70 04 $	T. P. 773 T. P. 775	107.7	Т. Р. 804	45 29 27.76 67 30 02.38	$286 \ 40 \ 53 \ 33$	T. P. 803 T. P. 805	235. 2 93. 6
Т. Р. 775	45 30 19.94 67 28 08.72	$250 \ 04 \\ 113 \ 01$	T. P. 774 T. P. 776	130.7 118.9			$     \begin{array}{r}       30 & 04 \\       108 & 14     \end{array} $	Ref. Mon. 151 Ref. Mon. 152	33. 4 39. 6
Т. Р. 776	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}293 \\ 28 \\ 06\end{array}$	T. P. 775. T. P. 777.	$     118.9 \\     206.3 $	T. P. 805	45 29 25.96 67 30 05.85	$   \begin{array}{cccc}     233 & 33 \\     70 & 08   \end{array} $	T. P. 804 T. P. 806	93. 6 162. 2
т. р. 777	$\begin{array}{c} 45 \ 30 \ 15, 55 \\ 67 \ 28 \ 18, 23 \end{array}$	$\begin{array}{ccc} 208 & 06 \\ 337 & 39 \end{array}$	T. P. 776 T. P. 778	206. 3 130, 9	T. P. 806	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 250 & 08 \\ 45 & 07 \end{array}$	T. P. 805 T. P. 807	162.2 52.8
т. р. 778	45 30 11.63 67 28 15.94	$157 \ 39 \\ 351 \ 35$	T. P. 777. T. P. 779	130.9 108.8	T. P. 807	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 225 & 07 \\ 3 & 37 \end{array}$	T. P. 806 T. P. 808	52.8 319.0
Т. Р. 779	45 30 08. 14 67 28 15. 21	$\begin{array}{c}171 \\ 27 \\ 42\end{array}$	T. P. 778 T. P. 780	108. 8 158. 8	T. P. 808	45 29 12.66 67 30 15.52	$\frac{183}{326}  \frac{37}{25}$	T. P. 807 T. P. 809	319.0 119.0
т. р. 780	45 30 03.59 67 28 18.61	$207 \ 42 \\ 337 \ 59$	T. P. 779. T. P. 781.	158. 8 159, 8	T. P. 809	45 29 09.45 67 30 12.50	$\frac{146}{355} \frac{25}{35}$	T. P. 808 T. P. 810	119.0 221.5
T. P. 781	45 29 58.79 67 28 15.85	$157 59 \\ 299 26$	T. P. 780 T. P. 782	159.8 254.5	T. P. 810	45 29 02 29 67 30 11 71	$   \begin{array}{ccccccccccccccccccccccccccccccccccc$	T. P. 809 T. P. 811	221. 5 154. 9
T. P. 782	45 29 54.74 67 28 05.64	$\frac{119}{272} \frac{26}{05}$	T. P. 781 T. P. 783	254. 5 239. 6	T. P. 811	45 28 58 25 67 30 07 51	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 810 T. P. 812	154.6 420.4

47378°—34——9

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
T. P. 812	° ' '' 45 28 44.70 67 30 05.57	° ' '' 174 14 328 45	T. P. 811 T. P. 813	420.4 251.5	T. P. 841	° / // 45 26 09.12 67 28 46.33	° ' '' 206 17 347 31	T. P. 840 T. P. 842	141. 8 157. 3
T. P. 813	45 28 37.74 67 29 59.56	$\begin{array}{c}148 \hspace{0.1cm} 45\\304 \hspace{0.1cm} 44\end{array}$	T. P. 812 T. P. 814	251, 5 215, 1	Т. Р. 842	45 26 04.15 67 28 44.76	$167 31 \\ 333 44$	T. P. 841 T. P. 843	157.3 190.3
Т. Р. 814	45 28 33.77 67 29 51.42	$\begin{array}{ccc} 124 & 44 \\ 334 & 34 \end{array}$	T. P. 813 T. P. 815	$215.1 \\ 377.3$	Т. Р. 843	45 25 58.62 67 28 40.89	$153 \ 44 \\ 351 \ 14$	T. P. 842 T. P. 844	$190.3 \\ 159.9$
T. P. 815	45 28 22.73 67 29 43.96	$154 \ 34 \\ 318 \ 06$	T. P. 814 T. P. 816	377.3 263.6	Т. Р. 844	45 25 53.50 67 28 39.77	$171 \ 14 \\ 18 \ 24$	T. P. 843 T. P. 845	159.9 100.3
T. P. 816	45 28 16.37 67 29 35.86	$138 \ 06 \\ 296 \ 57$	T. P. 815 T. P. 817	263.6 157.9	T. P. 845	45 25 50.42 67 28 41.22	$     198 24 \\     319 11 $	T. P. 844 T. P. 846	100.3 250.4
T. P. 817	45 28 14.06 67 29 29.38	$     116 57 \\     311 53   $	T. P. 816 T. P. 818	157.9 41.3	Т. Р. 846	45 25 44.28 67 28 33.69	$139 11 \\ 344 09$	T. P. 845 T. P. 847	250.4 305.0
т. р. 818	45 28 13.16 67 29 27.96	$   \begin{array}{cccc}     131 & 53 \\     350 & 59   \end{array} $	T. P. 817 T. P. 819	41.3 91.3	Т. Р. 847	45 25 34.77 67 28 29 86	$164 09 \\ 350 45$	T. P. 846 T. P. 848	305. 0 123. 0
т. Р. 819	45 28 10.24 67 29 27 30	170 59 307 00	T. P. 818	91.3 302.8			$59 13 \\ 218 47$	Ref. Mon. 160 Ref. Mon. 159	23. 5 44. 3
	01 20 21.00	$\begin{array}{c} 97 & 16 \\ 190 & 06 \end{array}$	Ref. Mon. 154 Ref. Mon. 153	51. 8 37. 8	Т. Р. 848	$\begin{array}{c} 45 \ 25 \ 30, 84 \\ 67 \ 28 \ 28, 95 \end{array}$	$\begin{array}{c}170&45\\331&37\end{array}$	T. P. 847 T. P. 849	$123. 0 \\ 236. 2$
Т. Р. 820	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$127 \ 00 \\ 340 \ 19 \\ 100 \ 48$	T. P. 819 T. P. 821	302.8 207.4 07.5	Т. Р. 849	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{c}       151 & 37 \\       287 & 33     \end{array} $	T. P. 848 T. P. 850	$236.2 \\ 201.0$
T. P. 821	45 27 58.02	160 19	T. P. 820	207.4	Т. Р. 850	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 107 \ \ 33 \\ 265 \ \ 57 \end{array}$	T. P. 849 T. P. 851	$201.0 \\ 159.7$
T. P. 822	67 29 12.96 45 27 53.55	358 35 178 35	T. P. 822	137.8	Т. Р. 851	$\begin{array}{c} 45 \\ 67 \\ 28 \\ 07. \\ 64 \end{array}$	$\begin{array}{r}85&57\\288&07\end{array}$	T. P. 850 T. P. 852	$159.7 \\ 114.0$
Т. Р. 823	67 29 12.80 45 27 50.46	317 59 137 59	T. P. 823	128. 5 128. 5	Т. Р. 852	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{108}{260} \frac{07}{01}$	T. P. 851 T. P. 853	114. 0 85. 0
T. P. 824	67 29 08.84 45 27 43.97	329 02 149 02	T. P. 824 T. P. 823	233. 6 233. 6	Т. Р. 853	45 25 21.84 67 27 58.81	80 01 278 18	T. P. 852 T. P. 854	$\begin{array}{c} 85.\ 0\\ 142.\ 1\end{array}$
T. P. 825	67 29 03.31 45 27 34.34	337 50 157 50	T. P. 825 T. P. 824	321.0 321.0	Т. Р. 854	45 25 21.17 67 27 52.34	$98\ 18$ 260 03	T. P. 853 T. P. 855	$142.1 \\ 123.3$
T. P. 826	67 28 57.73 45 27 26.07	6 51 186 51	T. P. 826 T. P. 825	257.3 257.3	Т. Р. 855	45 25 21.86 67 27 46.75	80 03 294 28	T. P. 854 T. P. 856	$123.3 \\ 98.7$
T. P. 827	67 28 59.14 45 27 23.37	66 28 246 28	T. P. 827 T. P. 826	208.4 208.4	T. P. 856	45 25 20.54 67 27 42.62	$     114 \ 28 \\     330 \ 08   $	T. P. 855 T. P. 857	$98.7 \\ 134.0$
T P 898	67 29 07.94 45 27 19 52	10 11	T. P. 828 T. P. 827	120.9	Т. Р. 857	45 25 16.77 67 27 39.55	$150 08 \\ 352 03$	T. P. 856 T. P. 858	134.0 83.2
	67 29 08.92	$     \begin{array}{r}       357 & 00 \\       8 & 10 \\       353 & 55     \end{array} $	T. P. 829 Ref. Mon. 156 Ref. Mon. 155	$     280.4 \\     215.7 \\     209.9 $	т. р. 858	45 25 14.10 67 27 39.02	$172 03 \\ 28 48$	T. P. 857 T. P. 859	$83.2 \\ 143.9$
Т. Р. 829	45 27 10.45 67 29 08.25	$177 \ 00 \\ 340 \ 00$	T. P. 828 T. P. 830	280. 4 181. 2	Т. Р. 859	$\begin{array}{c} 45 \ 25 \ 10. \ 02 \\ 67 \ 27 \ 42. \ 21 \end{array}$	$208 \ 48 \\ 326 \ 49$	T. P. 858 T. P. 860	$143.9 \\ 249.9$
Т. Р. 830	45 27 04.93 67 29 05.40	$   \begin{array}{r}     160 & 00 \\     353 & 59   \end{array} $	T. P. 829 T. P. 831	$     181.2 \\     203.9   $	T. P. 860	45 25 03.25 67 27 35.92	$146 \ 49 \\ 354 \ 09$	T. P. 859 T. P. 861	$249.9 \\ 183.6$
Ť. P. 831	45 26 58.36 67 29 04.42	$173 59 \\ 286 01$	T. P. 830 T. P. 832	$203.9 \\ 64.5$	T. P. 861	45 24 57.33 67 27 35.06	$\begin{array}{c}174 \\ 322 \\ 16\end{array}$	T. P. 860 T. P. 862	183.6     161.7
T. P. 832	45 26 57.79 67 29 01.56	$   \begin{array}{c}     106 & 01 \\     331 & 35   \end{array} $	T. P. 831 T. P. 833	$64.5 \\ 145.4$	Т. Р. 862	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{142}{282} \frac{16}{09}$	T. P. 861 T. P. 863	161.7     116.8     1
Т. Р. 833	45 26 53.65 67 28 58.38	$151 \ 35 \\ 298 \ 19$	T. P. 832 T. P. 834	$145.4 \\ 389.8$		and and	$120 \ 01 \\ 158 \ 36$	Ref. Mon. 162 Ref. Mon. 161	56. 1 73. 6
т. р. 834	45 26 47.66 67 28 42.59	118 19 342 02	T. P. 833 T. P. 835	389. 8 363. 0	т. Р. 863	45 24 52 39 67 27 25 25	$     102 09 \\     353 41 $	T. P. 862 T. P. 864	116.8
т. р. 835	45 26 36.47 67 28 37.44	$   \begin{array}{c}     162 & 02 \\     24 & 49   \end{array} $	T. P. 834 T. P. 836	363. 0 208. 1	T. P. 864	45 24 48.87 67 27 24.70	$173 \ 41 \\ 326 \ 25 \ 50^{\circ}$	T. P. 863 T. P. 865	$109.3 \\ 500.9$
т. Р. 836	45 26 30.36 67 28 41 46	204 49 82 29	T. P. 835 T. P. 837	208. 1 177. 6	T. P. 865	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{146}{291} \frac{26}{03} \frac{00}{03}$	T. P. 864 T. P. 866	$500.9 \\ 174.1$
T. P. 837	45 26 29.60 67 28 49.56	262 29 39 18	T. P. 836 T. P. 838	177.6	T. P. 866	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}111&03\\311&42\end{array}$	T. P. 865 T. P. 867	$174.1 \\ 394.5$
T. P. 838	45 26 27.88 67 28 51 56	219 18 349 07	T. P. 837 T. P. 839	68. 6 170. 6	T. P. 867	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}131&42\\323&55\end{array}$	T. P. 866 T. P. 868	$394.5 \\ 226.8$
Т. Р. 839	45 26 22.46 67 28 50.08	169 07 333 07	T. P. 838 T. P. 840	170. 6 319. 0	T. P. 868	45 24 18.89 67 26 44.81	$     \begin{array}{r}       143 & 55 \\       317 & 55     \end{array} $	T. P. 867 T. P. 869	$226 \ 8 \ 327.3$
		89 59 269 59	Ref. Mon. 158 Ref. Mon. 157	$27.4 \\ 24.0$	T. P. 869	45 24 11.02 67 26 34 72	$137 55 \\ 317 26$	T. P. 868 T. P. 870	327.3 266.4
T. P. 840	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     153 \ 07 \\     26 \ 17 $	T. P. 839 T. P. 841	319.0 141.8			263 50 344 01	Ref. Mon. 163 Ref. Mon. 164	236, 3 95, 5

#### BOUNDARY TURNING POINTS-ST. CROIX RIVER, FROM SPEDNIK LAKE TO WOODLAND, ME.—Continued

## BOUNDARY TURNING POINTS—ST. CROIX RIVER, FROM SPEDNIK LAKE TO WOODLAND, ME.—Continued

		and the second sec							
Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
T. P. 870	o , , , , , , , , , , , , , , , , , , ,	o / // 137 26 331 39	T. P. 869. T. P. 871 T. P. 870	266. 4 266. 9 266. 9	Т. Р. 899	° ' '' 45 21 27.20 67 25 33.41	° ' " 121 44 5 01 94 39 302 29	T, P. 898 T. P. 900 Ref. Mon. 170 Ref. Mon. 169	446. 5 92. 3 99. 9 34. 7
1.1.01	67 26 20. 61	314 55 50	T. P. 872	670.0	т. р. 900	45 21 24.22	185 01	T. P. 899	92. 3 200. 4
Т. Р. 872	45 23 41.73 67 25 58.80	326 15	T. P. 873	380. 3	T. P. 901	45 21 19.55	223 58	T. P. 900	200. 4
т. Р. 873	45 23 31.49 67 25 49.09	$146 \ 15 \\ 302 \ 20$	T. P. 872 T. P. 874	380.3 191.4	т. Р. 902	67 25 40.17 45 21 17.62	60 27 240 27	T. P. 902	120. 9
т. Р. 874	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{r}       122 & 20 \\       334 & 47     \end{array} $	T. P. 873 T. P. 875	$     191.4 \\     154.7 $	Т Р 903	67 25 45.00 45 21 14.60	8 49 188 49	T. P. 903	94. 2 94. 2
T. P. 875	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$154 \ 47 \\ 355 \ 32$	T. P. 874 T. P. 876	$154.7 \\ 473.6$	7D D 004	67 25 45.66 45 91 12 02	341 02	T. P. 904	51.7
Т. Р. 876	$\begin{array}{c} 45 \ 23 \ 08.35 \\ 67 \ 25 \ 36.93 \end{array}$	$175 \ 32 \\ 333 \ 22$	T. P. 875 T. P. 877	$473.6 \\ 231.3$	1. 1. 904	45 21 13.02 67 25 44.89	345 14	T. P. 905	102.4
т. р. 877	45 23 01.65 67 25 32.17	$153 22 \\ 338 09$	T. P. 876 T. P. 878	$231.3 \\ 192.4$	T. P. 905	45 21 09.81 67 25 43.69	$165 14 \\ 19 34$	T. P. 904	102.4
т. Р. 878	$\begin{array}{c} 45 & 22 & 55 & 87 \\ 67 & 25 & 28 & 88 \end{array}$	$\begin{array}{c}158&09\\310&47\end{array}$	T. P. 877 T. P. 879	$192.\ 4\\140.\ 2$	T. P. 906	45 21 06.66 67 25 45.28	$\begin{array}{c} 199 \ 34 \\ 65 \ 22 \\ 7 \ 01 \\ 99 \ 30 \end{array}$	T. P. 905 T. P. 907 Ref. Mon. 169-A Ref. Mon. 170-A	$     \begin{array}{r}       103.3 \\       173.3 \\       79.8 \\       88.8     \end{array} $
т. Р. 879	45 22 52.90 67 25 24.00	$130 \ 47 \\ 10 \ 46 \\ 93 \ 11$	T. P. 878 T. P. 880 Ref. Mon. 166	$     \begin{array}{r}       140.2 \\       141.3 \\       76.1     \end{array} $	Т. Р. 907	45 21 04.32 67 25 52.52	$245 22 \\ 23 24$	T. P. 906 T. P. 908	173.3 156.9
TD D 990	45 22 48 40	206 56	Ref. Mon. 165	17.9 141.3	т. Р. 908	45 20 59.66 67 25 55.38	$203 24 \\ 339 14$	T. P. 907 T. P. 909	156.9 221.3
1. 1. 800	67 25 25.21	345 23	T. P. 881	78.3	Т. Р. 909	45 20 52.95 67 25 51 78	159 14	T. P. 908	221.3
T. P. 881	67 25 24.30	310 51	T. P. 882	371.6	T. P. 910	45 20 45.14	153 41	T. P. 909	269.2
T. P. 882	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$130 51 \\ 10 10$	T. P. 881 T. P. 883	. 371.6 184.6	T. P. 911	45 20 40.13	177 36	T. P. 910	154.6
т. Р. 883	45 22 32.19 67 25 12.88	$     190 \ 10 \\     28 \ 52 $	T. P. 882 T. P. 884	184. 6 241. 0	T. P. 912	67 25 46.00 45 20 28.35	27 08 207 08	T. P. 912	408.6
т. Р. 884	45 22 25.35 67 25 18.23	$208 52 \\ 63 26$	T. P. 883 T. P. 885	241. 0 142, 4		67 25 54.56	$\begin{array}{c} 67 & 08 \\ 48 & 11 \\ 86 & 56 \end{array}$	T. P. 913 Ref. Mon. 171 Ref. Mon. 172	288.6 112.8 74.5
T. P. 885	$\begin{array}{c} 45 \ 22 \ 23. \ 29 \\ 67 \ 25 \ 24. \ 08 \end{array}$	$243 \ 26 \\ 89 \ 11$	T. P. 884 T. P. 886	. 142. 4 205. 0	т. Р. 913	45 20 24.72 67 26 06.77	$247 \ 08 \\ 45 \ 52$	T. P. 912 T. P. 914	288.6
т. р. 886	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$269 11 \\ 126 11$	T. P. 885 T. P. 887	205. 0 133. 8	T. P. 914	45 20 20, 28	225 52 46 37	T. P. 913	196.7
т. р. 887	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 306 \hspace{0.1cm} 11 \\ 42 \hspace{0.1cm} 07 \end{array}$	T. P. 886 T. P. 888	133. 8 115. 8	T. P. 915	45 20 10.24 67 26 28.32	226 37 34 52	T. P. 914. T. P. 916	451.4
Т. Р. 888	45 22 22.97 67 25 42.03	$222 \ 07 \ 52 \ 58$	T. P. 887 T. P. 889	115. 8 237. 7	T. P. 916	45 20 07.06	214 52	T. P. 915 T. P. 917	119.6
T. P. 889	- 45 22 18.33 67 25 50.75	$\begin{array}{c} 232 \ 58 \\ 23 \ 16 \\ 185 \ 26 \\ 260 \ 45 \end{array}$	T. P. 888 T. P. 890 Ref. Mon. 168 Ref. Mon. 167	$ \begin{array}{c} 237.7 \\ 430.0 \\ 30.8 \\ 45.9 \end{array} $	Т. Р. 917	45 20 02.63 67 26 33.46	197 44 354 58	T. P. 916. T. P. 918	143. 6 164. 4
T. P. 890	_ 45 22 05.54	209 45 203 16	T. P. 889	430.0	Т. Р. 918	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}174&58\\38&00\end{array}$	T. P. 917 T. P. 919	$     164.4 \\     223.0 $
Т. Р. 891	67 25 58.55 45 22 01.82	352 39 172 39	T. P. 891	. 115.6	T. P. 919	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$218 \ 00 \\ 64 \ 53$	T. P. 918 T. P. 920	223. 0 246. 9
TD D 809	67 25 57.87	39 03	T. P. 892	296.1	т. Р. 920	45 19 48.24 67 26 49.37	$244 53 \\ 75 55$	T. P. 919 T. P. 921	246.9
1. P. 894	67 26 06.45	337 52	T. P. 893	180.5	T. P. 921	45 19 45 48	253 42 255 55	Chub Rock	- 181.4 350.4
Т. Р. 893	- 45 21 48.96 67 26 03.32	$     \begin{array}{r}       157 & 52 \\       358 & 22     \end{array} $	T. P. 892 T. P. 894	180. 5 293. 6	T D 099	67 27 04.98 45 10 42 20	44 46	T. P. 922	138.4
Т. Р. 894	- 45 21 39.46 67 26 02.94	$\begin{array}{c}178&22\\318&10\end{array}$	T. P. 893 T. P. 895	293. 6 61. 6	1,1,322	67 27 09.46	$\begin{array}{r} 224 & 46 \\ 64 & 52 \\ 18 & 15 \\ 184 & 18 \end{array}$	T. P. 923 Ref. Mon. 173 Ref. Mon. 174	$ \begin{array}{c}     - 138.4 \\     - 296.5 \\     - 68.6 \\     - 60.1 \end{array} $
T. P. 895	- 45 21 37.97 67 26 01.05	$\begin{array}{c} 138 \ 10 \\ 263 \ 00 \end{array}$	T. P. 894 T. P. 896	61. 6 104. 0	Т. Р. 923	45 19 38.21 67 27 21.78	$244 52 \\ 28 31$	T. P. 922. T. P. 924	296.5
т. Р. 896	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	83 00 307 58	T. P. 895 T. P. 897	104. 0 73. 3	Т. Р. 924	45 19 31.42	$208 31 \\ 345 35$	T. P. 923 T. P. 925	- 238.6
Т. Р. 897	- 45 21 36.92 67 25 53.65	$127 58 \\ 316 54$	T. P. 896 T. P. 898	73.3	т. Р. 925	45 19 25.16 67 27 24.73	$     165 35 \\     332 56     $	T. P. 924 T. P. 926	199.6 142.1
T. P. 898	45 21 34.81 67 25 50.85	$136 54 \\ 301 44$	T. P. 897 T. P. 899	89.1 446.5	T. P. 926	45 19 21.06 67 27 21.76	$152 56 \\ 318 12$	T. P. 925 T. P. 927	142.1

#### Latitude and longitude Dis-tance (meters) Latitude and longitude Dis-Station Azimuth To station Station Azimuth To station tance (meters) 0 1 11 , 45 19 14.01 67 27 12.82 ${\begin{array}{c} 94 & 12 \\ 262 & 25 \\ 8 & 13 \end{array}}$ T. P. 956 (bronze disk in Grand Falls Dam). T. P. 927 ... T. P. 955... T. P. 957... West Dam. $232.3 \\ 21.1 \\ 24.0$ T. P. 926 T. P. 928 292.0144.2 T. P. 928 45 19 09.88 67 27 09.73 $152 12 \\ 353 08$ T. P. 927 T. P. 929 $144.2 \\ 177.8$ T. P. 957\_ T. P. 956. T. P. 958. 21.1136.7 T. P. 929 45 19 04.16 67 27 08.76 $173 08 \\ 16 04$ T. P. 928. T. P. 930. $177.8 \\ 461.5$ T. P. 958\_\_ 136.7 89.8 $58 \ 08 \\ 307 \ 23$ T. P. 957. T. P. 959. 45 18 49.79 67 27 14.62 T. P. 929. T. P. 931. 461.5 T. P. 930\_ $196 04 \\ 37 07 10$ T. P. 959 $127 23 \\ 18 50$ T. P. 958. T. P. 960. 89.8 178.9 571. 5 447. 4 T. P. 931\_ T. P. 930. T. P. 932. 45 18 35.03 67 27 30.45 $\begin{array}{cccc} 217 & 07 & 00 \\ 13 & 48 \end{array}$ T. P. 960. 45 16 26.46 67 28 39.92 $198 50 \\ 339 11$ T. P. 959. T. P. 961. 178.9305.5T. P. 932. 447.4 $193 \ 48 \\ 345 \ 25$ T. P. 931 T. P. 933 $159 11 \\ 10 42 \\ 247 04$ $305.5 \\ 92.1 \\ 61.1$ T. P. 961\_ T. P. 960. T. P. 962 Lower Pitch T. P. 933 45 18 16.22 67 27 33.60 $\begin{array}{r} 165 & 25 \\ 10 & 43 \end{array}$ T. P. 932. T. P. 934 151.3154.3 $\begin{array}{c} 190 \ 42 \\ 10 \ 59 \\ 110 \ 04 \end{array}$ T. P. 961. T. P. 963\_ 92, 1 66, 9 11, 1 T. P. 962 T. P. 933.... T. P. 935... Ref. Mon. 176... Ref. Mon. 175.... $154.3 \\ 353.2 \\ 38.7 \\ 38.1$ T. P. 934 $\begin{array}{r} 190 \\ 43 \\ 7 \\ 11 \end{array}$ 45 18 11.92 67 27 37.22 Gorge\_\_\_\_\_ $176 \ 47 \ 265 \ 03$ $\begin{array}{cccc} 190 & 59 \\ 13 & 03 \\ 180 & 58 \\ 222 & 34 \end{array}$ T. P. 962 T. P. 964 Ref. Mon. 184 Ref. Mon. 183. $\begin{array}{c} 66.9\\ 95.9\\ 55.8\\ 30.6 \end{array}$ T. P. 963 $\begin{array}{c} 45 & 16 & 12.14 \\ 67 & 28 & 36.31 \end{array}$ Т. Р. 935..... 45 18 00.57 67 27 39.24 $\begin{array}{r} 187 & 11 \\ 68 & 33 \end{array}$ 353. 2 210, 2 T. P. 934. T. P. 936. 45 17 58.08 67 27 48.22 $210.2 \\ 243.6$ $\begin{array}{c} 45 \ 16 \ 09.12 \\ 67 \ 28 \ 37.30 \end{array}$ Т. Р. 936 .... T. P. 935. T. P. 937. T. P. 964. $248 \ 33 \\ 102 \ 30$ $\begin{array}{r} 193 & 03 \\ 345 & 23 \end{array}$ T. P. 963. T. P. 965. 95.9 366.0 45 17 59.79 67 27 59.14 T. P. 937 .... $282 & 30 \\ 62 & 56$ 243.6196.9 T. P. 965\_. T. P. 936. T. P. 938. $165 23 \\ 352 43$ T. P. 964. T. P. 966. 366.0 290.6 T. P. 938 290.6296.245 17 56, 89 67 28 07, 18 $242 56 \\ 15 28$ T. P. 937 T. P. 939 196, 9 186, 8 T. P. 966 $\begin{array}{r} 45 & 15 & 48.31 \\ 67 & 28 & 31.38 \end{array}$ $172 43 \\ 308 01$ T. P. 965 T. P. 967 186, 8 222, 0 T P. 939 $195 28 \\ 284 29$ T. P. 938. T. P. 940\_ T. P. 967. $296.2 \\ 106.2$ $128 01 \\ 346 16$ T. P. 966 T. P. 968 222.0335.5T. P. 940 ... $\begin{array}{r} 104 & 29 \\ 2 & 11 \end{array}$ T. P. 939. T. P. 941. T. P. 968. $\begin{array}{c} 45 \ 15 \ 39.06 \\ 67 \ 28 \ 19.52 \end{array}$ $\begin{array}{r} 166 \\ 16 \\ 28 \\ 55 \end{array}$ $106.2 \\ 263.2$ T. P. 967 T. P. 969 $\begin{array}{r} 182 & 11 \\ 63 & 47 \end{array}$ T. P. 940. T. P. 942. 335. 5 113. 1 $\begin{array}{c} 45 \ 15 \ 31. \ 59 \\ 67 \ 28 \ 25. \ 36 \end{array}$ T. P. 941.... T. P. 969 .... $208 55 \\ 338 14$ T. P. 968. T. P. 970. 263.2414.8T. P. 941. T. P. 943 45 17 36.78 67 28 04.85 113. 1 T. P. 942.... 243 47 $\begin{array}{c} 45 \ 15 \ 19.11 \\ 67 \ 28 \ 18.30 \end{array}$ T. P. 970.. $158 14 \\ 320 36$ T. P. 969 T. P. 971 $414.8 \\ 272.4$ $\begin{array}{r} 87 & 37 \\ 16 & 14 \\ 196 & 14 \end{array}$ 266. Ref. Mon. 177... Ref. Mon. 178... 12.524.9T. P. 971. $\begin{array}{c} 45 \ 15 \ 12.30 \\ 67 \ 28 \ 10.37 \end{array}$ $140 \ 36 \\ 353 \ 22$ T. P. 970 T. P. 972 272.4293.9T. P. 943 ..... 45 17 36.42 67 28 17.08 $267 \ 37 \ 39 \ 27$ T. P. 942. T. P. 944. 266.7 158.9 T. P. 972 $\begin{array}{c} 45 & 15 & 02.84 \\ 67 & 28 & 08.82 \end{array}$ $173 22 \\ 311 38$ 293.9179.9T. P. 971 T. P. 973 T. P. 944 45 17 32.44 67 28 21.71 $219 27 \\ 73 59$ T. P. 943. T. P. 945. 158.9213.0T. P. 973 $179.9 \\ 536.8$ 131 38 337 34 30 T. P. 972 T. P. 974 T. P. 945. T. P. 944.... T. P. 946..... 213.0355.6 $253 59 \\ 17 56$ T. P. 974. T. P. 973 T. P. 975 $536.8 \\ 318.4$ T. P. 946 .... 45 17 19.58 67 28 36.14 $197 56 \\ 76 04$ $355.6 \\ 147.4$ T. P. 945. T. P. 947. $\begin{array}{r} 144 & 47 \\ 301 & 37 \end{array}$ T. P. 975 .... T. P. 974. T. P. 976. $318.4 \\ 164.3$ $\begin{array}{c} 45 \ 14 \ 34.47 \\ 67 \ 27 \ 44.84 \end{array}$ 45 17 18.43 67 28 42.70 T. P. 947..... $256 04 \\ 140 15$ T. P. 946. T. P. 948. $147.4 \\ 402.4$ T. P. 975 T. P. 977 $164.3 \\ 349.0 \\ 137.6 \\ 169.2$ T. P. 976 $121 \ 37 \\ 271 \ 59$ T. P. 948..... 45 17 28.45 67 28 54.51 402.4 303.4 $\begin{array}{c} 320 \hspace{0.1cm} 15 \\ 91 \hspace{0.1cm} 09 \end{array}$ T. P. 947 T. P. 949 $259 \ 47 \\ 292 \ 49$ Ref. Mon. 185 Ref. Mon. 186. T. P. 949 T. P. 977 ... 45 17 28.65 67 29 08.43 $271 \ 09 \\ 36 \ 19$ T. P. 948. T. P. 950. 303.4174.1 $91 59 \\ 297 28$ T. P. 976 T. P. 978 $349.0 \\ 158.7$ T. P. 950 45 17 24.11 67 29 13.16 $216 19 \\ 352 41$ T. P. 949. T. P. 951. 174.1322.1T. P. 978 45 14 28.92 67 27 15.98 $117 28 \\ 324 42 30$ T. P. 977 T. P. 979 $158.7 \\ 633.5$ $\begin{array}{cccccccccc} 172 & 41 \\ 28 & 44 & 50 \\ 10 & 51 \\ 92 & 44 \end{array}$ T. P. 950... T. P. 952. Ref. Mon. 179. Ref. Mon. 180... $\begin{array}{c} 322.\ 1\\ 618.\ 5\\ 181.\ 4\\ 106.\ 2 \end{array}$ T. P. 951 .... T. P. 979 T. P. 978 T. P. 980 633.5410.5 $\begin{array}{r} 159 & 30 \\ 318 & 30 & 50 \end{array}$ T. P. 979 T. P. 981 $410.5 \\ 602.0$ T. P. 980. 45 16 56.19 67 29 24.93 T. P. 951. T. P. 953. 618. 5 180. 0 T. P. 952..... T P 981 $138 \ 31 \ 10 \\ 315 \ 57$ T. P. 980 T. P. 982 602.0208.045 16 50.58 67 29 22.70 T. P. 953 .... T. P. 952. T. P. 954. 180. 0 452. 0 $164 20 \\ 286 00$ T. P. 982\_\_ $135 57 \\ 333 21$ T. P. 981. T. P. 983. 208.0 198.9 T. P. 954 ..... $\begin{array}{r} 452.0 \\ 468.7 \end{array}$ $106 \ 00 \\ 345 \ 43$ T. P. 953. T. P. 955. $\begin{array}{c}153&21\\0&21\end{array}$ T. P. 982. T. P. 984. $198.9 \\ 150.8$ T. P. 983. $\begin{array}{cccc} 165 & 43 \\ 274 & 12 \\ 230 & 54 \\ 303 & 33 \end{array}$ 468. 7 232. 3 363. 3 208. 0 T. P. 955 T. P. 954. T. P. 956 Ref. Mon. 181.... Ref. Mon. 182.... $150.8 \\ 290.7$ T. P. 984 T. P. 983. T. P. 985. $180 \ 21 \\ 321 \ 04$

#### BOUNDARY TURNING POINTS-ST. CROIX RIVER, FROM SPEDNIK LAKE TO WOODLAND, ME.-Continued

## BOUNDARY TURNING POINTS—ST. CROIX RIVER, FROM SPEDNIK LAKE TO WOODLAND, ME.—Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Т. Р. 985	° ' '' 45 13 22.29 67 26 15.28	° / // 141 04 4 19 22 48 262 29	T. P. 984 T. P. 986 Ref. Mon. 188 Ref. Mon. 187	$290.7 \\ 315.5 \\ 133.4 \\ 58.0$	T. P. 996	<ul> <li>, "</li> <li>, "</li> <li>45 11 07.92</li> <li>67 24 50.25</li> <li>45 10 57.60</li> </ul>	° ' '' 136 32 335 02 155 02	T. P. 995 T. P. 997 T. P. 996	212. 8 351. 5 351. 5
T. P. 986	45 13 12.10 67 26 16.37	184 19 340 02	T. P. 985 T. P. 987	315.5 451.1	Т. Р. 998	67         24         43.45           45         10         44.51           67         24         25.70	316         11         10           136         11         20           286         12	T. P. 998 T. P. 997 T. P. 999	559, 8 559, 8 492, 8
T. P. 987 T. P. 988	45 12 58.37 67 26 09.31 45 12 33.50	$\begin{array}{c} 160 & 02 \\ 335 & 42 & 50 \\ 155 & 43 & 00 \\ 259 & 00 \end{array}$	T. P. 985 T. P. 988 T. P. 987	451.1 842.5 842.5	T. P. 999	45 10 40.06 67 24 04.03	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 998 T. P. 1000	492.8 506.5
Т. Р. 989	67         25         53.43           45         12         21.91           67         25         52.90	358         09           178         09           334         38         30	T. P. 989 T. P. 988 T. P. 990	357.7 357.7 514.7	Т. Р. 1001	$\begin{array}{c} 45 & 10 & 24. & 02 \\ 67 & 23 & 56. & 16 \\ 45 & 10 & 08. & 71 \\ 67 & 23 & 59 & 26 \end{array}$	$ \begin{array}{c} 160 & 09 & 30 \\ 7 & 51 \\ 187 & 51 \\ 60 & 57 \\ \end{array} $	T. P. 1001	496. 1 496. 1
T. P. 990	$\begin{array}{c} 45 \ 12 \ 06.  85 \\ 67 \ 25 \ 42.  80 \end{array}$	$\begin{array}{cccccccc} 154 & 38 & 40 \\ 14 & 05 \\ 257 & 41 \\ 335 & 49 \end{array}$	T. P. 989 T. P. 991 Ref. Mon. 190 Ref. Mon. 189	$514.7 \\ 243.2 \\ 316.2 \\ 110.0$	т. Р. 1002	45 10 01.45 67 24 17.73	240 57 62 52 138 35 318 35	T. P. 1001 T. P. 1003 Ref. Mon. 194 Ref. Mon. 193	461. 4 39. 0 39. 2 39. 1
т. Р. 991	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}194 \\ 3 \\ 32 \\ 20\end{array}$	T. P. 990 T. P. 992	243. 2 690. 1	т. р. 1003	$\begin{array}{c} 45 \\ 67 \\ 24 \\ 19 \\ 32 \end{array} $	$242 52 \\ 10 35$	T. P. 1002 T. P. 1004	$39.0 \\ 432.3$
Т. Р. 992	45 11 36.90 67 25 47.46	183 32 20 318 59	T. P. 991 T. P. 993	690.1 286.7	т. р. 1004	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 190 & 35 \\ 349 & 30 \end{array}$	T. P. 1003 T. P. 1005	432.3 326.0
T. P. 993	45 11 29.89 67 25 38.84	$138 59 \\ 283 47 30 \\ 102 48 00$	T. P. 992 T. P. 994	286.7 708.0	T. P. 1005	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{r}       169 & 30 \\       284 & 28 \\       72 & 05     \end{array} $	T. P. 1004 T. P. 1006 Ref. Mon. 196	326.0 188.8 196.5
т. г. 994	45 11 24.42 67 25 07.34	$\begin{array}{c} 103 \ 48 \ 00 \\ 327 \ 25 \\ 38 \ 18 \\ 283 \ 48 \end{array}$	T. P. 995 Ref. Mon. 192 Ref. Mon. 191	$\begin{array}{c} 421.3 \\ 160.6 \\ 130.0 \end{array}$	T. P. 1006 (2-	45 09 35.19 67 24 11 87	252 05 104 28 313 20	Ref. Mon. 195 T. P. 1005 T. P. 1007	188. 8 145. 2
Т. Р. 995	$\begin{array}{c} 45 \ 11 \ 12 \ 92 \\ 67 \ 24 \ 56 \ 95 \end{array}$	$\begin{array}{c}147 \hspace{0.1cm} 25 \\316 \hspace{0.1cm} 32\end{array}$	T. P. 994 T. P. 996	421. 3 212. 8	in Woodland in Dam).	07 21 11.07	208 35	Ref. Mon. 195	146. 9

#### GEOGRAPHIC POSITIONS OF BOUNDARY TURNING POINTS DEFINING THE INTER-NATIONAL BOUNDARY THROUGH THE ST. CROIX RIVER FROM WOODLAND, ME., TO PASSAMAQUODDY BAY

	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
т	. P. 1007	° ' " 45 09 31.96 67 24 07.03	° / ″ 133 20 301 14 00 171 12	T. P. 1006 T. P. 1008. Ref. Mon. 195	$145.\ 2\\614.\ 3\\231.\ 5$	T. P. 1026	° ' '' 45 08 17.36 67 19 05.87	° ' '' 18 17 10 155 45 52 51 340 55	T. P. 1025. T. P. 1027. Ref. Mon. 207 Ref. Mon. 208.	782.7 382.8 99.4 154.0
Т	. P. 1008	45 09 21.64 67 23 42.98	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1007 T. P. 1009 Crossing Nearby		Т. Р. 1027	45 08 28.67 67 19 13.07	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1026. T. P. 1028. Ref. Mon. 209 Towers.	$382.8 \\ 140.0 \\ 71.3 \\ 48.0$
Т	. P. 1009	45 09 16.30 67 23 36.50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1008 T. P. 1010 Wapsaconhagan Crossing	217.3 805.7 39.8 143.2	T. P. 1028	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	314 49 349 58 260 10 40	Ref. Mon. 210 T. P. 1027 T. P. 1029 Sandari Island	146. 6 140. 0 816. 9
т	. P. 1010	45 09 07.46 67 23 01.79	$\begin{array}{ccccccccc} 109 & 48 & 00 \\ 252 & 18 \\ 334 & 46 \end{array}$	T. P. 1009 T. P. 1011 Lovering	$\begin{array}{c} 805.\ 7\\ 186.\ 4\\ 64.\ 0\end{array}$	T. P. 1029	$\begin{array}{c} 45 \\ 67 \\ 18 \\ 37 \\ 37 \\ 35 \end{array}$	$\begin{array}{r} 80 \\ 80 \\ 248 \\ 16 \\ 31 \\ 40 \end{array}$	T. P. 1028 T. P. 1030. Ref. Mon. 212	816.9 373.0 106.4
Т	. P. 1011	45 09 09.30 67 22 53.66	$\begin{array}{c} 72 \ 18 \\ 321 \ 53 \\ 52 \ 41 \end{array}$	T. P. 1010 T. P. 1012 Lovering	$186.\ 4\\371.\ 9\\189.\ 0$	T. P. 1030	$\begin{array}{c} 45 & 08 & 42. & 12 \\ 67 & 18 & 21. & 49 \end{array}$	211 40 68 16 251 03	Ref. Mon. 211 T. P. 1029 T. P. 1031	233. 0 373. 0 439. 9
Т	. P. 1012	45 08 59.82 67 22 43.16	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1011 T. P. 1013 Ref. Mon. 198 Ref. Mon. 197	371.9 792.9 283.8 52.4	T. P. 1031	$\begin{array}{c} 45 \\ 67 \\ 18 \\ 02. \\ 44 \end{array}$	148 18 71 03 240 23 196 43	Squirrel Point           T. P. 1030           T. P. 1032           Birch Hill	32.0 439.9 371.6 72.0
т	. P. 1013	45 08 38.37 67 22 23.18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1012 T. P. 1014 Ref. Mon. 199 Ref. Mon. 200	$\begin{array}{c} 792.\ 9\\ 251.\ 5\\ 726.\ 2\\ 651.\ 9\end{array}$	T. P. 1032	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 60 & 24 \\ 205 & 20 \\ 240 & 24 \end{array}$	T. P. 1031 T. P. 1033 Junction	371.6 226.7 262.0
т	. P. 1014	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1013 T. P. 1015 Ref. Mon. 199 Ref. Mon. 200	251.5 740.6 483.1 400.5	T. P. 1033	$\begin{array}{c} 45 \ 08 \ 59. \ 34 \\ 67 \ 17 \ 43. \ 22 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1032 T. P. 1034 Balcolm Junction	$\begin{array}{c} 226.\ 7\\ 441.\ 1\\ 456.\ 7\\ 151.\ 0\end{array}$
т	. P. 1015	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1014 T. P. 1016 Ref. Mon. 200 Ref. Mon. 199	740.6 755.2 365.6 261.2	T. P. 1034	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$5 \ 16 \\ 127 \ 57 \\ 210 \ 06$	T. P. 1033 T. P. 1035 Campbell	$\begin{array}{c} 441.\ 1\\ 333.\ 9\\ 230.\ 0\end{array}$
т.	, P. 1016	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1015 T. P. 1017 Clark	$\begin{array}{c} 755.\ 2\\ 116.\ 0\\ 184.\ 2\end{array}$	T. P. 1035	45 09 20.22 67 17 53.42	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1034 T. P. 1036 Pineo	333.9 360.3 128.0
т.	. P. 1017	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	288 05 221 07 316 24 240 25	Ephraim T. P. 1016 T. P. 1018 Ephraim	52. 4 116. 0 466. 3	T. P. 1036	45 09 25.68 67 18 08.00 45 09 39 06	297 52 168 35 277 47 348 35	T. P. 1035 T. P. 1037 Pineo T. P. 1036	360.3 421.4 371.0 421.4
т.	P. 1018	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	136 24 263 47 271 13	T. P. 1017 T. P. 1019 Ref. Mon. 202	$ \begin{array}{r} 466.3\\338.6\\246.9\end{array} $		67 18 11.82	195 36 20 95 13 275 13	T. P. 1038 Ref. Mon. 213 Ref. Mon. 214	977. 1 50. 0 104. 7
т.	P. 1019	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 83 & 47 \\ 323 & 35 \\ 64 & 58 \\ 115 & 92 \end{array}$	T. P. 1018 T. P. 1020 Ref. Mon. 202	338.6 420.2 99.1	T. P. 1038	45 10 09.54 67 17 59.78	$ \begin{array}{c} 15 & 36 & 30 \\ 242 & 52 \\ 224 & 15 \\ \end{array} $	T. P. 1037 T. P. 1039 Church	977. 1 222. 0 162. 0
т.	P. 1020	$\begin{array}{c} 45 & 07 & 35. \ 72 \\ 67 & 20 & 47. \ 72 \end{array}$	117 26 143 35 282 54 102 53	Ref. Mon. 201 T. P. 1019 T. P. 1021 Lawler	$ \begin{array}{r} 88.1 \\ 420.2 \\ 258.0 \\ 242.2 \\ \end{array} $	1. P. 1039	45 10 12.82 67 17 50.73	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1038 T. P. 1040 Ref. Mon. 216 Ref. Mon. 215	$     \begin{array}{r}       222.0 \\       166.0 \\       118.8 \\       89.4     \end{array}   $
т.	P. 1021	45 07 33.86 67 20 36.21	282 53 102 54 302 52	Waters T. P. 1020 T. P. 1022	398. 0 258. 0 182. 8	Т. Р. 1040	45 10 14.35 67 17 43.44	$\begin{array}{ccc} 73 & 26 \\ 261 & 55 \\ 47 & 38 \\ 117 & 35 \end{array}$	T. P. 1039 T. P. 1041. Ref. Mon. 215 Ref. Mon. 216	$166.0 \\ 127.2 \\ 96.8 \\ 91.8$
т.	P. 1022	45 07 30.64 67 20 29 19	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lawler           Waters           T. P. 1021           T. P. 1023	500.2 140.0 182.8 529.8	T. P. 1041	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 81 & 55 \\ 254 & 04 \\ 169 & 57 \\ 228 & 34 \end{array}$	T. P. 1040 T. P. 1042 Ref. Mon. 217 Ref. Mon. 218.	127.2 145.0 45.7 110.0
			$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Waters Ref. Mon. 203 Ref. Mon. 204	$70.1 \\ 109.1 \\ 123.3$	T. P. 1042	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 74 & 04 \\ 179 & 53 \\ 120 & 02 \end{array}$	T. P. 1041. T. P. 1043. Ref. Mon. 218	$     \begin{array}{r}       145.0 \\       208.2 \\       65.8 \\       65.8     \end{array} $
г.	r . 1023	45 07 42.60 67 20 11.79	$\begin{array}{r} 45 & 50 & 40 \\ 228 & 35 & 30 \\ 13 & 14 \\ 193 & 14 \end{array}$	T. P. 1022 T. P. 1024 Frostfield Cove	529.8 577.7 56.5 56.5	Т. Р. 1043	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	359         53           187         58           17         53	T. P. 1042. T. P. 1044. Ref. Mon. 218.	208. 2 186. 3 184. 2
т.	P. 1024	45 07 54.97 67 19 51.97	$\begin{array}{c} 48 & 35 & 50 \\ 273 & 53 & 30 \\ 56 & 14 \end{array}$	T. P. 1023 T. P. 1025 Abbott	577.7 763.4 161.0	T. P. 1044	45 10 28.95 67 17 30.13	$\begin{array}{c} 7 & 58 \\ 127 & 03 \\ 167 & 03 \end{array}$	T. P. 1043. T. P. 1045. Ref. Mon. 219	$     186.3 \\     237.5 \\     78.9   $
T.	P. 1025	45 07 53.29 67 19 17.11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1024 T. P. 1026 Ref. Mon. 206 Ref. Mon. 205.	763.4 782.7 218.4 263.4	Т. Р. 1045	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$307 \ 03 \\ 164 \ 07 \\ 140 \ 23$	T. P. 1044 T. P. 1046 Ref. Mon. 220	237.5 151.0 40.1

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# BOUNDARY TURNING POINTS-ST. CROIX RIVER, FROM WOODLAND, ME., TO PASSAMA-QUODDY BAY-Continued

		T I CALL				1	1	1	
Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
т. Р. 1046	° ' '' 45 10 38.29 67 17 40.71	° / // 344 07 207 32 20 156 09	T. P. 1045 T. P. 1047 Ref. Mon. 221	151.0 563.4 67.5	T. P. 1067	° , " 45 10 58.79 67 15 21.26	° ' '' 136 00 40 292 21	T. <b>P</b> . 1066 T. P. 1068	784. 9 484. 6
T. P. 1047	45 10 54.47	27 32 30 156 54	T. P. 1046 T. P. 1048	563.4 109.6	Т. Р. 1068	45 10 52.82 67 15 00.72	112 21 281 29	T. P. 1067	174. 2
T. D. 1949	45 10 57 74	159 34 178 46 336 54	Ref. Mon. 223 Ref. Mon. 222 T. P. 1047	355.8 131.2 109.6	T. P. 1069	45 10 51,70 67 14 52,91	$     \begin{array}{c}       101 & 30 \\       316 & 52 \\       69 & 36 \\       298 & 40     \end{array} $	T. P. 1008 T. P. 1070 Ref. Mon. 231 Ref. Mon. 230	$   \begin{array}{r}     174.2 \\     400.9 \\     247.9 \\     172.4   \end{array} $
T. P. 1048	45 10 57.74 67 17 30.75	$\begin{array}{c} 350 & 54 \\ 165 & 44 \\ 160 & 44 \\ 233 & 01 \end{array}$	T. P. 1049. Ref. Mon. 223 Ref. Mon. 222	$109.\ 2\\246.\ 2\\50.\ 3$	T. P. 1070	$\begin{array}{c} 45 \ 10 \ 42. \ 22 \\ 67 \ 14 \ 40. \ 36 \end{array}$	$\begin{smallmatrix}136&52\\352&10&20\end{smallmatrix}$	T. P. 1069 T. P. 1071	400. 9 651. 9
т. Р. 1049	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$345 44 \\ 183 50 \\ 156 45 \\ 210 97$	T. P. 1048 T. P. 1050 Ref. Mon. 223	109.2 47.9 137.7	T. P. 1071	45 10 21.30 67 14 36.27 45 10 16.04	$   \begin{array}{r}     172 & 10 & 20 \\     319 & 23 \\     139 & 23   \end{array} $	T. P. 1070 T. P. 1072 T. P. 1071	651. 9 213. 8 213. 8
Т. Р. 1050	45 11 02.71	318 27	T. P. 1049	47.9	T D 1079	67 14 29.90 45 10 11 44	288 04 108 04	T. P. 1073	458.6 458.6
	67 17 31.84	$\begin{array}{c} 215 & 00 \\ 144 & 00 \\ 332 & 33 \end{array}$	Ref. Mon. 223 Ref. Mon. 222	48. 8 97. 7 138. 8	T. D. 1075	67 14 09.94	302 56 122 56	T. P. 1074 T. P. 1073	242. 5 242. 5
т. Р. 1051	45 11 04.01 67 17 30.55	$35 \ 00 \\ 177 \ 09$	T. P. 1050 T. P. 1052	48. 8 80. 3	T. F. 10/4	67 14 00.62	328 56	T. P. 1075	476.3
		$\begin{array}{c} 114 \ \ 27 \\ 219 \ \ 17 \end{array}$	Ref. Mon. 223 Ref. Mon. 224	94. 0 285. 2	T. P. 10/5	43 09 33. 33 67 13 49. 36	308 47	T. P. 1076	251.2
Т. Р. 1052	45 11 06.61 67 17 30.74	$     \begin{array}{r}       357 & 09 \\       211 & 28 \\       63 & 04 \\       232 & 45     \end{array} $	T. P. 1051 T. P. 1053 Ref. Mon. 223 Ref. Mon. 224	$ \begin{array}{c} 80.3 \\ 47.1 \\ 91.3 \\ 232.0 \end{array} $	T. P. 1076	. 45 09 48.85 67 13 40.39	$     \begin{array}{r}       128 & 44 \\       271 & 16 \\       6 & 23 \\       209 & 30     \end{array} $	T. P. 1077 Ref. Mon. 233 Ref. Mon. 232	323. 8 72. 7 239. 4
Т. Р. 1053	45 11 07.91 67 17 29.61	$     \begin{array}{r}       31 & 28 \\       178 & 05     \end{array} $	T. P. 1052 T. P. 1054	47.1 47.8	Т. Р. 1077	45 09 48.62 67 13 25.57	$\begin{array}{c}91&17\\228&50&40\end{array}$	T. P. 1076 T. P. 1078	323. 2 542. 8
		$215 \ 20 \\ 237 \ 55$	Ref. Mon. 225 Ref. Mon. 224	295. 6 188. 9	Т. Р. 1078	45 10 00.18 67 13 06.88	$\begin{array}{ccc} 48 & 50 & 50 \\ 252 & 25 \end{array}$	T. P. 1077 T. P. 1079	542. 2 355. 6
Т. Р. 1054	45 11 09.46 67 17 29.68	$\begin{array}{c} 358 & 05 \\ 242 & 08 \\ 221 & 45 \\ 252 & 00 \end{array}$	T. P. 1053 T. P. 1055 Ref. Mon. 225 Ref. Mon. 224	$ \begin{array}{c} 47.8 \\ 72.7 \\ 259.0 \\ 169.8 \end{array} $	Т. Р. 1079	$\begin{array}{c} 45 \ 10 \ 03. \ 66 \\ 67 \ 12 \ 51. \ 36 \end{array}$	$\begin{array}{ccc} 72 & 25 \\ 243 & 16 \\ 93 & 54 \\ 271 & 02 \end{array}$	T. P. 1078 T. P. 1080 Ref. Mon. 234 Ref. Mon. 235	355. 6 444. 0 367. 1 358. 2
T. P. 1055	$\begin{array}{c} 45 \\ 67 \\ 17 \\ 26. \\ 74 \end{array}$	$\begin{array}{c} 62 & 08 \\ 157 & 48 \\ 259 & 14 \end{array}$	T. P. 1054 T. P. 1056. Ref. Mon, 224	$ \begin{array}{c} 72.7\\ 173.1\\ 99.1 \end{array} $	Т. Р. 1080	- 45 10 10.13 67 12 33.20	$\begin{array}{r} 63 & 17 \\ 230 & 23 \\ 120 & 12 \end{array}$	T. P. 1079. T. P. 1081. Ref. Mon. 236	444. 0 360. 6 151. 6
Т. Р. 1056	45 11 15.75 67 17 29.73	337 48 216 36 270 18	T. P. 1055 T. P. 1057 Ref. Mon. 225 Part Mon. 224	- 173. 1 168. 5 173. 6 215. 7	T. P. 1081	- 45 10 17.58 67 12 20.48	$\begin{array}{ccc} 50 & 24 \\ 271 & 49 \end{array}$	T. P. 1080 T. P. 1082	- 360. 6 - 180. 5
T. P. 1057	45 11 20.14	36 36	T. P. 1056	168.5	T. P. 1082	- 45 10 17.39 67 12 12.22	$91 49 \\ 305 52 00$	T. P. 1081 T. P. 1083	- 180. 5 - 980. 0
	67 17 25, 13	260 17 331 49	Ref. Mon. 225	154.8	T. P. 1083	- 45 09 58.79 67 11 35.84	$\frac{125}{293} \frac{52}{28} \frac{30}{28}$	T. P. 1082 T. P. 1084	- 980. 0 - 165. 0
Т. Р. 1058	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 80 & 17 \\ 226 & 33 \\ 38 & 41 \\ 182 & 17 \end{array}$	T. P. 1057 T. P. 1059 Ref. Mon. 225 Ref. Mon. 226	- 134. 0 - 221. 1 - 93. 0	Т. Р. 1084	- 45 09 56.66 67 11 28.91	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 1083 T. P. 1085 Ref. Mon. 238 Ref. Mon. 237	165.0 1,804.4 465.0 374.0
т. Р. 1059	45 11 24.29 67 17 10.99	$ \begin{array}{r} 46 33 \\ 199 37 \\ 90 34 \end{array} $	T. P. 1058 T. P. 1060 Ref. Mon. 226	$ \begin{array}{c}     - 134.0 \\     - 160.3 \\     - 93.6 \end{array} $	т. р. 1085	45 09 53.30 67 10 06.42	$\begin{array}{c} 93 & 18 & 50 \\ 292 & 34 & 40 \end{array}$	T. P. 1084 T. P. 1086	1, 804.
T. P. 1060	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 19 & 37 \\ 245 & 44 \\ 44 & 25 \\ 251 & 34 \end{array} $	T. P. 1059. T. P. 1061. Ref. Mon. 226 Ref. Mon. 227.	$ \begin{array}{c} 160.3\\ 150.4\\ 210.5\\ 144.5 \end{array} $	T. P. 1086	45 09 43.69 67 09 33.77	$\begin{array}{c} 112 \ 35 \ 00 \\ 328 \ 35 \ 50 \\ 45 \ 16 \ 10 \\ 156 \ 18 \ 00 \end{array}$	<ul> <li>T. P. 1085</li> <li>T. P. 1087</li> <li>Ref. Mon. 239</li> <li>Ref. Mon. 240</li> </ul>	2, 095. 556. 731.
T. P. 1061	45 11 31.19 67 17 02.25	$ \begin{array}{c} 65 & 44 \\ 283 & 35 \\ 0 & 00 \end{array} $	T. P. 1060 T. P. 1062 Ref. Mon. 227	150. 4 351. 7 16. 0	T. P. 1087	45 08 45.76 67 08 43.76	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 1086 T. P. 1088 Ref. Mon. 241	2,095. 1,976. 1,031.
T. P. 1062	45 11 28.51 67 16 46.59	$103 \ 35 \\ 266 \ 03$	T. P. 1061 T. P. 1063	351. 7 345. 6	T. P. 1088	45 07 56.67 67 07 45.70	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	<ul> <li>T. P. 1087</li> <li>T. P. 1089</li> <li>Ref. Mon. 242</li> </ul>	$\begin{array}{c} 1,976.\\ 2,531.\\ 546. \end{array}$
т. Р. 1063	$\begin{array}{c} 45 \ 11 \ 29. 28 \\ 67 \ 16 \ 30. 79 \end{array}$	$\begin{array}{c} 86 & 03 \\ 273 & 52 \end{array}$	T. P. 1062 T. P. 1064	345. 6 204. 9	3 9 T. P. 1089	45 06 45 8	308 44 5 0 149 47 4	0 Ref. Mon. 243 0 T. P. 1088	1, 190. 2, 531.
т. Р. 1064	$\begin{array}{c} - \\ 45 \\ 67 \\ 16 \\ 21. \\ 43 \end{array}$	$\begin{array}{c} 93 & 52 \\ 289 & 24 \end{array}$	T. P. 1063 T. P. 1065	204. 9 233. 7	97	67 06 47.3	7 341 28 4 94 37 2	<ul> <li>T. P. 1 (Passama quoddy Bay).</li> <li>Ref. Mon. 244.</li> </ul>	- 4, 462. 1, 273.
Т. Р. 1065	- 45 11 26.32 67 16 11.33	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 1064 T. P. 1066	233. 5	7		322 21 3	0 Ref. Mon. 245	2,010.
т. Р. 1066	- 45 11 17.09 67 15 46.23	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 1065 T. P. 1067 Ref. Mon. 229 Ref. Mon. 228	617. 2 784. 9 381. 4 319. 5	7 9 4 2				

	1		1		1				
Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Traverse Sta- tion 2.	° ', '' 45 56 03.85 67 46 41.09	° ' '' 5 00 341 39	T. P. 71 Ref. Mon. 2	26. 2 27. 9	Camp Collier mark.	° ' '' 45 53 17.07 67 47 50.63	° / // 20 32 22 50 44 49	T. P. 466 Twist tablet	81.3 146.8
Ref. Mon. 2	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 92 \ 10 \\ 161 \ 39 \end{array}$	T. P. 71. Traverse Station 2.	$\begin{array}{c}11.\ 1\\27.\ 9\end{array}$			$\begin{array}{c} 11 & 13 \\ 217 & 47 \\ 224 & 52 \end{array}$	T. P. 463 T. P. 464	$     \begin{array}{r}       11.3 \\       57.3 \\       42.2     \end{array} $
Traverse Sta- tion 5.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 286 \hspace{0.1cm} 16 \\ 303 \hspace{0.1cm} 18 \end{array}$	Traverse Station 6. T. P. 134	$459.2 \\ 22.5$	Twist tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 20 \hspace{0.1cm} 18 \\ 186 \hspace{0.1cm} 27 \end{array}$	T. P. 469 T. P. 467	$106.7 \\ 17.3$
Traverse Sta- tion 6	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 22 & 09 \\ 106 & 16 \end{array}$	T. P. 178 Traverse Station 5.	$\begin{matrix}14.\ 0\\459.\ 2\end{matrix}$			202 50 355 47	Camp Collier mark. T. P. 468	146. 8 26. 1
Ref. Mon. 3	45 55 40.93 67 45 58.72	$\frac{118}{276} \; \frac{06}{25}$	T. P. 204 Traverse Station 8_	$\begin{array}{c}11.\ 6\\355.\ 1\end{array}$	T.P. 469=Curve tablet.	45 53 09.44 67 47 54.99	$200 \ 18 \\ 207 \ 44$	Twist tablet T. P. 468	106. 7 83. 7
Traverse Sta- tion 8.	45 55 39.64 67 45 42.34	$\begin{array}{c} 96 \ 25 \\ 206 \ 04 \end{array}$	Ref. Mon. 3 T. P. 227	$\begin{array}{c} 355.\ 1\\11.\ 6\end{array}$	Hornet 2 tablet -	45 53 06.44	357 16 27 36	T. P. 470 Spring tablet	43. 9 96. 9
Traverse Sta- tion 10.	$\begin{array}{c} 45 \ 55 \ 26. 17 \\ 67 \ 45 \ 33. 46 \end{array}$	$\begin{array}{cccc} 264 & 09 \\ 313 & 23 & 00 \end{array}$	T. P. 257 Traverse Station 11	$\begin{array}{c}10.5\\715.0\end{array}$	Spring tablet	67 47 57.09 45 53 03.65	94 14 81 13	T. P. 471 T. P. 474	51. 8 64. 7
Traverse Sta- tion 11.	$\begin{array}{c} 45 \ 55 \ 10.\ 27 \\ 67 \ 45 \ 09.\ 35 \end{array}$	$\begin{array}{c} 75 & 22 \\ 133 & 23 & 20 \end{array}$	T. P. 297 Traverse Station 10	$\begin{array}{c} 42.\ 6\\715.\ 0\end{array}$		67 47 59.17	$     \begin{array}{r}       207 & 36 \\       215 & 09 \\       238 & 29     \end{array} $	Hornet 2 tablet T. P. 472 T. P. 473	$96.9 \\ 50.9 \\ 27.4$
Ref. Mon. 4	45 54 58.22 67 45 09.52	$\begin{smallmatrix}&0&34\\128&58\end{smallmatrix}$	Ref. Mon 5 T. P. 322	$29.7 \\ 43.0$	Ley	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$96 24 \\ 101 22 \\ 200 20$	T. P. 477 T. P. 478	$38.2 \\ 53.4$
Ref. Mon. 5	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}149&43\\180&34\end{array}$	T. P. 322. Ref. Mon. 4		Dan	45 52 56.97	239 33 32 02	T. P. 476 Ref. Mon. 12	67.8 149.2
Traverse Sta- tion 14.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	262 11	Т. Р. 359	11. 9		67 48 13.80	$\begin{smallmatrix} 53 & 42 \\ 104 & 40 \end{smallmatrix}$	T. P. 485 T. P. 484	$39.2 \\ 60.2$
Ref. Mon. 6	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 293 & 58 \\ 319 & 39 \end{array}$	T. P. 384 Ref. Mon. 7	29. 9 29. 8	Kel. Mon. 12	45 52 52 87 67 48 17.47	$   \begin{array}{ccccccccccccccccccccccccccccccccccc$	Ref. Mon. 13 T. P. 487	$37.2 \\ 55.7$
Ref. Mon. 7	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 139 \ \ 39 \\ 217 \ \ 10 \end{array}$	Ref. Mon. 6 T. P. 384	29. 8 13. 3	Ref. Mon. 13	45 52 52 95 67 48 15.75	$\begin{array}{c} 86 & 15 \\ 131 & 08 \end{array}$	Ref. Mon. 12 T. P. 486	$37.2 \\ 27.3$
Traverse Sta- tion 17.	$\begin{array}{c} 45 & 54 & 19. \ 00 \\ 67 & 46 & 03. \ 30 \end{array}$	${\begin{array}{c} 191 \\ 230 \\ 43 \end{array}} {\begin{array}{c} 01 \\ 20 \\ 43 \end{array}}$	Traverse Station 16 T. P. 394	$562.8 \\ 23.1$	Joe	45 52 46.94 67 48 14.85	$\begin{array}{c}11&54\\131&53\end{array}$	Tom T. P. 488	$93.0 \\ 20.4$
Traverse Sta- tion 18-F.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 14 & 15 \\ 313 & 14 \end{array}$	Traverse Station 18 T. P. 406	$276.8 \\ 6.7$	Tom	45 52 44.00 67 48 15.75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 490 T. P. 489 Joe	48.1 49.5 93.0
Traverse Sta- tion 18.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 194 \ 15 \\ 330 \ 54 \end{array}$	Traverse Station 18-F.	276.8	Phil	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 224 \hspace{0.1cm} 35 \\ 333 \hspace{0.1cm} 08 \end{array}$	T. P. 491 Pete	$\begin{array}{c} 19.\ 4\\ 164.\ 2\end{array}$
Traverse Sta-	45 53 49.99	286 04	T. P. 422	24. 0 23. 5	Pete	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 26 & 03 \\ 36 & 45 \end{array}$	T. P. 494 T. P. 496	50.3 164.8
Ref. Mon. 8	45 53 48.41 67 46 37.78	$\begin{array}{c} 65 & 24 \\ 159 & 17 \end{array}$	Ref. Mon. 9 T. P. 426	$40.2 \\ 120.1$			$\begin{array}{c} 39 & 06 \\ 44 & 06 \\ 136 & 03 \\ 153 & 08 \end{array}$	T. P. 495 T. P. 493 T. P. 492 Phil	119.0 23.6 60.3 164.2
Ref. Mon. 9	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}177&21\\245&24\end{array}$	T. P. 426 Ref. Mon. 8	$\begin{array}{c}129.2\\40.2\end{array}$	Leaf	45 52 10.82 67 48 21.40	$     188 14 \\     205 20   $	Drybush tablet T. P. 499	379.2 238.2
Acheron tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	246 01	T. P. 432	32, 0			$\begin{array}{c} 213 \ 11 \\ 241 \ 01 \\ 246 \ 21 \end{array}$	T. P. 500 T. P. 501 T. P. 502	$     189.1 \\     187.8 \\     162.9 $
Sucker tablet	45 53 27.04 67 47 35.13	$\begin{array}{c} 38 & 35 \\ 65 & 03 \\ 201 & 11 \\ 218 & 44 \\ 229 & 01 \end{array}$	Pickerel tablet T. P. 453 T. P. 452 T. P. 451 T. P. 446	136.1 68.6 12.2 27.9 86.1			254 38 283 55 296 20 298 18 299 33	T. P. 503 T. P. 504 T. P. 506 T. P. 505 T. P. 507	84. 063. 6159. 791. 0211. 1
Pickerel tablet.	45 53 23.60 67 47 39 07	10 21	T. P. 456	40.2	Ref. Mon. 14	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	193 31 230 31	Ref. Mon. 15 T. P. 509	$109.6 \\ 54.7$
		195 57 218 35 296 24	T. P. 454 Sucker tablet T. P. 455	$\begin{array}{c} 58.1 \\ 50.6 \\ 136.1 \\ 20.9 \end{array}$	Ref. Mon. 15	45 52 05.59 67 48 10.21	$\begin{array}{cccc} 13 & 31 \\ 85 & 02 \\ 346 & 59 \end{array}$	Ref. Mon. 14 T. P. 508 T. P. 509	$109. \ 6 \\ 56. \ 9 \\ 73. \ 7$
Ref. Mon. 10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	40 28 107 01	T. P. 458 Ref. Mon. 11	$\begin{array}{c} 24.7\\ 16.4 \end{array}$	Hardwood tab-	45 51 50.70 67 47 58.26	235 41 235 53	T. P. 515 T. P. 518	259.5 86.0
Ref. Mon. 11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{smallmatrix}&0&52\\287&01\end{smallmatrix}$	T. P. 458 Ref. Mon. 10	$\begin{array}{c} 23.\ 6\\ 16.\ 4\end{array}$			244 49 246 48 252 01	T. P. 516 T. P. 519 T. P. 517	229.5 34.4 164.9
Trout tablet	45 53 16.52 67 47 45.42	134 20 210 47 219 39 242 37	T. P. 461 Perch tablet T. P. 459 T. P. 460	$\begin{array}{r} 7.9 \\ 142.0 \\ 71.5 \\ 11.3 \end{array}$			313 09 315 32 321 46 323 03 437 21	T. P. 521 T. P. 522 T. P. 523 T. P. 523 T. P. 520 Moose tablet	279.0 330.4 353.8 99.6 169.7

#### GEOGRAPHIC POSITIONS OF MONUMENTS AND MARKED STATIONS REFERENCING THE TURNING POINTS OF THE INTERNATIONAL BOUNDARY FROM THE SOURCE OF THE ST. CROIX RIVER THROUGH MONUMENT BROOK TO NORTH LAKE
# DESCRIPTION AND DEFINITION OF THE BOUNDARY LINE 121

# BOUNDARY REFERENCE MONUMENTS AND MARKED STATIONS-MONUMENT BROOK-Con.

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Ref. Mon. 16	° / ″ 45 51 08.38 67 47 27.98	$\circ$ / $''$ 164 37 232 11 300 40 319 17	T. P. 534 Ref. Mon. 17 T. P. 535 T. P. 536	151. 2 98. 1 52. 8 383. 8	Calf	° / ″ 45 50 14.08 67 46 01.85	$\circ$ / // 2 16 4 00 36 05 95 54 120 49	T. P. 553 T. P. 555 Fawn T. P. 552 T. P. 551	85. 6 252. 5 194. 4 135. 4 244 1
Ref. Mon. 17	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 52 \ 11 \\ 126 \ 03 \end{array}$	Ref. Mon. 16 T. P. 534	$98.1 \\ 145.5$			$\begin{array}{c} 134 & 37 \\ 137 & 32 & 30 \\ 100 & 52 & 00 \end{array}$	T. P. 549 T. P. 548	432. 0 530. 5
North Stump	45 51 07.47 67 47 24.54	$\begin{array}{c} 91 \ 59 \\ 110 \ 37 \\ 326 \ 12 \end{array}$	T. P. 535 Ref. Mon. 16 T. P. 536	28.8 79.4 316.5			$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 546 T. P. 547 T. P. 550 T. P. 556	647.5 591.8 274.6 314.1
Raspberry	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$271 \ 31 \\ 303 \ 57$	T. P. 537 Cropley	$41.6 \\ 258.1$			356 14	T. P. 554	354. 0 144. 8
Cropley	45 50 50.83 67 47 01.87	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Raspberry T. P. 537 T. P. 539 T. P. 538	$\begin{array}{c} 258.\ 1\\ 224.\ 1\\ 205.\ 7\\ 124.\ 4\end{array}$	Fawn	45 50 08,99 67 46 07,16	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 546 T. P. 548 T. P. 547 T. P. 547 T. P. 549 T. P. 551	$\begin{array}{c} 719.\ 4\\ 600.\ 2\\ 666.\ 4\\ 499.\ 4\\ 297.\ 8\end{array}$
Landing tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 87 & 59 \\ 314 & 18 \\ 322 & 53 \\ 338 & 13 \end{array}$	T. P. 538. T. P. 540. Cedar. T. P. 539	$73.\ 1\\217.\ 2\\222.\ 2\\39.\ 3$			$\begin{array}{c} 171 \ 01 \\ 173 \ 16 \\ 216 \ 05 \\ 237 \ 12 \\ 264 \ 11 \\ 200 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 $	T. P. 550 T. P. 552 Calf T. P. 553 T. P. 553	$\begin{array}{r} 374.9\\172.3\\194.4\\132.2\\124.7\end{array}$
Cedar	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Landing tablet T. P. 540 T. P. 542 T. P. 541	$\begin{array}{r} 222.\ 2\\ 33.\ 2\\ 267.\ 4\\ 228.\ 3\end{array}$	Buck	45 50 00.13	302 23 308 08 314 22 20 55	T. P. 556 T. P. 557 T. P. 555 T. P. 559	259. 6 289. 0 135. 5 133. 6
Ref. Mon. 18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 165 & 05 \\ 209 & 10 \\ 297 & 10 \\ 305 & 21 \end{array}$	T. P. 543 Ref. Mon. 19 T. P. 544. T. P. 545	$\begin{array}{r} 46.7\\ 56.1\\ 134.4\\ 208.3 \end{array}$		67 45 55.75	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	T. P. 558 Ref. Mon. 20 T. P. 560 T. P. 561 T. P. 562	$\begin{array}{r} 47.\ 3\\ 478.\ 7\\ 202.\ 8\\ 246.\ 3\\ 306.\ 6\end{array}$
Ref. Mon. 19	45 50 36.72 67 46 34.98	$\begin{array}{c} 29 \ 10 \\ 84 \ 25 \\ 84 \ 54 \\ 92 \ 39 \\ 319 \ 56 \\ 320 \ 06 \end{array}$	Ref. Mon. 18 T. P. 543 T. P. 542 T. P. 541 T. P. 545 T. P. 544	56. 139. 599. 3136. 9221. 5143. 8					

## GEOGRAPHIC POSITIONS OF MONUMENTS AND MARKED STATIONS REFERENCING THE TURNING POINTS OF THE INTERNATIONAL BOUNDARY THROUGH NORTH LAKE, THE THOROUGHFARE, AND GRAND, MUD, AND SPEDNIK LAKES

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Ref. Mon. 20	° ′ ′′ 45 49 47.58 67 45 42.75	$\circ$ / // 49 24 50 63 04 50 111 24 00 125 27 00 128 41 00	Ref. Mon. 21 T. P. 563 T. P. 562 T. P. 561 T. P. 559	$\begin{array}{r} 403.\ 3\\ 218.\ 0\\ 238.\ 0\\ 260.\ 6\\ 420.\ 8\end{array}$	Ref. Mon. 40	° ' " 45 45 11.40 67 48 32.99	$\circ$ / // 215 42 40 215 42 40 283 04 00 283 04 00	Ref. Mon. 39 T. P. 582. Ref. Mon. 41 T. P. 583	974. 2 305. 0 2, 151. 2 1, 229. 2
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 560. T. P. 558	$294.1 \\ 501.0$	Ref. Mon. 41	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 40 T. P. 583	2, 151. 2 922. 0
Ref. Mon. 21	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 563 Ref. Mon. 20 T. P. 564	198.3 403.3 889.2	Ref. Mon. 42	$\begin{array}{c} 45 \ 44 \ 15, 93 \\ 67 \ 47 \ 47, 51 \end{array}$	$\begin{array}{cccc} 19 & 40 & 00 \\ 303 & 45 & 10 \end{array}$	Ref. Mon. 44 T. P. 584	1, 638. 9 1, 305. 5
Ref. Mon. 22	45 49 15.36	67 11 40 80 52 40	T. P. 566	116.3	Ref. Mon. 43	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 44 T. P. 585	2,032.3 1,209.3
	07 45 41.04	$\begin{array}{c} 39 & 32 & 40 \\ 148 & 14 & 00 \\ 236 & 46 & 40 \end{array}$	T. P. 565 T. P. 564	61.1 521.9	Ref. Mon, 44	$\begin{array}{c} 45 \ 43 \ 25. \ 94 \\ 67 \ 48 \ 13. \ 02 \end{array}$	$\begin{array}{c} 140 \ 37 \ 20 \\ 140 \ 37 \ 20 \\ 243 \ 26 \ 40 \end{array}$	Ref. Mon. 43 T. P. 585 T. P. 584	2,032.3 823.0 1.830.0
Ref. Mon. 23	45 49 15.34 67 45 51.11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 565. Ref. Mon. 22 T. P. 566	182.1 206.6 109.0	Ref. Mon. 45	$\begin{array}{c} 45 \\ 45 \\ 67 \\ 48 \\ 57 \\ 66 \end{array} \\ \begin{array}{c} 30 \\ 57 \\ 66 \end{array}$	$\begin{array}{c} 12 & 34 & 10 \\ 12 & 34 & 10 \\ 12 & 34 & 10 \\ 305 & 20 & 20 \end{array}$	Ref. Mon. 46 T. P. 587 Ref. Mon. 48	1, 790. 8 959. 0 1, 979. 3
Watson	45 49 12.51 67 45 51.25	$\begin{array}{c} 90 \ 31 \ 00 \\ 181 \ 57 \ 50 \\ 213 \ 36 \ 00 \end{array}$	T. P. 568 Ref. Mon. 23 T. P. 567	42.7 87.5 32.0	Ref. Mon. 46	45 41 11.69	305 20 20 192 33 50	Ref. Mon. 45	1, 175. 1
Piedra	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$55 \ 36 \\ 76 \ 07$	T. P. 569. Ref. Mon. 24	$109.7 \\ 299.6$	Ref. Mon. 47	67 49 15.66 45 40 28.94	192 33 50 203 48 00	Ref. Mon. 48	831. 8 2, 101. 3
Ref. Mon. 24	$\begin{array}{c} 45 \\ 67 \\ 67 \\ 46 \\ 07. \\ 76 \end{array} \\ \begin{array}{c} 96 \\ 96 \\ 96 \\ 76 \\ \end{array}$	$     \begin{array}{r}       165 & 56 \\       270 & 32     \end{array} $	Ref. Mon. 25 T. P. 570	$\begin{array}{c} 63.8 \\ 53.6 \end{array}$	Ref. Mon. 48	67 48 22.22 45 41 31.22	203 48 00 23 48 30	Ref. Mon. 47	2, 101. 3
Ref. Mon. 25	45 49 08.97 67 46 08.48	$312 \ 03 \\ 345 \ 56$	T. P. 570 Ref. Mon. 24	$93.1 \\ 63.8$		67 47 43.03	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 588. T. P. 586. Ref. Mon. 45	$   \begin{array}{r}     1, 725. \\     804. \\     1, 979. \\     3   \end{array} $
Difficile	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{157}{286} \frac{27}{53}$	T. P. 571. Ref. Mon. 24	$20.7 \\ 312.8$	Ref. Mon. 49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 50 T. P. 589	$1, 889. \\ 807. \\ 4$
Ref. Mon. 26	$\begin{array}{r} 45 \ 49 \ 11, 97 \\ 67 \ 46 \ 35, 64 \end{array}$	$\begin{array}{c} 67 \\ 355 \\ 42 \end{array}$	T. P. 572 Ref. Mon. 27	$180, 2 \\ 90, 1$	Ref. Mon. 50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 49 T. P. 589	1, 889. 4 1, 082. 0
Ref. Mon. 27	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{c} 96 \ 41 \\ 175 \ 42 \end{array}$	T. P. 572 Ref. Mon. 26	$\begin{array}{c}174.\ 2\\90.\ 1\end{array}$	Ref. Mon. 51	$\begin{array}{c} 45 & 39 & 47.  24 \\ 67 & 45 & 39.  52 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 52 T. P. 590	$1,152.5 \\ 697.5$
Ref. Mon. 28	$\begin{array}{r} 45 \\ 45 \\ 67 \\ 46 \\ 50 \\ 56 \end{array} \\ \begin{array}{r} 59 \\ 56 \\ 56 \end{array}$	$\begin{array}{c} 80 \ 47 \\ 149 \ 27 \end{array}$	Ref. Mon. 29 T. P. 573	63, 7 89, 5	Ref. Mon. 52	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrr} 42 & 57 & 50 \\ 42 & 57 & 50 \\ \end{array}$	Ref. Mon. 51 T. P. 590	1,152.5 455.0
Ref. Mon. 29	45 49 01.66 67 46 53.47	${\begin{array}{c} 191 \ 17 \\ 260 \ 47 \end{array}}$	T. P. 573. Ref. Mon. 28	89. 0 63. 7			$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 592 Ref. Mon. 57 T. P. 594 T. P. 593	$\begin{array}{c} 527.1 \\ 1,558.1 \\ 1,207.9 \\ 956.3 \end{array}$
Fox	45 49 01.00 67 46 50.84		T. P. 574 T. P. 575 Ref. Mon. 31	109.5 166.9 187.0	Ref. Mon. 53	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 54 T. P. 591	$\begin{array}{c} 799.\ 6\\ 166.\ 9\end{array}$
Ref. Mon. 30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	338 49 339 49	Ref. Mon. 31 T. P. 576	$132.\ 3\\112.\ 6$	Ref. Mon. 54	45 40 34.52 67 44 43.74	$\begin{array}{rrrrr} 14 & 33 & 20 \\ 14 & 33 & 20 \\ 354 & 16 & 00 \end{array}$	Ref. Mon. 53 T. P. 591 T. P. 592	$\begin{array}{c} 799.\ 6\\ 632.\ 7\\ 356.\ 4\end{array}$
Ref. Mon. 31	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     153 11 \\     158 49 \\     225 15 $	T P. 576 Ref. Mon. 30	19.8 132.3 95.9	Ref. Mon. 55	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 54 T. P. 594	1, 225. 7 120, 1
		263 07	T. P. 575	39.5	Ref. Mon. 56	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 244 & 55 \\ 284 & 31 \end{array}$	T. P. 595 Ref. Mon. 58	$\begin{array}{c} 44.8\\ 258.0 \end{array}$
Ref. Mon. 32	45 48 22.68 67 48 24.09	318 14 10 318 14 10	Ref. Mon. 33 T. P. 577	463. 2	Ref. Mon. 57	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 52 T. P. 593	1,558.1 601.8
Ref. Mon. 33	45 48 02.43 67 47 58.25	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 32 T. P. 577	837. 8 374. 6	Ref. Mon. 58	45 39 50.56	109 34 40 55 09	T. P. 596	100. 6
Ref. Mon. 34	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 64 & 30 & 20 \\ 64 & 30 & 20 \end{array}$	Ref. Mon. 35 T. P. 578	$513.6 \\ 113.6$		67 43 55.27	$\begin{array}{c} 104 & 32 \\ 295 & 09 \\ 340 & 43 \end{array}$	T. P. 598 T. P. 597	258.0 195.4 32.6
Ref. Mon. 35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 34 T, P. 578	513.6 400.0	Ref. Mon. 59	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$23 \ 49 \\ 95 \ 25 \\ 319 \ 16 \\ 225 \ 19$	T. P. 599 T. P. 598 Ref. Mon. 60	20.7 129.6 67.2
Rel. Mon. 36	45 46 56 90 67 48 07 28	54 29 20 54 29 20	T. P. 579	232. 9	Ref. Mon. 60	45 39 45.83	105 13	T. P. 600	24. 2 61 0
Ref. Mon. 37	45 46 44.34 67 48 32.44	234 29 00 234 29 00	Ref. Mon. 36 T. P. 579		Rof Mon 61	45 20 51 00	139 16	Ref. Mon. 59	67.2
Ref. Mon. 38	45 46 00.17 67 48 23.56	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 581 Ref. Mon. 37 T. P. 579 T. P. 580	$276.8 \\ 1,377.1 \\ 1,624.5 \\ 333.0$	Aver, 191011, 01	43 59 51, 96 67 43 29, 45	$ \begin{array}{r} 48 \\ 49 \\ 28 \\ 58 \\ 24 \\ 76 \\ 314 \\ 50 \\ 318 \\ 10 \\ \end{array} $	T. P. 601 T. P. 603 T. P. 604 T. P. 605 T. P. 605	$ \begin{array}{c}     59.7 \\     155.0 \\     83.7 \\     56.1 \\     51.8 \\     204.2 \end{array} $
Ref. Mon. 39	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 40 T. P. 582	$974.2 \\ 669.2$			$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 606. Ref. Mon. 62	114.0 403.6

# DESCRIPTION AND DEFINITION OF THE BOUNDARY LINE

## BOUNDARY REFERENCE MONUMENTS AND MARKED STATIONS—NORTH LAKE, THE THOROUGHFARE, AND GRAND, MUD, AND SPEDNIK LAKES—Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Ref. Mon. 62	° / ″ 45 39 41.65 67 43 17.99	° / // 142 04 146 14 146 36 154 26 178 52 204 19 219 29 220 21	Ref. Mon. 61 T. P. 609 T. P. 608 T. P. 610 T. P. 611 T. P. 612 T. P. 613 T. P. 613 T. P. 614	$\begin{array}{c} 403.\ 6\\118.\ 0\\146.\ 6\\84.\ 7\\69.\ 5\\90.\ 5\\121.\ 3\\150.\ 6\end{array}$	Ref. Mon. 79 Ref. Mon. 80	° ' '' 45 40 39 31 67 42 11 31 45 40 19 39 67 42 29 87	$\begin{array}{c} \circ \ \ , \ \ \ \ \ , \ \ \ \ \ , \ \ \ \ \ \ \ \ , \ \ , \$	Ref. Mon. 80 T. P. 651 T. P. 650. Ref. Mon. 79 T. P. 651. Ref. Mon. 81 T. P. 652	734, 5 517, 5 841, 2 734, 5 217, 0 762, 2 584, 1
Ref. Mon. 63	45 39 53.97 67 43 10.68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 616. T. P. 615. Ref. Mon. 64. T. P. 621. T. P. 620. T. P. 619. T. P. 618. T. P. 617.	$\begin{array}{c} 169.\ 8\\ 214.\ 0\\ 356.\ 8\\ 122.\ 7\\ 115.\ 9\\ 48.\ 8\\ 51.\ 5\\ 115.\ 2\end{array}$	Ref. Mon. 81 Ref. Mon. 82 Ref. Mon. 83	$\begin{array}{cccccccc} 45 & 40 & 06 & 03 \\ 67 & 42 & 00 & 27 \\ 45 & 39 & 38 & 47 \\ 67 & 42 & 20 & 62 \\ 45 & 39 & 33 & 42 \\ 67 & 41 & 43 & 74 \end{array}$	$\begin{array}{c} 122 \ 47 \ 00 \\ 122 \ 47 \ 00 \\ 281 \ 02 \ 50 \\ 281 \ 02 \ 50 \\ 101 \ 03 \ 10 \\ 101 \ 03 \ 10 \end{array}$	Ref. Mon. 80 T. P. 652 Ref. Mon. 83 T. P. 653 Ref. Mon. 82 T. P. 653	762, 2 178, 1 813, 5 570, 4 813, 5 243, 1
Ref. Mon. 64	45 40 03.10 67 43 00.57	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 620 Ref. Mon. 63 T. P. 621 T. P. 622	$\begin{array}{c} 271.\ 4\\ 356.\ 8\\ 234.\ 1\\ 137.\ 8\end{array}$	Ref. Mon. 84	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 85 T. P. 655 T. P. 654	$777. \ 4 \\ 604. \ 8 \\ 210. \ 5$
Ref. Mon. 65	45 40 15 59 67 43 34 11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 66 T. P. 625 T. P. 624 T. P. 622 T. P. 622	636.4 303.1 206.5 689.8 185.6	Ref. Mon. 85	45 38 55.33 67 41 36.52 45 38 18.08 67 40 42 11	$\begin{array}{c} 192 \ 24 \ 50 \\ 192 \ 24 \ 50 \\ 192 \ 24 \ 50 \\ 90 \ 31 \ 00 \\ 90 \ 31 \ 00 \end{array}$	Ref. Mon. 84 T. P. 654 T. P. 655 Ref. Mon. 87	777.4 566.9 172.6 611.9 158.0
Ref. Mon. 66	45 40 35 28 67 43 42 84	$\begin{array}{c} 104 \ 26 \ 50 \\ 324 \ 06 \ 20 \\ 342 \ 43 \ 00 \end{array}$	T. P. 626 T. P. 624 T. P. 625 Ref. Mon. 65	$     160. 2 \\     565. 9 \\     334. 7 \\     636. 4   $	Ref. Mon. 87	45 38 18.25 67 41 10.36	$\begin{array}{c} 270 & 30 & 40 \\ 270 & 30 & 40 \\ 315 & 54 & 30 \\ 315 & 54 & 30 \\ 315 & 54 & 30 \\ \end{array}$	Ref. Mon. 86 T. P. 656 Ref. Mon. 88 T. P. 658	611, 9453, 92, 677, 52, 171, 4
Ref. Mon. 67	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 627. Ref. Mon. 68 T. P. 626	$333.8 \\ 351.8 \\ 541.4$	Ref. Mon. 88	45 37 15.96 67 39 44.37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 657 Ref. Mon. 87 T. P. 657 T. P. 658	1, 163, 0 2, 677, 5 1, 514, 4 506, 1
Ref. Mon. 68	45 41 03.72 67 44 00.74 45 41 23 54	$\begin{array}{c} 0 & 58 & 10 \\ 65 & 23 & 10 \end{array}$	Ref. Mon. 67 T. P. 627 Ref. Mon. 70	351. 8 48. 3 344. 6	Ref. Mon. 89	$\begin{array}{c} 45 & 37 & 35.  57 \\ 67 & 39 & 40.  21 \end{array}$	$\begin{array}{c} 8 & 28 & 20 \\ 61 & 19 & 40 \\ 61 & 19 & 40 \end{array}$	Ref. Mon. 88 T. P. 658 T. P. 659	612, 1 504, 0 241, 1
Ref. Mon. 70	$\begin{array}{c} 10 & 11 & 20 & 01 \\ 67 & 44 & 08 & 22 \\ 45 & 41 & 21 & 08 \\ 67 & 43 & 52 & 69 \end{array}$	337 59 50 15 25 87 30 00	T. P. 628 T. P. 629 T. P. 628	96, 1 9, 8 300, 4	Ref. Mon. 90	$\begin{array}{c} 45 & 36 & 43 & 39 \\ 67 & 38 & 57 & 10 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 93 T. P. 661 T. P. 660	1,469,2829,5284,5
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 69 T. P. 630 T. P. 631 T. P. 632	$\begin{array}{c} 344.\ 6\\ 105.\ 8\\ 142.\ 0\\ 191.\ 9\end{array}$	Ref. Mon. 91	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 92 T. P. 663 T. P. 662	${}^{1,012,8}_{781,1}_{343,8}$
Ref. Mon. 71	$\begin{array}{c} 45 \ 41 \ 19. \ 56 \\ 67 \ 43 \ 52. \ 37 \end{array}$	$165 55 \\ 171 45$	T. P. 629 Ref. Mon. 70	38. 7 47. 5	Ref. Mon. 92	$\begin{array}{c} 45 \ 37 \ 34. \ 69 \\ 67 \ 38 \ 13. \ 69 \end{array}$	59 58 40 59 58 40 59 58 40	Ref. Mon. 91 T. P. 662 T. P. 663	1,012.8 669.0 231.7
Ref. Mon. 72	45 41 20.18 67 43 40.32	$\begin{array}{c} 73 & 22 \\ 95 & 59 \\ 335 & 00 \\ 335 & 33 \\ 341 & 05 \\ 344 & 53 \end{array}$	T. P. 634. T. P. 633. T. P. 635. Ref. Mon. 73. T. P. 637. T. P. 636.	$13. \ 4 \\ 58. \ 8 \\ 39. \ 6 \\ 413. \ 7 \\ 108. \ 8 \\ 85. \ 3$	Ref. Mon. 93	$\begin{array}{c} 45 & 37 & 10. & 00 \\ 67 & 38 & 00. & 88 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 90 T. P. 660. T. P. 661 Ref. Mon. 94 T. P. 664	1, 469, 2 1, 184, 7 639, 7 433, 0 247, 3
Ref. Mon. 73	$\begin{array}{c} 45 \ 41 \ 07. \ 98 \\ 67 \ 43 \ 32. \ 41 \end{array}$	$     \begin{array}{r}       123 & 56 \\       155 & 33     \end{array} $	T. P. 643 Ref. Mon. 72	21.9 413.7	Ref. Mon. 94	$\begin{array}{c} 45 & 37 & 23. & 01 \\ 67 & 37 & 53. & 42 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 93 T. P. 664	433. 0 185. 7
		$155 54 \\ 156 07 \\ 157 05 \\ 161 16$	T. P. 639 T. P. 640 T. P. 638	199.0 149.7 237.7	Ref. Mon. 95	$\begin{array}{c} 45 & 36 & 42.  38 \\ 67 & 36 & 20.  42 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 96 T. P. 665	$1, 164.5 \\ 661.4$
		$ \begin{array}{c} 161 & 16 \\ 162 & 39 \\ 315 & 58 \end{array} $	T. P. 642 T. P. 641 T. P. 644	81.1 95.7 145.4	Ref. Mon. 96	$\begin{array}{c} 45 & 36 & 07. \ 65 \\ 67 & 36 & 41. \ 39 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 95 T, P. 665	$1,164.5\\503.1$
Ref. Mon. 74	$\begin{array}{c} 45 \ 41 \ 06. \ 97 \\ 67 \ 43 \ 32. \ 78 \end{array}$	$\begin{array}{c} 194 \ 20 \\ 303 \ 56 \end{array}$	Ref. Mon. 73 T. P. 644	$\begin{array}{c} 32.\ 2\\ 131.\ 4\end{array}$	Ref. Mon. 97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 98 T. P. 666	$921, 3 \\ 375, 6$
Ref. Mon. 75	45 41 04.18 67 43 23.70	$\begin{array}{c} 19 \ 21 \ 20 \\ 56 \ 43 \ 30 \\ 345 \ 05 \ 10 \end{array}$	Ref. Mon. 76 T. P. 645 T. P. 646	$162.5 \\ 46.0 \\ 221.2$	Ref. Mon. 98	45 36 40.68 67 35 14.20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 97 T. P. 666 Ref. Mon. 99 T. P. 667	$\begin{array}{r} 921.\ 3\\545.\ 7\\1,\ 318.\ 7\\1,\ 023.\ 4\end{array}$
Ref. Mon. 76	45 40 59.21 67 43 26.19	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 645 Ref. Mon. 75 T. P. 646 T. P. 647	$     \begin{array}{r}       129.0 \\       162.5 \\       126.2 \\       584.2     \end{array} $	Ref. Mon. 99	45 35 59.47 67 34 58.20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 98 T. P. 667	1, 318, 7 295, 3
Ref. Mon. 77	45 40 52 54 67 42 56 49	$\begin{array}{r} 48 \ 21 \ 20 \\ 266 \ 46 \ 00 \\ 266 \ 46 \ 00 \end{array}$	T. P. 647 T. P. 649 T. P. 648	284.3 430.3 157.1	Ref. Mon. 100	45 35 59.01 67 34 01.08	$\begin{array}{c} 291 \ 47 \ 10 \\ 297 \ 41 \ 00 \\ 326 \ 06 \ 30 \end{array}$	T. P. 670 Ref. Mon. 101 T. P. 668	780.1 1,107.0 653.9
Ref. Mon. 78	45 40 46.07 67 42 48.73	319 55 50 139 55 50 229 27 40 273 45 40	Ref. Mon. 78 Ref. Mon. 77 T. P. 649 T. P. 650	260. 8 260. 8 344. 4 186. 8	Ref. Mon. 101	45 35 42.35 67 33 15.86	$\begin{array}{c} 87 & 21 & 30 \\ 87 & 21 & 30 \\ 131 & 18 & 20 \\ 234 & 35 & 10 \\ 234 & 35 & 10 \end{array}$	T. P. 668 T. P. 669 T. P. 670 Ref. Mon. 102 T. P. 671	$ \begin{array}{c} 616, 3\\ 310, 2\\ 340, 6\\ 1, 107, 7\\ 555, 7 \end{array} $

# 4 DESCRIPTION AND DEFINITION OF THE BOUNDARY LINE

# BOUNDARY REFERENCE MONUMENTS AND MARKED STATIONS—NORTH LAKE, THE THOROUGHFARE, AND GRAND, MUD, AND SPEDNIK LAKES—Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Ref. Mon. 102	° / ″ 45 36 03.14 67 32 34.20	$\begin{array}{c}\circ & \prime & \prime \prime \\ 54 & 35 & 40 \\ 54 & 35 & 40 \\ 319 & 04 & 30 \\ 319 & 04 & 30 \end{array}$	Ref. Mon 101 T. P. 671. Ref. Mon. 103 T. P. 672	$1, 107. 7 \\ 552. 0 \\ 2, 338. 1 \\ 836. 0$	Ref. Mon. 113	° ' '' 45 35 57.23 67 28 16.00	° / // 135 49 40 135 49 40 135 49 40 221 38 20 221 38 20	Ref. Mon. 112 T. P. 688 T. P. 689 Ref. Mon. 114 T. P. 691	$1, 233.8 \\747.4 \\221.5 \\1, 441.6 \\646.9$
Ref. Mon. 102-A	45 36 05.24 67 32 38.64	$\begin{array}{r} 42 \ 35 \ 30 \\ 304 \ 05 \ 20 \\ 317 \ 15 \ 40 \end{array}$	T. P. 671 Ref. Mon. 102 T. P. 672	522.8 116.0 948.6	Ref. Mon. 114	45 36 32.13	221 38 20 41 38 50	T. P. 690 Ref. Mon. 113	237. 0 1, 441. 6
Ref. Mon. 103	45 35 05.91 67 31 23.55	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 102 T. P. 672 Ref. Mon. 104 T. P. 673	2, 338. 1 1, 502. 1 1, 842. 8 411. 2		67 27 31.80	$\begin{array}{c} 41 & 38 & 50 \\ 41 & 38 & 50 \\ 346 & 24 & 40 \\ 346 & 24 & 40 \end{array}$	T. P. 690 T. P. 691 Ref. Mon. 115 T. P. 692	$\begin{array}{c} 1,204.6\\794.7\\993.8\\507.6\end{array}$
Ref. Mon. 104	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 103 T. P. 673	$1,842.8\\1,431.6$	Ref. Mon. 115	45 36 00.84 67 27 21.03	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 114 T. P. 692 Ref. Mon. 116	993.8 486.2 937.1 485.6
Ref. Mon. 105	45 34 56.61 67 30 01.12 45 35 33.81	$     \begin{array}{r}       186 \ 13 \ 10 \\       186 \ 13 \ 10 \\       6 \ 13 \ 20 \\     \end{array} $	Ref. Mon. 106 T. P. 674 Ref. Mon. 105.	1, 155. 4 492. 7	Ref.Mon.115-A	45 36 00.78 67 27 21.24	$\begin{array}{c} 167 & 00 & 00 \\ 237 & 08 & 20 \\ 247 & 21 & 50 \end{array}$	T. P. 692 T. P. 693 Def. Mon. 115	487. 0 490. 6
Ref. Mon. 107	67 29 55.35 45 35 36.47	6 13 20 165 33 20	T. P. 674 Ref. Mon. 110	662.7 1,067.7	Ref. Mon. 116	45 36 17.36 67 26 44.75	$\begin{array}{c} 57 & 02 & 20 \\ 57 & 02 & 20 \\ 57 & 02 & 20 \end{array}$	Ref. Mon. 115 T. P. 693	937.1 451.5
	67 29 33.54	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 683 T. P. 679 T. P. 677 Ref. Mon. 108 T. P. 676 T. P. 675	$\begin{array}{r} 644. \ 9 \\ 423. \ 4 \\ 207. \ 3 \\ 433. \ 6 \\ 72. \ 0 \\ 272 \ 2 \end{array}$	Ref. Mon. 117	45 35 44.15 67 26 47.81	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 694. T. P. 695. Ref. Mon. 118 T. P. 696.	$164. 1 \\ 118. 5 \\ 288. 4 \\ 287. 7$
Ref. Mon. 108	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 61 & 11 & 40 \\ 97 & 22 & 40 \\ 97 & 22 & 40 \\ 113 & 28 & 10 \end{array}$	T. P. 675 Ref. Mon. 107 T. P. 676 T. P. 677	$\begin{array}{c} 442.\ 5\\ 433.\ 6\\ 361.\ 6\\ 247.\ 7\end{array}$	Ref. Mon. 118	45 35 45.98 67 26 34.76	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 696 Ref. Mon. 117 T. P. 694 T. P. 695	243. 8 288. 4 391. 9 228. 5
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 110 T. P. 682 T. P. 681 T. P. 678	$1, 293. 1 \\750. 1 \\556. 2 \\294. 7$	Ref. Mon. 119	45 35 11.06 67 25 52.95	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 120 T. P. 698 T. P. 697	$\begin{array}{c} 429.\ 4\\ 240.\ 6\\ 228.\ 3\end{array}$
Ref. Mon. 109	45 36 03.25 67 29 34.45	130 01 50 130 01 50 130 01 50	Ref. Mon. 110 T. P. 684	352.0 322.2 101.2	Ref. Mon.119-A	45 35 11.49 67 25 51.57	$\begin{array}{c} 7 & 37 & 00 \\ 10 & 21 & 10 \\ 75 & 13 & 30 \end{array}$	Ref. Mon. 120 T. P. 698 T. P. 697	$\begin{array}{r} 445.\ 6\\ 257.\ 5\\ 260.\ 6\end{array}$
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 112 T. P. 685 T. P. 686 T. P. 680	1,093.098.5115.1551.4	Ref. Mon. 120	45 34 57.19 67 25 54.30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 697 Ref. Mon. 119 T. P. 698 Ref. Mon. 119-A	$\begin{array}{r} 421.\ 9\\ 429.\ 4\\ 188.\ 8\\ 445.\ 6\end{array}$
Ref. Mon. 110	45 36 09.96 67 29 45.83	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 109 T. P. 684 Ref. Mon. 108 T. P. 678	322.2 221.0 1,293.1 008.4	Ref. Mon. 121	45 34 43.04 67 25 39.21	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 122 T. P. 699 T. P. 700	$181.\ 5\\111.\ 4\\216.\ 5$
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 681 T. P. 682 Ref. Mon. 107 T. P. 683.	598.4 736.9 543.0 1,067.7 422.8	Ref. Mon. 122	45 34 46.28 67 25 32.23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 700 T. P. 699 Ref. Mon. 121	$\begin{array}{c} 279.\ 6\\ 112.\ 2\\ 181.\ 5\end{array}$
Ref. Mon. 111	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$5 \ 27 \ 20 \\ 113 \ 38 \ 40 \\ 200 \ 12 \ 40 \\ 100 \ 10 \ 40 \\ 100 \ 10 \ 40 \\ 100 \ 10 \ 40 \\ 100 \ 10 \ 40 \\ 100 \ 10 \ 40 \\ 100 \ 10 \ 40 \\ 100 \ 10 \ 40 \\ 100 \ 10 \ 40 \\ 100 \ 100 \ 10 \ 40 \\ 100 \ $	T. P. 680 T. P. 686	307.2 294.3	Ref. Mon. 123	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 124 T. P. 701	$\begin{array}{c} 140.\ 6\\ 84.\ 2\end{array}$
Ref. Mon. 112	45 36 25, 89	$\begin{array}{c} 209 & 12 & 40 \\ 209 & 12 & 40 \\ 29 & 12 & 50 \end{array}$	Ref. Mon. 112 Ref. Mon. 111	933. 5 216. 3 933. 5	Kef. Mon. 124	45 34 25.84 67 25 25.97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 123 T. P. 701 T. P. 702	$140. \ 6 \\ 56. \ 5 \\ 233. \ 7$
	67 28 55.68	$\begin{array}{c} 29 & 12 & 50 \\ 50 & 14 & 50 \\ 50 & 14 & 50 \\ 315 & 49 & 10 \end{array}$	T. P. 687 Ref. Mon. 109 T. P. 685 Ref. Mon. 113	717.2 1,093.0 994.5	Ref. Mon. 125	45 34 11.86 67 25 44.15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 702 Ref. Mon. 126 T. P. 703	447.0 181.4 77.1
		315 49 10 315 49 10 315 49 10	T. P. 689 T. P. 688	$\begin{array}{c} 1,233.8\\ 1,012.3\\ 486.4\end{array}$	Ref. Mon. 126	45 34 07.44 67 25 38.64	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 125 T. P. 703	181, 4 104, 3

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Ref. Mon. 127.	° / // 45 33 54.89 67 25 39.64	° ' '' 91 25 94 45	T. P. 707 Ref. Mon. 129	85. 8 198. 8	Ref. Mon. 149	° / // 45 29 40.74 67 29 13.57	° ' '' 184 11 216 56	Ref. Mon. 150 T. P. 797	54. 9 30. 6
Ref. Mon. 129	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 274 & 45 \\ 277 & 17 \end{array}$	Ref. Mon. 127 T. P. 707	$198.8 \\ 113.2$	Boot Point bench mark.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 20 \ 39 \\ 26 \ 44 \end{array}$	Ref. Mon. 149 Ref. Mon. 150	$198.5 \\ 146.7$
East Abutment.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$		T. P. 708 West Abutment.	$24.1 \\ 48.2$	Ref. Mon. 150	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r}4&11\\334&36\end{array}$	Ref. Mon. 149 T. P. 797	54. 9 33. 5
West Abutment.	45 33 50.57 67 25 42.15	$243 \ 35 \\ 243 \ 35$	T. P. 708 East Abutment	$24.1 \\ 48.2$	Ref. Mon. 151	45 29 26.82 67 30 03.16	$153 \ 10 \\ 210 \ 04$	Ref. Mon. 152 T. P. 804	$     46.3 \\     33.4 $
Ref. Mon. 128	$\begin{array}{c} 45 \ 33 \ 49. \ 47 \\ 67 \ 25 \ 34. \ 27 \end{array}$	$53 28 \\ 63 49$	T. P. 709. Ref. Mon. 130	99.1 159.6	Scott Brook	45 29 27.55 67 30 05.11	$228 \ 42 \\ 297 \ 50$	Ref. Mon. 152 Ref. Mon. 151	$   \begin{array}{c}     28.6 \\     48.0   \end{array} $
Ref. Mon. 130	$\begin{array}{c} 45 \ 33 \ 47. \ 19 \\ 67 \ 25 \ 40. \ 88 \end{array}$	$243 \ 49 \\ 259 \ 49 \\ 333 \ 21$	Ref. Mon. 128 T. P. 709 T. P. 710	$159.6 \\ 64.6 \\ 80.8$	Ref. Mon. 152	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 288 & 14 \\ 333 & 10 \end{array}$	T. P. 804 Ref. Mon. 151	$39.6 \\ 46.3$
Ref. Mon. 131	$\begin{array}{c} 45 \ 33 \ 17. \ 23 \\ 67 \ 25 \ 21. \ 58 \end{array}$	$154 \ 06 \\ 180 \ 07$	Ref. Mon. 132 T. P. 714	260.3 210.4	Ref. Mon. 153	45 28 11.45 67 29 27.00	$\begin{array}{c}10&06\\62&07\end{array}$	T. P. 819 Ref. Mon. 154	$37.8 \\ 65.7$
Ref. Mon. 132	$45 \ 33 \ 24.82 \\ 67 \ 25 \ 26.82$	$   \begin{array}{c}     281 & 45 \\     334 & 06   \end{array} $	T. P. 714 Ref. Mon. 131	116.6 260.3	Ref. Mon. 154	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 242 \ 07 \\ 277 \ 16 \end{array}$	Ref. Mon. 153 T. P. 819	
Ref. Mon. 133	45 32 25.79 67 25 50 63	125 10 200 57	T. P. 726 Ref. Mon. 134	67. 6 62. 8	Ref. Mon. 154–A	45 28 05.41 67 29 20.40	$\frac{127}{289} \frac{43}{48}$	Ref. Mon. 154 T. P. 820	$254.6 \\ 97.5$
Ref. Mon. 134	45 32 27.69 67 25 49 60	20 57 75 46	Ref. Mon. 133	62. 8 80. 2	Ref. Mon. 155	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r}84&49\\173&55\end{array}$	Ref. Mon. 156 T. P. 828	53. 1 209. 9
Ref. Mon. 135	45 31 45.87	3 02	T. P. 732	125.0	Ref. Mon. 156	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}188 \\ 264 \\ 49\end{array}$	T. P. 828 Ref. Mon. 155	$215.7 \\ 53.1$
Ref. Mon. 136	45 31 46.80	298 04 242 47	Ref. Mon. 135	61.5	Split Rock	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	144 20	Ref. Mon. 156	64.8
Ref. Mon. 135-A	45 31 12.05	49 10 75 07	Ref. Mon. 136-A	61. 3 67. 0	Ref. Mon. 157	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	89 59 89 59	Ref. Mon. 158 T. P. 839	$51.4 \\ 24.0$
Ref. Mon. 136-A	45 31 10.75	199 04 220 10	T. P. 737	32. 3	Ref. Mon. 158	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	269 59 269 59	Ref. Mon. 157 T. P. 839	$51.4 \\ 27.4$
Ref. Mon. 137	45 30 52.62	42 15	T. P. 742	88. 7	Ref. Mon. 159	45 25 35.89 67 28 28.58	$\begin{array}{c} 38 \hspace{0.1cm} 47 \\ 45 \hspace{0.1cm} 49 \end{array}$	T. P. 847 Ref. Mon. 160	$\begin{array}{c} 44.3\\ 66.8\end{array}$
Ref. Mon. 138	67 25 29.46 45 30 52.32	266 43	Ref. Mon. 137 Ref. Mon. 137	161. 1	Ref. Mon. 160	45 25 34.38 67 28 30.78	$\begin{array}{cccc} 225 & 49 \\ 239 & 13 \end{array}$	Ref. Mon. 159 T. P. 847	66. 8 23. 5
Ref. Mon. 137-A	67 25 36.87 45 30 03.69	299 10 141 20	Ref. Mon, 137-B.	450.4	Ref. Mon. 161	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 28 & 16 \\ 338 & 36 \end{array}$	Ref. Mon. 162 T. P. 862	$45.9 \\ 73.6$
Ref. Mon. 137–B	67 25 07.08 45 30 15.08	182 57 318 06	T. P. 746 T. P. 746	35. 9 424. 2	Ref. Mon. 162	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$208 \ 16 \\ 300 \ 01$	Ref. Mon. 161 T. P. 862	45.9 56.1
Ref. Mon. 139	67 25 20.04 45 30.09.86	321 20 59 01	T. P. 750	450. 4 85. 6	Meetinghouse Rock.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	121 49	Ref. Mon. 158	123. 4
Ref. Mon. 140	67 25 34.40 45 30 11.03	150 30 33 30	Ref. Mon. 140 T. P. 750	41. 4 96. 0	Grassy	45 25 38.85 67 28 33.42	310 58	Ref. Mon. 159	139.3
Ref. Mon. 141	67 25 35.34 45 30 34.17	330-30 75-46	T. P. 761	41. 4 41. 6	Grassy Island bench mark.	45 25 29.56 67 28 29.20	$     \begin{array}{r}       166 59 \\       183 56     \end{array} $	Ref. Mon. 160 Ref. Mon. 159	153.0 196.1
Ref. Mon. 142	67 27 10, 94 45 30 34, 98	159 14 41 01	Ref. Mon, 142 T. P. 761	26. 9 46. 9	Irish	45 24 29.48 67 26 56.04			
Ref. Mon. 143	67 27 11.38 45 29 56.72	339 14 126 00	Ref. Mon. 141 T. P. 767	26. 9 24. 4	Coot	45 24 34.43 67 27 00.81	325 54	Irish	184.7
Ref. Mon. 144	67 27 06.96 45 29 58.19	162 05 9 22	Ref. Mon. 144 T. P. 767	47.6 31.3	Rock	45 24 29.44 67 27 03.65	201 52 269 33	Coot Irish	166.2     165.4
Ref. Mon. 145	67 27 07.64 45 30 27.36	342 05 316 04	Ref. Mon. 143 Ref. Mon. 146	47.6 67.1	Ref. Mon. 163	45 24 11.84 67 26 23 92	60 41 83 50	Ref. Mon. 164	239. 2 236. 3
Ref. Mon. 146	67 27 46.51 45 30 25.80	332 47 75 47	T. P. 770 T. P. 770	59.8 19.8	Ref. Mon. 164	45 24 08.05	164 01	T. P. 869	95. 5
Duck	67 27 44.36 45 29 47 85	136 04 315 10	Ref. Mon. 145 Ref. Mon. 148	67.1	Ref. Mon. 165	67 26 33. 51 45 22 53. 42	240 41 26 56	T. P. 879	239. 2 17. 9
Pof Mon 147	67 28 10.71	349 04	Ref. Mon. 147	97.7	Pot Mon 180	67 25 23.62	82 03	Ref. Mon. 166	84.9
nel. Mon. 147	45 29 44.75 67 28 09.86	215 27 296 29	T. P. 785	55.3 110.3	Nel. MION. 166	45 22 53.04 67 25 27.49	262 03 273 11	T. P. 879	84. 9 76. 1
Ref. Mon. 148	45 29 46. 20 67 28 08. 38	$35 27 \\ 324 43$	Ref. Mon. 147 T. P. 785	55.3 115.4	Cottage	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	19 20.		

#### GEOGRAPHIC POSITIONS OF MONUMENTS AND MARKED STATIONS REFERENCING THE TURNING POINTS OF THE INTERNATIONAL BOUNDARY THROUGH THE ST. CROIX RIVER FROM THE OUTLET OF SPEDNIK LAKE TO WOODLAND, ME.

## DESCRIPTION AND DEFINITION OF THE BOUNDARY LINE

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Traverse Sta- tion B-36.	° / ″ 45 22 21.19 67 25 39.47	0 / //			West Dam	° ' " 45 16 30.51 67 28 46,99	° / ″ 36 29 188 13	Ref. Mon. 182 T. P. 956	92. 3 24. 0
Traverse Sta- tion B-37.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	248 07	Traverse Station B-36.	119.8	Lower Pitch	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 37 \hspace{0.1cm} 11 \\ 67 \hspace{0.1cm} 04 \end{array}$	Gorge T. P. 961	$138.7 \\ 61.1$
Ref. Mon. 167	$\begin{array}{r} 45 \ 22 \ 18.34 \\ 67 \ 25 \ 48. 64 \end{array}$	$\begin{array}{r} 89 \ 45 \\ 125 \ 20 \end{array}$	T. P. 889 Ref. Mon. 168	45. 9 52. 6	Gorge	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 217 & 11 \\ 290 & 04 \end{array}$	Lower Pitch T. P. 962	$138.7 \\ 11.1$
Ref. Mon. 168	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{smallmatrix}&5&26\\&305&20\end{smallmatrix}$	T. P. 889 Ref. Mon. 167	$30.8 \\ 52.6$	Ref. Mon. 183	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r}42&34\\149&18\end{array}$	T. P. 963 Ref. Mon. 184	30, 6 38, 7
K	45 21 41.70 67 26 01.78				Ref. Mon. 184	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}0&58\\329&18\end{array}$	T. P. 963. Ref. Mon. 183	55, 8 38, 7
Ref. Mon. 169	$\begin{array}{c} 45 \ 21 \ 26. \ 60 \\ 67 \ 25 \ 32. \ 06 \end{array}$	$   \begin{array}{c}     101 & 44 \\     122 & 29   \end{array} $	Ref. Mon. 170 T. P. 899	$\begin{array}{c}131.\ 6\\34.\ 7\end{array}$	Ref. Mon. 185	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 79 \hspace{0.1cm} 47 \\ 347 \hspace{0.1cm} 09 \end{array}$	T. P. 976 Ref. Mon. 186	$137.6 \\ 92.3$
Ref. Mon. 170	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 274 \hspace{0.1cm} 39 \\ 281 \hspace{0.1cm} 44 \end{array}$	T. P. 899 Ref. Mon. 169	99, 9 131, 6	Ref. Mon. 186	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 112 \ 49 \\ 167 \ 09 \end{array}$	T. P. 976 Ref. Mon. 185	$169.2 \\ 92.3$
Fin	$\begin{array}{r} 45 \ 21 \ 04. \ 55 \\ 67 \ 25 \ 43. \ 49 \end{array}$				Pomhanan	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	358 45	Maurel	104, 5
Ref. Mon. 169-A.	45 21 04.10 67 25 45.73	$140 \ 19 \\ 187 \ 01$	Ref. Mon. 170-A T. P. 906	121. 9 79. 8	Maurel	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	178 45	Pomhanan	104, 5
Ref. Mon. 170-A.	45 21 07.14 67 25 49.30	$279 \ 30 \\ 320 \ 19$	T. P. 906. Ref. Mon. 169-A	88. 8 121. 9	Ref. Mon. 187	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 39 & 55 \\ 82 & 29 \end{array}$	Ref. Mon. 188 T. P. 985	$170.2 \\ 58.0$
Ref. Mon. 171	45 20 25.93 67 25 58.41	$     187 \ 42 \\     228 \ 11   $	Ref Mon. 172 T. P. 912	$71.5 \\ 112.8$	Ref. Mon. 188	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 202 \ \ 48 \\ 219 \ \ 55 \end{array}$	T. P. 985 Ref. Mon. 187	$133.4 \\ 170.2$
Ref. Mon. 172	45 20 28.22 67 25 57.97	$\begin{array}{c} 7 \ 42 \\ 266 \ 56 \end{array}$	Ref. Mon. 171 T. P. 912	71. 5 74. 5	Ref. Mon. 189	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 95 & 19 \\ 155 & 49 \end{array}$	Ref. Mon. 190 T. P. 990	355, 5 110, 0
McNicholl	45 20 23.29 67 26 01.41	206 08	Ref. Mon. 172	169.7	Ref. Mon. 190	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 77 \ 41 \\ 275 \ 18 \end{array}$	T. P. 990 Ref. Mon. 189	$316, 2 \\ 355, 5$
Beaver	45 20 11.35 67 26 27.94				Weatherby	$\begin{array}{c} 45 \ 11 \ 43. \ 58 \\ 67 \ 25 \ 28. \ 88 \end{array}$	27 13 50	Whidden	983, 4
Chub Rock	45 19 49.88 67 26 41.38	$\begin{array}{c} 73 \ 42 \\ 73 \ 58 \ 00 \end{array}$	T. P. 920 Ref. Mon. 174	$\begin{array}{c}181.\ 4\\631.\ 4\end{array}$	Whidden	$\begin{array}{c} 45 \ 11 \ 15. \ 26 \\ 67 \ 25 \ 49. \ 49 \end{array}$	207 13 40	Weatherby	. 983, 4
Ref. Mon. 173	45 19 40.18 67 27 10.44	$\frac{191}{198} \frac{44}{15}$	Ref. Mon. 174 T. P. 922	$127.8 \\ 68.6$	Ref. Mon. 191	$\begin{array}{c} 45 \ 11 \ 23. \ 42 \\ 67 \ 25 \ 01. \ 56 \end{array}$	$\begin{smallmatrix} 67 & 10 \\ 103 & 48 \end{smallmatrix}$	Ref. Mon. 192 T. P. 994	245. 0 130. 0
Ref. Mon. 174	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4 18 11 44 252 57 40	T. P. 922. Ref. Mon. 173	$\begin{array}{c} 60.1\\ 127.8\\ 631.4 \end{array}$	Ref. Mon. 192	$\begin{array}{c} 45 \ 11 \ 20. \ 34 \\ 67 \ 25 \ 11. \ 90 \end{array}$	$\begin{array}{c} 218 \hspace{0.1cm} 18 \\ 247 \hspace{0.1cm} 10 \end{array}$	T. P. 994 Ref. Mon. 191	$     \begin{array}{r}       160. \ 6 \\       245. \ 0     \end{array} $
Ref. Mon. 175	45 18 12.03	85 03	T. P. 934	38.1	Ledges	$\begin{array}{cccccccccccccccccccccccccccccccccccc$			
Ref. Mon. 176	45 18 13.17	311 22 312 27	Ref. Mon. 175	53. 5	New	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	30 07 40	Mill	. 814, 1
Ref. Mon. 177	45 17 36.39	196 14	Ref. Mon. 178	37. 3	Mill	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	210 07 30	New	. 814, 1
Ref. Mon. 178	45 17 37. 55	196 14 16 14	Ref. Mon. 177	37.3	Ref. Mon. 193	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{138}{138}  \frac{35}{35}$	T. P. 1002 Ref. Mon. 194	39, 1 78, 3
Cabin	45 17 35.12	10 14 191 44	Ref. Mon. 178	76. 8	Ref. Mon. 194	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 318 & 35 \\ 318 & 35 \end{array}$	T. P. 1002. Ref. Mon. 193	39. 2 78. 3
Ref. Mon. 179	67 28 05.25 45 17 07.99	158 33	Ref. Mon. 180	196. 9	Ref. Mon. 195	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{r}       28 & 35 \\       72 & 05 \\       72 & 05     \end{array} $	T. P. 1006 T. P. 1005 Ref. Mon. 196	146.9     266.0     462.5
Ref. Mon. 180	45 17 13.92	272 44	T. P. 951	106.2	Ref Mon 196	45 00 34 76	351 12	T. P. 1007	231, 5
Ref. Mon. 181	45 16 39.25 67 28 44 59	17 31 50 54	Ref. Mon. 182	360. 8	T. P. 1006 (2-	67 24 28.80 45 09 35 19	252 05 104 28	Ref. Mon. 195 T. P. 1005	462, 5
Ref. Mon. 182	45 16 28.11 67 28 40 50	123 33	T. P. 955	208.0	inch iron shaft in Woodland	67 24 11.87	$208 35 \\ 313 20$	Ref. Mon. 195 T. P. 1007	146.9 145.2
	07 28 49.50	197 31 216 29	West Dam	92. 3	Dam).				
T. P. 956 (bronze disk in Grand Falls Dam).	45 16 31, 28 67 28 46, 83	$8 13 \\ 94 12 \\ 262 25$	T. P. 955 T. P. 957	24.0 232.3 21.1					

# BOUNDARY REFERENCE MONUMENTS AND MARKED STATIONS—ST. CROIX RIVER FROM SPEDNIK LAKE TO WOODLAND, ME.—Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
Crossing	•         ''           45         09         20.         87           67         23         37.         67	° ' '' 34 53 101 37 349 44	Nearby T. P. 1008 T. P. 1009	150.9 118.6 143.2	Ref. Mon. 210.	° ' '' 45 08 25.32 67 19 08.32	° , '' 105 51 134 49	Ref. Mon. 209 T. P. 1027	$121.3 \\ 146.6$
Nearby	$45 09 16.86 \\ 67 23 41.62$	$   \begin{array}{c}     168 & 34 \\     214 & 53   \end{array} $	T. P. 1008 Crossing	$150.6 \\ 150.9$	Towers	45 08 27.52 67 19 14.55	$222 13 \\ 222 13$	Sawdust Island T. P. 1027	111. 0 48. 0
Wapsaconhagan	45 09 15.13 67 23 37 26	$177 08 \\ 204 40$	Crossing T. P. 1009	177.3 39.8	Sawdust Island.	45 08 30.18 67 19 11.13	$\begin{array}{r} 42 & 13 \\ 143 & 47 \end{array}$	Towers T. P. 1028	$111.0 \\ 113.0$
Lovering	45 09 05.59	154 46	T. P. 1010	64. 0 189. 0	Ref. Mon. 211	45 08 44.07 67 18 31.75	$\begin{array}{c} 31 \ 40 \\ 31 \ 40 \end{array}$	T. P. 1029 Ref. Mon, 212	233. 0 339. 4
D. 6 3.6 107	45 00 01 00	329 19 20	Ref. Mon. 198	504.8	Ref. Mon. 212	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 211 \ 40 \\ 211 \ 40 \end{array}$	T. P. 1029 Ref. Mon. 211	106.4 339.4
Ref. Mon. 197	45 09 01.02 67 22 41.45	28 33 45 08	T. P. 1012	52. 4	Squirrel Point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 328 & 18 \\ 247 & 51 \end{array}$	T. P. 1030 Birch Hill	$32.0 \\ 489.8$
Ref. Mon. 198	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	205 32 208 33	T. P. 1012 Ref. Mon. 197	283. 8 333. 6	Birch Hill	45 08 48.99 67 18 01.50	$\begin{smallmatrix}16&43\\67&51\end{smallmatrix}$	T. P. 1031 Squirrel Point	72. 0 489. 8
Ref. Mon. 199	45 08 22.32 67 21 58.89	$\begin{array}{cccc} 76 & 09 \\ 126 & 49 \\ 133 & 02 & 20 \\ 318 & 35 \end{array}$	Ref. Mon. 200 T. P. 1014 T. P. 1013 T. P. 1015	$ \begin{array}{r} 162.1\\ 483.1\\ 726.2\\ 261.2 \end{array} $	Junction	45 08 56.89 67 17 37.23	$\begin{smallmatrix} 60 & 24 \\ 119 & 58 & 30 \\ 119 & 59 \end{smallmatrix}$	T. P. 1032 Balcolm T. P. 1033	$262.\ 0\\607.\ 7\\151.\ 0$
Ref. Mon. 200	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1013 T. P. 1014	651.9 400.5	Balcolm	$\begin{array}{c} 45 & 09 & 06. \ 73 \\ 67 & 18 & 01. \ 33 \end{array}$	$\begin{array}{c} 299 & 58 \\ 299 & 58 & 10 \end{array}$	T. P. 1033 Junction	$456.7 \\ 607.7$
		256 09 295 27	Ref. Mon. 199 T. P. 1015	$162.1 \\ 365.6$	Campbell	45 09 20.01 67 17 36.08	$30 \ 06 \\ 53 \ 21 \ 50$	T. P. 1034 Balcolm	$230.0 \\ 687.2$
Clark	45 08 01.11 67 21 33.77	288 05 288 05	T. P. 1016 Ephraim	$184.2 \\ 236.6$	Pineo	45 09 24.05 67 17 51.17	$22 \ 32 \\ 97 \ 47$	T. P. 1035 T. P. 1036	$128.0 \\ 371.0$
Ephraim	45 07 58.73 67 21 23.48		T. P. 1017 Clark T. P. 1016	$144.8 \\ 236.6 \\ 52.4$	Ref. Mon. 213	45 09 39.20 67 18 14.10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1037 Ref. Mon. 214	50. 0 154. 7
Ref. Mon.201	45 07 47.99 67 21 02.71	$\begin{array}{c}7&58\\297&26\end{array}$	Ref. Mon. 202 T. P. 1019	83. 3 88. 1	Ref. Mon. 214	45 09 38.75 67 18 07.04	$95\ 13$ $95\ 13$	T. P. 1037 Ref. Mon. 213	$104.7 \\ 154.7$
Ref. Mon. 202	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 91 & 13 \\ 187 & 58 \\ 244 & 58 \end{array}$	T. P. 1018 Ref. Mon. 201 T. P. 1019	$246. 9 \\ 83. 3 \\ 99. 1$	Church	45 10 13.30 67 17 54.60	$\begin{array}{c} 44 \hspace{0.1cm} 15 \\ 296 \hspace{0.1cm} 14 \end{array}$	T. P. 1038. Pumping Station.	162. 0 141. 3
Lawler	45 07 37.47 67 20 58.53	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Waters T. P. 1020 T. P. 1021	$\begin{array}{c} 640.\ 2\\ 242.\ 2\\ 500.\ 2\end{array}$	Ref. Mon. 215.	45 10 12.24 67 17 46.72	$\begin{array}{c} 101 \ \ 33 \\ 174 \ \ 43 \\ 227 \ \ 38 \end{array}$	T. P. 1039 Ref. Mon. 216 T. P. 1040	89.4 108.3 96.8
Waters	45 07 32.84 67 20 29.97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lawler T. P. 1020 T. P. 1021 T. P. 1022	$\begin{array}{r} 640.\ 2\\ 398.\ 0\\ 140.\ 0\\ 70.\ 1\end{array}$	Ref. Mon. 216	45 10 15.73 67 17 47.17	$\begin{array}{c} 40 & 52 \\ 264 & 10 \\ 297 & 35 \end{array}$	T. P. 1039. Ref. Mon. 217 T. P. 1040.	118. 8 200. 4 91. 8
Ref. Mon. 203	45 07 33.66	31 18 312 14	T. P. 1022 Ref. Mon. 204	109.1	Ref. Mon. 217	45 10 16.39 67 17 38.04	$\begin{array}{r} 84 \hspace{0.1cm} 10 \\ 349 \hspace{0.1cm} 57 \end{array}$	Ref. Mon. 216 T. P. 1041	200. 4 45. 7
Ref. Mon. 204	45 07 31.88 67 20 23.82	71 55 132 14	T. P. 1022 Ref. Mon. 203	123. 3 81. 8	Ref. Mon. 218	45 10 17.29 67 17 33.90	$\begin{array}{r} 48 & 34 \\ 188 & 25 \\ 197 & 53 \\ 300 & 02 \end{array}$	T. P. 1041 Ref. Mon. 219 T. P. 1043 T. P. 1042	$ \begin{array}{r} 110.0\\ 441.6\\ 184.2\\ 65.8 \end{array} $
Frostfield	45 07 40.81 67 20 12.39	$\begin{array}{ccc} 193 & 14 \\ 193 & 14 \end{array}$	Cove T. P. 1023	113. 0 56. 5	Ref. Mon. 219	45 10 31.44	0 56	T. P. 1042 Ref. Mon. 218	469.9
Cove	45 07 44.38 67 20 11.20	$\begin{array}{ccc}13&14\\13&14\end{array}$	Frostfield T. P. 1023	113. 0 56. 5	D. ( ) ( 000	15 10 04 50	347 03	T. P. 1044	78.9
Abbott	45 07 52.07 67 19 58.09	$\begin{array}{c} 236 \ 14 \\ 315 \ 57 \end{array}$	T. P. 1024 Doten	$ \begin{array}{c} 161.0\\ 405.0 \end{array} $	Kel. Mon. 220	45 10 34.58 67 17 39.99	320 23	T. P. 1045	40.1
Ref. Mon. 205	45 07 55.32 67 19 28.82	283 44 339 27	T. P. 1025 Ref. Mon. 206	$\begin{array}{c} 263.4 \\ 166.1 \end{array}$	Ref. Mon. 221	45 10 40.29 67 17 41.96	$336 09 \\ 346 17$	T. P. 1046 Ref. Mon. 220	181.4
Ref. Mon. 206	45 07 50.28 67 19 26.15	$\begin{array}{c}159&27\\244&47\end{array}$	Ref. Mon. 205 T. P. 1025	166. 1 218. 4	Ref. Mon. 222	45 10 58,72 67 17 28,91	$53 \ 01$ $138 \ 27$ $149 \ 01$ $152 \ 33$ $358 \ 46$	T. P. 1048 T. P. 1049 Ref. Mon. 223 T. P. 1050 T. P. 1047	50.3 101.1 235.8 138.8 131.2
Ref. Mon. 207.	45 08 15.42 67 19 09.50	$232 51 \\ 303 25$	T. P. 1026 Ref. Mon. 208	99. 4 155. 3	Ref. Mon. 223	45 11 05. 27	235 39	Ref. Mon. 224	322.5
Ref. Mon. 208.	45 08 12.65 67 19 03.57	$\frac{123}{160}\;\frac{25}{55}$	Ref. Mon. 207 T. P. 1026	155. 3 154. 0		67 17 34.47	243 04 294 27 324 00 226 45	T. P. 1052 T. P. 1051 T. P. 1050	91. 3 94. 0 97. 7
Ref. Mon. 209	45 08 26.40 67 19 13.66	190 19 285 51	T. P. 1027 Ref. Mon. 210	71.3		1	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	T. P. 1049 T. P. 1047 T. P. 1048	355. 8 246. 2

# GEOGRAPHIC POSITIONS OF MONUMENTS AND MARKED STATIONS REFERENCING THE TURNING POINTS OF THE INTERNATIONAL BOUNDARY THROUGH THE ST. CROIX RIVER FROM WOODLAND, ME., TO PASSAMAQUODDY BAY

# 128 DESCRIPTION AND DEFINITION OF THE BOUNDARY LINE

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)
	0 1 11	0 / //				0 / //	0 / //		
Ref. Mon. 224	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     39 17 \\     52 45 \\     55 20 $	T. P. 1051 T. P. 1052	285. 2 232. 0	Ref. Mon. 234	45 10 04.47 67 13 08.13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 235 T. P. 1079	725.1 367.1
	122.00	57 55 72 00	T. P. 1053	188.9 160.8	Ref. Mon. 235	45 10 03.45	91 02	T. P. 1079	358. 2
		$79 14 \\ 131 04$	T. P. 1055 T. P. 1056	99.1 215.7	Ref. Mon. 236	45 10 12 60	300 12	T P 1080	297.3
Ref. Mon. 225	45 11 15.72	35 20	T. P. 1053	295.6	100 1101 100111	67 12 39. 20	341 51	Ref. Mon. 235	297.3
	67 17 21.78	41 45 90 18	T. P. 1054 T. P. 1056	259.0 173.6	Ref. Mon. 237	45 09 45.72 67 11 21.49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1084 Ref. Mon. 238	374.6 590.1
		$     \begin{array}{r}       131 & 49 \\       208 & 07 \\       218 & 41     \end{array} $	Ref. Mon. 226 T. P. 1058	$     \begin{array}{r}       154.8 \\       301.1 \\       221.1     \end{array} $	Ref. Mon. 238	45 10 02.85 67 11 09.50	$\begin{array}{ccc} 26 & 20 & 50 \\ 65 & 44 \end{array}$	Ref. Mon. 237 T. P. 1084	590.1 465.0
Ref. Mon. 226	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{r}       2 & 17 \\       28 & 07 \\       224 & 25     \end{array} $	T. P. 1058 Ref. Mon. 225	93.0 301.1 210.5	Ref. Mon. 239	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 240 T. P. 1086	$1,065.8\\556.2$
		270 34	T. P. 1059	93. 6	Ref. Mon. 240	45 10 05.38 67 09 47.23	$5 26 40 \\ 336 17 50$	Ref. Mon. 239 T. P. 1086	1,065.8
Ref. Mon. 227	45 11 30.67 67 17 02.25	$55 27 \\ 71 34 \\ 180 00$	Ref. Mon. 226 T. P. 1060 T. P. 1061	$345.5 \\ 144.5 \\ 16.0$	Ref. Mon. 241	45 09 14.44 67 08 19.58	$\begin{array}{c} 30 & 49 & 20 \\ 352 & 32 & 10 \end{array}$	T. P. 1087 Ref. Mon. 242	1, 031. 0 2, 822. 9
Ref. Mon. 228	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 21 & 58 \\ 338 & 08 \end{array}$	Ref. Mon 229 T. P. 1066	$469.5 \\ 319.2$	Ref. Mon. 242	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1088 Ref. Mon. 243	546. 1 1, 347. 2
Ref. Mon. 229	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 201 & 58 \\ 244 & 26 \end{array}$	Ref. Mon. 228 T. P. 1066	$469.5 \\ 381.4$	Ref. Mon. 243	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 242 T. P. 1088	1, 347. 2 1, 190. 1
Ref. Mon. 230	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 89 \ 26 \\ 118 \ 40 \end{array}$	Ref. Mon. 231 T. P. 1069	$383.7 \\ 172.4$	Ref. Mon. 244	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1089 Ref. Mon. 245	1, 273. 1 3, 017. 4
Ref. Mon. 231	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 249 & 35 \\ 269 & 26 \end{array}$	T. P. 1069 Ref. Mon. 230	247. 9 383. 7	Ref. Mon. 245	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 244 T. P. 1089	3, 017. 4 2, 010. 3
Ref. Mon. 232	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 24 & 11 \\ 29 & 31 \end{array}$	Ref. Mon. 233 T. P. 1076	$307.8 \\ 239.4$	Ref. Mon. 246	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 1 (Passama- quoddy Bay).	928.5
Ref. Mon. 233	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$     \begin{array}{r}       186 & 23 \\       204 & 11     \end{array} $	T. P. 1076 Ref. Mon. 232	$\begin{array}{c} 72.\ 7\\ 307.\ 8\end{array}$				Range Mark 1	1, 888. 2

# BOUNDARY REFERENCE MONUMENTS AND MARKED STATIONS—ST. CROIX RIVER FROM WOODLAND, ME., TO PASSAMAQUODDY BAY—Continued

Station	Latitude and longitude	Azimuth	To station	Dis- tance (meters)	Station	Latitude and longitude	Azimuth	To station •	Dis- tance (meters)
T. P. 1	° ', '' 45 04 28.73 67 05 42.56	$\begin{smallmatrix} \circ & , & , \\ 73 & 28 & 52 \\ 161 & 29 & 25 \\ 255 & 12 & 21 \\ 255 & 12 & 21 \\ 336 & 45 & 56 \\ 336 & 45 & 56 \\ 336 & 45 & 56 \\ 336 & 45 & 56 \\ \end{smallmatrix}$	Ref. Mon. 246 T. P. 1089 (St. Croix River). Range Mark 1 Range Mark 2 Range Mark 7 Range Mark 8	$\begin{array}{c} 928.5\\ 4,462.5\\ 960.0\\ 1,074.2\\ 14,583.1\\ 18,733.1\\ 19,993.3 \end{array}$	т. р. 8	。 / // 44 52 02.59 66 58 57.80	$\begin{smallmatrix} \circ & \prime & \prime \prime \\ 8 & 29 & 52 \\ 8 & 29 & 52 \\ 171 & 30 & 26 \\ 171 & 30 & 26 \\ 188 & 29 & 52 \\ 278 & 32 & 20 \\ 278 & 32 & 20 \\ 351 & 30 & 26 \\ \end{smallmatrix}$	Range Mark 27 Range Mark 28. Range Mark 29 T. P. 7 Range Mark 30 Range Mark 25 Range Mark 26 T. P. 9.	$\begin{array}{r} 495.\ 0\\ 611.\ 6\\ 3,\ 319.\ 5\\ 3,\ 451.\ 2\\ 1,\ 152.\ 6\\ 192.\ 2\\ 220.\ 4\\ 759.\ 7\end{array}$
T. P. 2	44 57 14.55 67 01 20.11	$\begin{array}{c} 156 \ 49 \ 02 \\ 210 \ 15 \ 13 \\ 210 \ 15 \ 13 \\ 317 \ 48 \ 56 \\ 317 \ 48 \ 56 \\ 317 \ 48 \ 56 \\ 317 \ 48 \ 56 \\ 336 \ 49 \ 02 \\ 336 \ 49 \ 02 \\ \end{array}$	T. P. 1 Range Mark 3 Range Mark 4 T. P. 3 Range Mark 11 Range Mark 12 Range Mark 7. Range Mark 8.	$14,583.1\\1,930.1\\2,261.7\\1,373.1\\4,206.9\\7,698.2\\4,150.0\\5,410.2$	Т. Р. 9	$\begin{array}{c} 44 \ 51 \ 38, 25 \\ 66 \ 58 \ 52, 69 \end{array}$	$\begin{array}{ccccccccc} 156 & 03 & 35 \\ 156 & 03 & 35 \\ 171 & 30 & 30 \\ 171 & 30 & 30 \\ 171 & 30 & 30 \\ 273 & 44 & 42 \\ 273 & 44 & 42 \\ 336 & 03 & 35 \end{array}$	Range Mark 31 Range Mark 32 T. P. 8. Range Mark 29 Range Mark 30 Range Mark 33 Range Mark 34 T. P. 10	$\begin{array}{c} 1,843.4\\ 2,095.4\\ 759.7\\ 4,079.2\\ 4,210.9\\ 177.3\\ 340.6\\ 1,156.4\end{array}$
T.P.3	44 56 41.59 67 00 38.06	38 49 34 38 49 34 137 49 26 317 49 26 317 49 26 330 19 41 330 19 41	Range Mark 5 Range Mark 6 T. P. 2 Range Mark 11 Range Mark 12 T. P. 4 Range Mark 13	$1, 137. 7 \\1, 332. 3 \\1, 373. 1 \\2, 833. 8 \\6, 325. 1 \\2, 093. 8 \\3, 343. 9$	т. Р. 10	44 51 04.01 66 58 31.32	$\begin{array}{ccccccc} 0 & 23 & 14 \\ 156 & 03 & 50 \\ 156 & 03 & 50 \\ 156 & 03 & 50 \\ 180 & 23 & 14 \\ 180 & 23 & 14 \\ 180 & 23 & 14 \\ 299 & 37 & 49 \\ 299 & 37 & 49 \end{array}$	T. P. 11 T. P. 9 Range Mark 31 Range Mark 32 Range Mark 35 Range Mark 36 Range Mark 37 Range Mark 38	$\begin{array}{c} 1,040,0\\ 1,156,4\\ 2,999,8\\ 3,251,8\\ 1,023,9\\ 1,167,5\\ 536,4\\ 655,6\end{array}$
T. P. 4	44 55 42,65 66 59 50,79	330 19 41 47 12 49 47 12 49 150 20 15 311 57 44 311 57 44 311 57 44	Range Mark 14           Range Mark 10           T. P. 3           T. P. 5           Range Mark 15           Range Mark 16	4, 243. 0 909. 7 1, 183. 8 2, 093. 8 2, 988. 7 4, 138. 4 4, 303. 2	T. P. 11	44 50 30.32 66 58 31.64	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 10. Range Mark 35. Range Mark 36. Range Mark 39. Range Mark 40. T. P. 12. Range Mark 41. Range Mark 42.	$\begin{array}{c} 1,040,0\\ 2,063,9\\ 2,207,5\\ 589,3\\ 632,8\\ 1,607,2\\ 2,853,5\\ 2,985,0 \end{array}$
T. P. 5	44 54 37.90 66 58 09.48	$\begin{array}{c} 330 \ 20 \ 15 \\ 330 \ 20 \ 15 \\ \end{array}$ $\begin{array}{c} 9 \ 03 \ 57 \\ 131 \ 58 \ 56 \\ 189 \ 03 \ 57 \end{array}$	Range Mark 13           Range Mark 14           T. P. 6           T. P. 4           Range Mark 17	1, 250. 1 2, 149. 1 1, 751. 9 2, 988. 7 948. 4	Т. Р. 12	44 49 44.38 66 57 57.21	$\begin{array}{c} 98 \ 11 \ 15 \\ 98 \ 11 \ 15 \\ 151 \ 55 \ 58 \\ 278 \ 11 \ 15 \\ 331 \ 55 \ 58 \\ 331 \ 55 \ 58 \end{array}$	Range Mark 43 Range Mark 44 T. P. 11. T. P. 13. Range Mark 41 Range Mark 42	2, 018. 4 2, 276. 0 1, 607. 2 2, 616. 8 1, 246. 3 1, 377. 8
т. р. 6	44 53 41.86 66 58 22.06	$\begin{array}{c} 189\ 03\ 57\\ 311\ 58\ 56\\ 311\ 58\ 56\\ 17\ 41\ 48\ 48\\ 17\ 41\ 48\ 48\\ 17\ 41\ 48\ 48\ 48\ 48\ 48\ 48\ 48\ 48\ 48\ 48$	Range Mark 18 Range Mark 15 Range Mark 16 T. P. 7. Range Mark 23 Range Mark 24	$\begin{array}{c} 1, 523. 7 \\ 1, 149. 8 \\ 1, 314. 6 \\ \hline \\ 2, 019. 9 \\ 3, 045. 5 \\ 3, 085. 7 \\ 2, 009. 9 \\ \end{array}$	Т. Р. 13	44 49 32.29 66 55 59.31	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	T. P. 12. Range Mark 43 Range Mark 44 Range Mark 45 Range Mark 46 Range Mark 47 Range Mark 48 T. P. 14.	$\begin{array}{c} 2, 616, 8\\ 4, 635, 2\\ 4, 892, 8\\ 2, 664, 4\\ 3, 655, 1\\ 577, 5\\ 637, 2\\ 5, 100, 0\end{array}$
		$\begin{array}{c} 17 \ 41 \ 48 \\ 105 \ 47 \ 50 \\ 105 \ 47 \ 50 \\ 189 \ 03 \ 48 \\ 189 \ 03 \ 48 \\ 189 \ 03 \ 48 \end{array}$	Range Mark 19 Range Mark 20 T. P. 5. Range Mark 17 Range Mark 18	1, 152, 1 1, 264, 2 1, 751, 9 2, 700, 3 3, 275, 6	T. P. 14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 34 \ 42 \ 00 \\ 114 \ 20 \ 09 \\ 133 \ 02 \ 00 \\ 133 \ 02 \ 00 \\ 133 \ 02 \ 00 \\ 217 \ 02 \ 30 \end{array}$	Point 15(terminus) West Quoddy Head Lighthouse, T. P. 13	2, 383. 0 5, 646. 3 5, 100. 0 7, 764. 4 8, 755. 1 19, 883. 1
T. P. 7	44 52 39.52 66 58 50.04	$\begin{array}{c} 8 & 29 & 57 \\ 8 & 29 & 57 \\ 8 & 29 & 57 \\ 17 & 41 & 29 \\ 17 & 41 & 29 \\ 17 & 41 & 29 \\ 97 & 13 & 54 \\ 97 & 14 \\ 97 & 14 & 14 \\ 97 & 14$	T. P. 8 Range Mark 27 Range Mark 28 Range Mark 23 Range Mark 24 Lubec c h u r c h spire. Range Mark 21 Range Mark 22	$\begin{array}{c} 1, 152. \ 6\\ 1, 647. \ 6\\ 1, 764. \ 2\\ 1, 025. \ 6\\ 1, 065. \ 8\\ 1, 978. \ 1\\ 576. \ 3\\ 790. \ 1\end{array}$	Point 15 (termi- nus).	$\begin{array}{c} 44 \ \ 46 \ \ 36. \ 11 \\ 66 \ \ 54 \ \ 11. \ 32 \end{array}$	138 31 01 159 23 25 214 41 17 216 46 45	Island Light- house. West Quody Head Lighthouse, Range Mark 47 T. P. 14. South West Wolf Island Light-	5, 720. 0 6, 415. 7 2, 383. 0 22, 264. 3
		187 41 29	I, I, 0	2,019.9				nouse.	

## GEOGRAPHIC POSITIONS OF BOUNDARY TURNING POINTS DEFINING THE INTERNATIONAL BOUNDARY THROUGH PASSAMAQUODDY BAY TO THE ATLANTIC OCEAN

 $47378^{\circ} - 34 - 10$ 

#### GEOGRAPHIC POSITIONS OF MONUMENTS RANGING THE COURSES AND CROSS-RANGING THE TURNING POINTS OF THE INTERNATIONAL BOUNDARY THROUGH PASSAMA-QUODDY BAY TO THE ATLANTIC OCEAN

Range Marks Nos.	Latitude and longitude	Azimuth	To Range Mark or Boundary Turning Point	Dis- tance (me- ters)	Range Marks Nos.	Latitude and longitude	Azimuth	To Range Mark or Boundary Turning Point	Dis- tance (me- ters)
Cross - ranging 1 boundary turning point	° ' '' 45 04 36.67 67 05 00.13	$\circ$ / // 75 12 51 255 12 51	T. P. 1 Range Mark 2.	960. 0 114. 2	Cross - ranging 21 b o u n d a r y turning point	$\begin{smallmatrix}\circ&&&&'\\44&52&41,87\\66&59&16,09\end{smallmatrix}$	° / // 97 13 36 277 13 36	Range Mark 22. T. P. 7	213. 7 576. 3
1. 2	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 75 & 12 & 55 \\ 75 & 12 & 55 \end{array}$	Range Mark 1 T. P. 1	$114.2 \\ 1,074.2$	7. 22	44 52 42.74 66 59 25.75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 21. T. P. 7	213. 7 790, 1
Cross-ranging 3 boundary turning point	$\begin{array}{c} 44 \\ 67 \\ 00 \\ 35.74 \end{array} \\ $	$\begin{array}{c} 30 \ 15 \ 44 \\ 210 \ 15 \ 44 \end{array}$	T. P. 2. Range Mark 4	$1,930.1 \\ 331.6$	Ranging bound-	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 17 \ 41 \ 19 \\ 17 \ 41 \ 19 \\ 197 \ 41 \ 19 \\ 197 \ 41 \ 19 \end{array}$	Range Mark 24. Lubec ch. sp T. P. 7	$\begin{array}{r} 40.1\\952.5\\1,025.6\end{array}$
2. (4	44 58 17.83 67 00 28.11	$\begin{array}{c} 30 & 15 & 49 \\ 30 & 15 & 49 \end{array}$	Range Mark 3 T. P. 2	331.6 2,261.7	ary course 6-7.	44 52 06.63 66 59 04.79	197 41 19 17 41 18 197 41 18	Lubec ch. sp Range Mark 23_	912.4 40.1
Cross - ranging 5 b o u n d a r y turning point	44 56 12.88 67 01 10.58	$\begin{array}{c} 38 \ 49 \ 11 \\ 218 \ 49 \ 11 \end{array}$	Range Mark 6 T. P. 3	$194.6 \\ 1,137.7$			197 41 18 197 41 18	T. P. 7 T. P. 6	1, 065, 8 3, 085, 7
3. [6	44 56 07.96 67 01 16.15	218 49 07 218 49 07	Range Mark 5 T. P. 3	194. 6 1, 332. 3	Lubec ch. sp 1919. <sup>2</sup>	$\begin{array}{c} 44 \ 51 \ 38. 47 \\ 66 \ 59 \ 17. 42 \end{array}$	$\begin{array}{c} 197 \ 41 \ 09 \\ 197 \ 41 \ 09 \\ 197 \ 41 \ 09 \\ 197 \ 41 \ 09 \\ \end{array}$	Range Mark 24. Range Mark 23. T. P. 7.	912.4 952.5 1,978.1
Ranging bound- ary course 1-2.	44 55 10.96 67 00 05.62	$156 49 54 \\ 156 49 54 \\ 336 49 54$	T. P. 2 T. P. 1 Range Mark 8.	4, 150, 0 18, 733, 1 1, 260, 2	Cross - ranging (25	44 52 01.67	98 32 26	T. P. 8	192.2
[8	44 54 33.43 66 59 43.02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 7. T. P. 2. T. P. 1.	$1,260.2 \\ 5,410.2 \\ 19,993.3$	boundary turning point 8.	66         58         49.14           44         52         01.53           66         58         47.87	278 32 26 98 32 27 98 32 27	Range Mark 26. Range Mark 25. T. P. 8	28.2 28.2 220.4
Cross - ranging 9 b o u n d a r y turning point	$\begin{array}{c} 44 \ 55 \ 22. \ 63 \\ 67 \ 00 \ 21. \ 23 \end{array}$	$\begin{array}{c} 47 & 12 & 28 \\ 227 & 12 & 28 \end{array}$	Range Mark 10. T. P. 4	274. 1 909. 7	Papering bound 27	44 51 46.73 66 59 01.13	8 29 49 188 29 49	Range Mark 28. T. P. 8	$     \begin{array}{r}       116.6 \\       495.0     \end{array} $
4. (10	44 55 16,60 67 00 30,40	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 9 T. P. 4	274. 1 1, 183. 8	ary course 7-8.	44 51 43.00	188 29 49 188 29 49	T. P. 7 Range Mark 27.	1, 647. 6 116. 6
Ranging bound-	$\begin{array}{c} 44 \ 55 \ 33.\ 55 \\ 66 \ 59 \ 11.\ 30 \end{array}$	$\begin{array}{c} 137 \ 50 \ 27 \\ 137 \ 50 \ 27 \\ 317 \ 50 \ 27 \end{array}$	T. P. 3 T. P. 2. Range Mark 12.	2, 833.8 4, 206.9 3, 491.3		66 59 01.91	188 29 49 188 29 49	T. P. 7	1, 764. 2
12 ary course 2 o.	$\begin{array}{c} 44 \ 54 \ 09. \ 69 \\ 66 \ 57 \ 24. \ 49 \end{array}$	$\begin{array}{c} 137 \ 51 \ 42 \\ 137 \ 51 \ 42 \\ 137 \ 51 \ 42 \\ 137 \ 51 \ 42 \end{array}$	Range Mark 11. T. P. 3 T. P. 2	3, 491, 3 6, 325, 1 7, 698, 2	Ranging bound- ary course 8-9.	44 53 48.95 66 59 20.14	$\begin{array}{c} 171 \ 30 \ 10 \\ 351 \ 30 \ 10 \\ 351 \ 30 \ 10 \end{array}$	Range Mark 30. T. P. 8. T. P. 9.	131.7 3, 319.5 4, 079.2
Ranging bound-	$\begin{array}{c} 44 \ 55 \ 07. \ 46 \\ 66 \ 59 \ 22. \ 58 \end{array}$	$150 \ 20 \ 34$ $150 \ 20 \ 34$ $230 \ 20 \ 34$	T. P. 4 T. P. 3 Paper Mark 14	1, 250, 1 3, 343, 9 800, 1	[30	44 53 53.17 66 59 21.03	351 30 10 351 30 10 351 30 10	Range Mark 29. T. P. 8 T. P. 9	$   \begin{array}{r} 131.7\\ 3,451.2\\ 4,210.9 \end{array} $
ary course 3-4.	$\begin{array}{c}44 & 54 & 42.15 \\66 & 59 & 02.30\end{array}$	$\begin{array}{c} 350 \ 20 \ 34 \\ 150 \ 20 \ 49 \\ 150 \ 20 \ 49 \\ 150 \ 20 \ 49 \end{array}$	Range Mark13. T. P. 4	899.1 2,149.1 4 243 0	Ranging bound- ary course 9-	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 32. T. P. 9. T. P. 10	252. 0 1, 843. 4 2, 999. 8
Ranging bound-	44 54 12.99 66 57 30.53	131 59 23 131 59 23 131 59 23	T. P. 5 T. P. 4	1, 149. 8 4, 138. 4	[32	44 52 40.29 66 59 31.42	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 31. T. P. 9 T. P. 10	252. 0 2, 095. 4 3, 251. 8
ary course 4-5.	44 54 09.42	311 59 23 131 59 27 131 59 27	Range Mark 15. T. P. 5	164.8 1.314.6	Cross-ranging 33 b o u n d a r y turning point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 93 \ 44 \ 48 \\ 273 \ 44 \ 48 \end{array}$	T. P. 9 Range Mark 34.	$177.3 \\ 163.3$
		131 59 27	Т. Р. 4	4, 303. 2	9. [34	44 51 37.53 66 58 37.20	93 44 53 93 44 53	Range Mark 33_ T. P. 9	$163.3 \\ 340.6$
Ranging bound- ary course 5-6.	$\begin{array}{c} 44 \ 55 \ 08. \ 24 \\ 66 \ 58 \ 02. \ 67 \end{array}$	$\begin{array}{c} 9 & 04 & 02 \\ 9 & 04 & 02 \\ 189 & 04 & 02 \end{array}$	T. P. 5. T. P. 6. Range Mark 18.	948. 4 2, 700. 3 575. 3	Ranging bound-	$\begin{array}{c} 44 \ 51 \ 37. 18 \\ 66 \ 58 \ 31. 00 \end{array}$	$\begin{array}{ccccc} 0 & 23 & 14 \\ 0 & 23 & 14 \\ 180 & 23 & 14 \end{array}$	T. P. 10 T. P. 11. Range Mark 36.	${\begin{array}{c}1,023,9\\2,063,9\\143,6\end{array}}$
[18	44 55 26.65 66 57 58.54	$\begin{array}{c} 9 & 04 & 05 \\ 9 & 04 & 05 \\ 9 & 04 & 05 \\ \end{array}$	Range Mark 17. T. P. 5 T. P. 6	575.3 1, 523.7 3, 275.6	11. (36	44 51 41.84 66 58 30.96	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 35. T. P. 10 T. P. 11	$143. \ 6 \\ 1, 167. \ 5 \\ 2, 207. \ 5$
Cross - ranging [19 b o u n d a r y] turning point]	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 105 \ 47 \ 15 \\ 285 \ 47 \ 15 \end{array}$	Range Mark 20. T. P. 6	$112.1 \\ 1,152.1$	Cross-ranging (37 boundary	44 50 55.42 66 58 10.09	119 38 04 299 38 04	T. P. 10 Range Mark 38.	536. 4 119. 2
6. [20	44 53 53.01 66 59 17.51	$\begin{array}{c} 285 \ 47 \ 11 \\ 285 \ 47 \ 11 \end{array}$	Range Mark 19. T. P. 6	$\begin{array}{c c} 112.1 \\ 1,264.2 \end{array}$	turning point 10.	44 50 53.51 66 58 05.37	119 38 08 119 38 08	Range Mark 37 T. P. 10	$     \begin{array}{r}       119.2 \\       655.6     \end{array} $

A vertical white line, also on range with boundary course 3-4, was painted on Seacoast Canning Co.'s factory No. 2, which hides range mark 14 from view.
 <sup>3</sup> Lubec church spire is on range with boundary course 6-7. It is one of the range marks agreed upon by the commissioners under the convention of 1892.
 <sup>3</sup> A vertical white line, also on range with course 7-8, was painted on a lumber shed which hides range mark 28 from view.

Range Marks Nos.	Latitude and longitude	Azimuth	To Range Mark or Boundary Turning Point	Dis- tance (me- ters)	Range Marks Nos.	Latitude and longitude	Azimuth	To Range Mark or Boundary Turning Point	Dis- tance (me- ters)
Cross - ranging 39 b o u n d a r y turning p o int 40 Ranging bound- ary course 11- 12. Renging bound- ary course 12- 13.	$\begin{array}{c} \circ & \prime & \prime \\ 44 & 50 & 44 & 11 \\ 66 & 58 & 13 & 08 \\ 44 & 50 & 45 & 13 \\ 66 & 57 & 13 \\ 66 & 57 & 30 & 52 \\ 44 & 49 & 05 & 06 \\ 66 & 57 & 27 & 70 \\ 44 & 49 & 53 & 68 \\ 66 & 59 & 28 & 16 \\ 44 & 49 & 54 & 87 \\ 66 & 59 & 39 & 76 \end{array}$	<ul> <li><i>i i i i i i i i i i</i></li></ul>	T. P. 11 Range Mark 40. Range Mark 40. T. P. 11 T. P. 12 Range Mark 42. Range Mark 42. T. P. 11 T. P. 12 T. P. 11 Range Mark 44. T. P. 12 T. P. 13 Range Mark 43. T. P. 13	$\begin{array}{c} 589.3\\ 43.5\\ 632.8\\ 1,246.3\\ 2,853.5\\ 131.5\\ 131.5\\ 1,37.5\\ 2,985.0\\ 257.6\\ 2,018.4\\ 4,635.2\\ 257.6\\ 2,276.0\\ 4,802.8\\ \end{array}$	Ranging bound- ary course 13- 14. Cross-ranging boundary turning point 13. 48	$\begin{array}{c} \circ & , \  ''\\ 44 \ 50 \ 31. \ 15\\ 66 \ 57 \ 28. \ 03\\ 44 \ 50 \ 53. \ 03\\ 66 \ 58 \ 01. \ 04\\ 44 \ 49 \ 50. \ 64\\ 66 \ 55 \ 54. \ 13\\ 44 \ 49 \ 52. \ 53\\ 66 \ 55 \ 53. \ 59\\ \end{array}$	° / " 132 58 58 312 58 58 312 58 58 312 58 34 312 58 34 312 58 34 312 207 191 22 07 11 22 08 11 22 08	Range Mark 46. T. P. 13. T. P. 14. Range Mark 45. T. P. 13. T. P. 14. T. P. 14. Range Mark 48. Range Mark 47. T. P. 13.	990. 7 2, 664. 4 7, 764. 4 990. 7 3, 655. 1 8, 755. 1 577. 5 59. 7 637. 2

RANGE MARKS-PASSAMAQUODDY BAY-Continued

We certify that the foregoing is a true and accurate description and definition of the section of the international boundary line between the United States of America and the Dominion of Canada from the source of the St. Croix River to the Atlantic Ocean, as established by the commissioners and as marked by them on the quadruplicate sets of eighteen accurate modern maps submitted with this report, in accordance with the provisions of Articles I and II of the treaty signed at Washington, April 11, 1908, and of Articles I and II of the treaty signed at Washington, May 21, 1910, between the United States and Great Britain, and of Article III of the treaty signed at Washington, February 24, 1925, between the United States and His Britannic Majesty in respect of the Dominion of Canada.

In witness whereof, we have hereunto set our hands and seals at the City of Washington this ninth day of May, in the year of our Lord one thousand nine hundred and thirty-four.

[SEAL]

His Britannic Majesty's Commissioner.

United States Commissioner.

[SEAL]

# CONCLUSION

It is of importance to note that the section of the international boundary line from the source of the St. Croix River to Passamaquoddy Bay and through Passamaquoddy Bay to the Atlantic Ocean as now established by the commissioners pursuant to existent boundary treaties and as herein described and defined by them is now geodetically fixed in terms of a geodetic datum common to the two countries in interest. Regardless, therefore, of changes which may take place in the shore lines of the boundary waterways and irrespective of the deterioration or displacement of the boundary reference monuments and range marks, the permanency of the position of the line is henceforth assured. This fact, together with the provision made by the two Governments by the treaty of February 24, 1925, for the continuous maintenance of the international boundary line in its present state of effective demarcation, makes it reasonably certain that a complete reestablishment of any portion of the international boundary line will never again be necessary.

The work of the establishment of the St. Croix River and Passamaquoddy Bay sections of the international boundary line was initiated by His Britannic Majesty's Commissioner W. F. King and United States Commissioner O. H. Tittmann in 1908. In conjunction with work on other parts of the international boundary, it was continued successively by Commissioners E. C. Barnard and E. Lester Jones for the United States and by Commissioners J. J. McArthur and J. D. Craig for His Britannic Majesty. The work was completed by the present commissioners, James H. Van Wagenen for the United States and Noel J. Ogilvie for His Britannic Majesty.

Throughout the progress of the work of carrying out the provisions of the boundary treaties, the present commissioners and their predecessors have had the cordial cooperation of other agencies of the two Governments. They refer particularly to the assistance given them by the United States Coast and Geodetic Survey in furnishing its records of hydrographic surveys made of Passamaquoddy Bay and the St. Croix River, and to both the Geodetic Survey of Canada and the United States Coast and Geodetic Survey for first-order and second-order control for the boundary triangulation and for first-order control for the boundary leveling. The commissioners desire to express their appreciation of the excellent work done by the United States Geological Survey in the printing of the boundary maps, and of the many courtesies extended to them by the customs and immigration officials of both countries during the progress of the field work.

The commissioners also desire to express their appreciation of the efficient and conscientious services of all of their assistants who have taken part in the work. They are particularly indebted to Mr. Jesse Hill, engineer to the United States section of the commission, to Mr. J. A. Pounder, D. L. S., engineer to the Canadian section of the commission, to Mr. R. N. Ashmun, mathematician, Mr. Frank H. Brundage, topographic engineer, and Mr. R. L. Ross, cartographer, of the United

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States section of the commission, and to Mr. G. T. Prinsep, D. L. S., and Mr. D. F. Chisholm of the Canadian section of the commission. The competent and pains-taking work done by these men, in the field and in the office, is worthy of the highest commendation.

It is most gratifying to state that throughout the course of the work of carrying out the provisions of the boundary treaties the most cordial relations have existed between the commissioners and between their assistants in both countries, and that their duties have been performed in a spirit of hearty cooperation.

Dellalire

His Britannic Majesty's Commissioner.

Washington, May 9, 1934,

Tan Wagenen

United States Commissioner.



Cedar post set in 1817 and cast-iron monument erected in 1843 to mark the boundary at the source of the St. Croix River (photograph taken in 1908)

#### APPENDIX I

# HISTORICAL SKETCH OF THE INTERNATIONAL BOUNDARY FROM THE SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN

The framers of the boundary treaties of 1783, 1794, and 1814 between Great Britain and the United States were influenced by claims and disputes dating back almost to the earliest discoveries on the continent of America. This historical sketch is presented in order to show to some extent how and why the present boundary has been evolved.

In 1493, after Columbus returned from his first voyage and reported the existence of islands and a continent far to the west, Pope Alexander VI issued a bull defining a line of separation of the spheres of influence of the Kingdoms of Spain and Portugal. The following year these two countries agreed by treaty upon a different line, somewhat near the present meridian 60°. All territories east of this line were to belong to Portugal, while those west of it were to fall within the Spanish sphere. This partition was not recognized, however, by England or France and soon disappeared.

In 1497 John Cabot, under a patent from the King of England, set sail for the west and landed on Cape Breton Island; on the return journey he explored the south coast of Newfoundland. The following year he again crossed the Atlantic and resumed his explorations, and took possession in the name of the King of England of all the coast as far south as latitude 36°, thus establishing a claim on the ground of first discovery.

In 1524 a French expedition under Verrazano, sailing in search of a legendary passage to India, explored the coast from latitude 34° north to Newfoundland. The King of France, still bent upon the discovery of the "Strait of Anian," reported by Marco Polo, sent out Jacques Cartier, who explored the Gulf of St. Lawrence in 1534, and who, during the following year, ascended the river of that name.

In 1583, by which time any titles or claims of Spain and Portugal had disappeared, the English took formal possession of Newfoundland and the coast as far south as Cabot's discoveries had extended. King James I granted to the London Company in 1606 the right to form settlements 100 miles square in the territory between parallels 34° and 41°, and to the Plymouth Company the right to form similar settlements in the territory between parallel 38° and parallel 45°. This last-named parallel forms part of our boundary of the present day.

In the meantime, France also claimed territory about the St. Lawrence, basing her claim on Cartier's voyages of 1534 and 1535; and Henry IV of France gave a charter to De Monts in 1603 for the seacoast and territory of America lying between parallels 40° and 46°, under the name "Acadia." It will be noted that the territory granted in 1606 by the charter of the Plymouth Company overlapped this area which had been granted by France three years before, and it was not long before trouble arose between the two countries.

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De Monts, who had Champlain with him as geographer, sailed for Acadia in 1604. He built a fort on an island near the mouth of the St. Croix River, later abandoning it in favor of Port Royal, or Annapolis, as it is now called. Port Royal was captured and destroyed by the English in 1613, although they did not formally lay claim to Acadia, which, at that time, included the present Provinces of Nova Scotia and New Brunswick and a part of the State of Maine.

However, King James I of England in 1620 gave a charter to the Council for New England, granting them territory from parallel 40° to parallel 48°, and this grant was not only for the coast region but for the interior of the continent to the Pacific Ocean.

The following year, 1621, a grant was made which has had a great effect on the international boundary as it exists to-day. This was a grant of Nova Scotia given by King James to Sir William Alexander. The part of his charter which describes this grant reads as follows:<sup>1</sup>

··\* \* \* do give, grant and convey to the aforesaid Sir William Alexander, his heirs or assigns, hereditarily, all and single, the lands of the Continent and islands situated and lying in America, within the head or promontory commonly called Cape of Sable, lying near the fortythird degree of north latitude or thereabouts; from this Cape, stretching along the shores of the sea, westward to the roadstead of St. Mary, commonly called St. Mary's Bay, and thence northward by a straight line, crossing the entrance, or mouth, of that great roadstead which runs towards the eastern part of the land between the countries of the Suriqui and Etchimine, commonly called Suriquois and Etchimines, to the river generally known by the name St. Croix, and to the remotest springs, or source, from the western side of the same, which empty into the first mentioned river; thence by an imaginary straight line, which is conceived to extend through the land, or run northward to the nearest bay, river, or stream emptying into the great river of Canada; and going from that eastward along the low shores of the same river of Canada to the river, harbor, port, or shore, commonly known and called by the name Gathepe or Gaspie, and thence south-southeast to the isles called Bacalaos or Cape Breton, leaving the said isles on the right, and the mouth of the said great river of Canada, or large bay, and the territory of Newfoundland, with the islands belonging to the same lands on the left; thence to the headland, or point of Cape Breton aforesaid, lying near latitude forty-five degrees or thereabouts; and from the said point of Cape Breton toward the south and west to the above mentioned Cape Sable, where the boundary began; including and containing within the said coasts and their circumference, from sea to sea, all lands of the continent with the rivers, falls, bays, shores, islands, or seas, lying near or within six leagues on any side of the same on the west, north or east sides of the same coasts and bounds and on the south-southeast (where Cape Breton lies) and on the south side of the same (where Cape Sable is) all seas and islands southward within forty leagues of said seashore, thereby including the large island commonly called Isle de Sable or Sablon, lying towards Carban, in common speech south-southeast about thirty leagues from the said Cape Breton seaward and being in latitude forty-four degrees or thereabouts

"\* \* \* And if any questions or doubts shall arise on the meaning and construction of any clause in our present charter, all these shall be taken and explained in their amplest form and in favor of the said Sir William Alexander and his aforesaids."

On the best map of the time, Champlain's map of 1612, two features are very prominently marked: the St. Croix River flowing into the "Baye Francoise" or Bay of Fundy; and a large unnamed river (which does not exist), north of the St. Croix, flowing into the St. Lawrence River. As the heads of these two rivers, as shown on the map, are very close to each other, it was probably considered that they, being natural features easily identified, would make a better boundary for the grant to Alexander than an artificial line, the location of which was unknown.

<sup>&</sup>lt;sup>1</sup> Sir John Bourinot. "Builders of Nova Scotia."

#### HISTORICAL SKETCH

This grant encroached on territory previously granted to the Council for New England and, also, included the south shore of the St. Lawrence River, which was of course claimed by France. The council, however, waived its right to lands covered by the grant and, also, in 1628 gave a grant to the governor and company of Massachusetts Bay.

War which broke out between England and France in 1627 resulted in the capture by the English of Quebec and Port Royal, which latter place the French had reoccupied after its destruction by the English in 1613.

The convention of Susa, agreed to in 1629, provided that France was to regain her American possessions, and this agreement was formally ratified by the treaty of St. Germain in 1632, by which England agreed to restore to France all the places occupied by her in New France, Acadia, and Canada. France assumed that under the convention all Acadia would be hers, and acting on this assumption gave grants of land therein and proceeded to take possession of the forts and trading posts.

Some time later, in 1638, in consequence of a dispute between La Tour and Charnisay, two lieutenants of France, regarding their respective territories, the King of France granted to the latter as his territory the present Province of New Brunswick and part of the present State of Maine, described as the coast of the Etchimins; and to the former the present Province of Nova Scotia, designated as Acadia. Thus territory under the name Acadia was confined to the peninsula, instead of to the entire territory as formerly. Ten years later, Charnisay was made governor of Acadia by letters patent, and in these documents Acadia is described as extending from the shore of the St. Lawrence River to Virginia.

The contradiction between the descriptions of Acadia in these two cases shows how a name was sometimes applied to one tract of country and sometimes to a quite different one; and thus boundary disputes easily arose over the interpretation of treaties in which such names occurred.

Some French documents of a few years later refer to Acadia as including the mainland to the Penobscot River, as well as the peninsula. In the documents describing a grant made by Sir William Alexander in 1630 within his own territories, Acadia is referred to as if it formed only a part of the peninsula.

It has already been noted that after the convention of Susa, France occupied the forts and trading posts of Acadia and evidently considered the entire country to have been restored to her by the treaty of St. Germain. Nevertheless King Charles of England directed Alexander to continue with his scheme of colonization, claiming that he had never meant to relinquish the entire country. The Council for New England, therefore, gave patent in 1635 to Lord William Alexander, to whose father Nova Scotia had been granted, for lands to be known as the County of Canada, extending along the coast from the Pemaquid River to the St. Croix River, and north to the St. Lawrence River. This territory and an addition to it were transferred to the father on the death of his son.

In 1654 an English expedition under orders from Cromwell seized all the French posts between the Penobscot River and Canso. The next year the treaty of Westminster provided that commissioners should be appointed to decide which country should retain the three forts, Penobscot, St. John, and Port Royal, but whether these commissioners ever made any report is uncertain. At any rate, Cromwell, in 1656, assumed England to be entitled to all Acadia and, ignoring any rights of Alexander, gave to Temple, Crowne, and La Tour a grant comprising rather more than Alexander's Nova Scotia and County of Canada together.

In the document conferring this grant, Acadia is referred to as a part only of the peninsula, and is differentiated from Nova Scotia; and this document was later made use of by the French in the English-French boundary disputes.

In 1663 King Charles II of England, ignoring any rights of France to the territory in question under the treaty of St. Germain, or of Temple, Crowne, and La Tour under the grant from Cromwell, gave a grant to his brother, the Duke of York, comprising practically the same territory as Alexander's County of Canada. This grant later became known as the territory of Sagadahock.

While England thus laid claim to part of the south bank of the St. Lawrence River, as being included in her territories known as Acadia, Nova Scotia, or County of Canada, France was in actual possession and seems to have regarded it as part of New France and not of Acadia, even when her title to the latter was undisputed. Commissions to governors of Quebec of that period place under their jurisdiction the south bank of the St. Lawrence to a depth of 10 leagues.

War broke out again between England and France, and the treaty of Breda in 1667, which brought the dispute to a close, provided that Acadia should be restored to France. The next year King Charles ceded all Acadia to the King of France, and in particular the forts of Penobscot, St. John, Port Royal, La Havre, and Cape Sable. He also sent orders to Temple, who had bought out the rights of Crowne and La Tour, to surrender Acadia, including these forts to the French; and, after some delay and objection, this was done. In spite of this transfer of Acadia, which included territory to the Penobscot River, King Charles, in 1674, confirmed the grant of Sagadahock to the Duke of York.

In the meantime the French gave seignorial grants, some of which were in the present State of Maine, and most of these grants were described as being in Acadia.

A treaty of neutrality in 1686, between England and France, confirmed the right of each country to places in America which were then in their actual possession. While this treaty would seem to confirm the title of France to territory as far as the Penobscot River, England later maintained that it wiped out earlier rights, replacing them by one based on occupation.

Notwithstanding these treaties, England continued to claim Sagadahock, and trouble arising in consequence of the attempts of the English to occupy it, they seized Port Royal again in 1690. The next year a new charter was granted to Massachusetts, in which Nova Scotia, or Acadia, and Sagadahock were annexed to that Province.

The war was brought to a close in 1697 by the treaty of Ryswick. By this treaty all the possessions which the French held before the war were to be restored to them, and commissioners were to be appointed to fix the boundary between the English and French territories.

Massachusetts claimed Sagadahock under her recent charter; the French claimed that Acadia extended to the Kennebec River; and the commissioners were apparently going to make the St. Georges River, between the Kennebec and the Penobscot, the boundary; but before anything was definitely settled war broke out again in 1702. It was brought to a close in 1713 by the treaty of Utrecht, by which Acadia was ceded to England.

Part of the treaty which describes the territory to be transferred reads:

"\* \* \* Nova Scotia, otherwise called Acadia, in its entirety, conformably to its ancient limits as also the town of Port Royal now called Annapolis Royal and generally of all depending upon the said lands and islands of this country, \* \* \* ."

This treaty only paved the way for a series of boundary disputes.

The French, previous to the treaty of Utrecht, had claimed that Acadia extended to the Kennebec River, or at least to the Penobscot, but now they claimed that the Acadia of the treaty was limited to a part of the peninsula, and continued to occupy the mainland. No real efforts appear to have been made to settle the question until 1748, when the treaty of Aix-la-Chappelle provided that commissioners should be appointed to determine the boundaries of Acadia.

The English commissioners claimed that the Nova Scotia, or Acadia, of the treaty of Utrecht was the Acadia of the period immediately preceding, and that it included the mainland to the Kennebec River, and they were able to cite many French documents, grants, and charters in support of this claim. They also pointed out that in the treaty of Utrecht the words "Nova Scotia" and "Acadia" were names used to refer to the same territory, and that the French previous to and during the preliminary negotiations preceding the treaty considered Acadia as including the mainland as far as the Kennebec; and they contended that this should decide what was meant by the name "Acadia" or "Nova Scotia" in the treaty.

They also contended that the territory called Acadia or Nova Scotia extended to the St. Lawrence River, citing in support the grant of Nova Scotia to Alexander and the subsequent extension of his territory to the Kennebec River.

The French commissioners took advantage of the words "Acadia within its ancient limits," mentioned in the treaty, and maintained that the territory lately called "Acadia" by them or by the English was not the Acadia of the treaty; that the Acadia of the treaty was an ancient Acadia which included only a part of the peninsula. They pointed out that a part of the peninsula had been called Acadia from the earliest times, but that the remainder of the territory claimed by England as Acadia had in those times been called by many names, New France, Canada, Norumbegue, Etchimins, Baye Francoise, Acadia, Grand Baye of St. Lawrence, and Gaspesie, and quoted several documents to show that New France and Acadia were distinct places.

With regard to the English contention that in the treaty of Utrecht, "Nova Scotia" and "Acadia" were synonymous, the French commissioners maintained that what the English had in the past called "Nova Scotia" was a matter of indifference to them, as France had never had a colony called "Nova Scotia" and could not cede what she never had; and that, as the territory always had legally belonged to France, previous to the treaty of Utrecht, the name Nova Scotia was of no real significance, but was invented by the English to sustain claims to the country.

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They also stated that the English commissioners "confound, throughout their memoir, the ideal Nova Scotia of 1621 with the Nova Scotia of the treaty of Utrecht, and both of them with Acadia without distinction of ancient limits in order to extend thereby their pretensions to everything, in whatsoever period, which can be designated by the name of Nova Scotia or Acadia."

They quoted many documents to prove that the south bank of the St. Lawrence River had always been part of Canada, and not of Acadia, and that the governors of Canada had always exercised jurisdiction over it.

The commissioners, after debating the questions for over four years, were unable to agree on any boundary, though it is probable that England was willing to abandon her claim to the south bank of the St. Lawrence. Nothing was done, however. War broke out again, and the dispute was finally settled by the treaty of Paris in 1763, by which Canada and Acadia were ceded to England.

In the meantime, in 1719, Nova Scotia had been created a separate Province; and while France and England were disputing as to whether the mainland had been ceded to England by the treaty of Utrecht, Nova Scotia and Massachusetts had a boundary dispute of their own over the division between them of this same territory, and this latter dispute had its effect on the boundary claims of later times.

Massachusetts continued to claim Sagadahock, annexed to her in 1691, but Nova Scotia maintained that her territories included all the old Acadia and, therefore, to the St. Georges River. The commissions to the governors of Nova Scotia between 1719 and 1763 do not give any boundaries for the province, but simply call it Nova Scotia, or Acadia.

The Nova Scotia authorities went so far as to have land surveys made west of the St. Croix River and continued to claim this territory until 1762, when Massachusetts proposed that they should come to an agreement about the boundary. However, Nova Scotia considered that such a question should be settled by the Crown. The governors of the two provinces then agreed to make no further grants of land in the disputed territory until the boundary was fixed, which was not done until after the treaty of Paris.

Article IV of the treaty of Paris of 1763, by which France gave up all claim to Canada and Acadia, reads as follows:

"His Most Christian Majesty renounces all pretensions which he has heretofore formed. or might form, to Nova Scotia or Acadia, in all its parts, and guarantees the whole of it, and with all its dependencies, to the King of Great Britain: moreover his Most Christian Majesty cedes and guarantees to His said Britannic Majesty, in full right, Canada, with all its dependencies, as well as the island of Cape Breton, and all the other islands and coasts in the Gulf and River St. Lawrence and in general, everything that depends on the said countries, lands, islands and coasts, with the sovereignty, property, possession and all rights acquired by treaty or otherwise which the said Most Christian King and the Crown of France have had till now over the said countries, lands, islands, places, coasts, and their inhabitants, so that the most Christian King cedes and makes over the whole to the said King and to the Crown of Great Britain, and that in the most ample manner and form, without restriction and without any liberty to depart from the said cession and guaranty under any pretence, or to disturb Great Britain in the possessions above mentioned \* \* \*"

Now that France was no longer in possession of Canada, England, although she had in her boundary disputes with France maintained that the Provinces of

#### HISTORICAL SKETCH

Massachusetts and Nova Scotia extended to the St. Lawrence, was no longer desirous that they should do so. In 1763 a royal proclamation creating the new Province of Quebec included all the south bank of the St. Lawrence in that province.

In the royal proclamation, the southern boundary of the new province is described as follows:

"\* \* \* from whence the said line crossing the river St. Lawrence and the Lake Champlain, in 45° of North Latitude, passes along the Highlands which divide the rivers that empty themselves into the said river St. Lawrence from those which fall into the sea; and also along the north coast of the Baye des Chaleurs \* \* \*"

A portion of this boundary was soon afterwards determined, and has remained the boundary until the present day.

The southern boundary of Quebec became the northern boundary of Massachusetts and Nova Scotia. The commission to Montague Wilmot in 1763, as governor of Nova Scotia, reads in part:

"To the northward our said province shall be bounded by the southern boundary of our Province of Quebec, as far as the western extremity of the Baye des Chaleurs, to the eastward by the said Bay and the gulf of St. Lawrence to the Cape or Promontory called Cape Breton in the Island of that name including that Island, the Island of St. John's, and all other Islands within six leagues of the coast, to the southward by the Atlantic Ocean from the said Cape to Cape Sable including all other islands within forty leagues of the coast, with all the rights, members and appurtenances whatever thereunto belonging and to the westward, although our said province hath anciently extended and doth of right extend as far as the River Pentagoet or Penobscot, it shall be bounded by a line drawn from Cape Sable across the extrance of the Bay of Fundy to the mouth of the river St. Croix, by the said river to its source and by a line drawn due north from thence to the southern boundary of our Colony of Quebec."

In 1764 Massachusetts was offered the territory up to the St. Croix River and a line drawn due north from its source, if she would waive her claim to any portion of the south bank of the St. Lawrence River, which the Crown, as had been shown in the royal proclamation, wished to include in the new Province of Quebec.

Apparently Massachusetts agreed informally to this, for the right of Quebec to the south bank of the St. Lawrence River was not disputed, nor was that of Massachusetts to the territory up to the St. Croix River; and all commissions to governors of Nova Scotia, subsequent to 1763, made the St. Croix River and a north line from its source the western boundary, without mentioning that that province of right extended to the Penobscot River.

While, as we have seen, the St. Croix River was decided upon as the boundary between Massachusetts and Nova Scotia, its location was left undetermined. In 1764, Governor Bernard, of Massachusetts, sent two surveyors, Mitchel and Jones, to survey Passamaquoddy Bay, and to determine and survey the St. Croix River and a pond at its head.

Mitchel identified the Magaguadavic as the St. Croix, on the sworn testimony of three Indians of the locality to that effect. He made a survey of this river to Second Falls and also of Lake Utopia and of Passamaquoddy Bay. A copy of the map made by Mitchel as a result of this survey, annotated by Governor Bernard, as well as some correspondence of the latter with Governor Wilmot, show that Bernard did not accept Mitchel's idea based on the testimony of the Indians that the river they pointed out, the present Magaguadavic, was the St. Croix.

#### APPENDIX I

Testimony taken some years later seems to show that both the present Magaguadavic and St. Croix, and even the Cobscook, were known prior to that time to some of the inhabitants of the district as the St. Croix. Bernard at the time decided that the present Digdeguash was the St. Croix, calling the present St. Croix the Passamaquoddy and identifying it with a river called Riviere des Etchemins by Champlain. As aforesaid, he communicated his views on the subject to Governor Wilmot, of Nova Scotia.

In 1765 Governor Wilmot sent the surveyor general of Nova Scotia, Charles Morris, to survey Passamaquoddy Bay. On the strength of the testimony of Indians and by a comparison of his surveys with Champlain's description of the St. Croix, which had been furnished by Governor Bernard, Morris decided that the Cobscook was the only river that could be the St. Croix. However, no actual decision as to what river was the St. Croix was made by responsible authorities previous to the Revolutionary War.

The War of the American Revolution was brought to a close by a treaty signed at Paris in 1783. Part of Article II of this treaty is as follows:

"And that all disputes which might arise in future, on the subject of the boundaries of the said United States may be prevented, it is hereby agreed and declared, that the following are and shall be their boundaries, viz: From the northwest angle of Nova Scotia, viz: that angle which is formed by a line drawn due north from the source of the Saint Croix River to the Highlands; along the said Highlands which divide those rivers that empty themselves into the river St. Lawrence from those which fall into the Atlantic Ocean, to the northwesternmost head of Connecticut River; thence down along the middle of that river, to the forty-fifth degree of north latitude; from thence, by a line due west on said latitude until it strikes the river Iroquois or Cataraquy; \* \* \* East by a line to be drawn along the middle of the river St. Croix from its mouth in the Bay of Fundy to its source, and from its source directly north to the aforesaid Highlands, which divide the rivers that fall into the Atlantic Ocean from those which fall into the river St. Lawrence; comprehending all islands within twenty leagues of any part of the shores of the United States, and lying between lines to be drawn due east from the points where the aforesaid boundaries between Nova Scotia on the one part and East Florida on the other, shall respectively touch the Bay of Fundy and the Atlantic Ocean; excepting such islands as now are, or heretofore have been, within the limits of the said province of Nova Scotia."

With regard to the portion of the boundary at present under discussion, the United States negotiators of the treaty, under instructions from their Government, tried to secure the St. John River from mouth to source as a boundary, but to this the English negotiators would not agree. The English, on their part, attempted to secure as boundary, first the Piscatqua River, then the Kennebec, and then the Penobscot, but the American negotiators would not agree to any of those rivers as the boundary.

Finally all agreed that the former boundary between Massachusetts and Nova Scotia, the St. Croix River, should continue to be the new boundary. This was held to be in agreement with the old boundary of Sir William Alexander's Nova Scotia of 1621 and with the boundary of Massachusetts Bay under the charter of 1691.

It will be noted that the wording of the description of this portion of the boundary agrees closely with the wording of the description of the western boundary of the Province of Nova Scotia as given in the commission to Wilmot in 1763 and subsequent commissions.

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#### HISTORICAL SKETCH

In spite of the hope of the negotiators of the treaty of 1783, that future boundary disputes might be avoided, and the care taken in describing the boundaries to that end, disputes did arise because the location of the boundary as defined by the treaty was unknown and undetermined.

With regard to the portion of the boundary between the Atlantic coast and the source of the St. Croix river, the treaty failed to define or make clear what islands were formerly within the limits of Nova Scotia and what river was the River St. Croix.

A dispute about the identity of the St. Croix arose very soon after the treaty of 1783, for royalist refugees settled near St. Andrews, and the State of Massachusetts claimed that they were on United States territory.

The Nova Scotia authorities maintained that the present St. Croix, known locally at that time as the Scoodic, was the St. Croix of the treaty and of earlier periods; they had apparently abandoned the opinion held a few years before that the Cobscook was Champlain's St. Croix.

Massachusetts, in 1784, appointed a committee to investigate the question. This committee visited Passamaquoddy Bay and made inquiries in that district; they also secured the evidence of John Jay, one of the negotiators of the treaty of 1783, and of Mitchel, who had formerly, as we have seen, identified the Magaguadavic with the St. Croix. As a result of this investigation, the committee made a report in which it was admitted that Mitchell's map of 1755 used by the negotiators of the treaty was somewhat inaccurate, yet they claimed on the evidence they had obtained that the Magaguadavic was the St. Croix of the treaty of 1783.

The Governor of Massachusetts wrote to the Governor of Nova Scotia informing him of the report of this committee, and suggested that he recall those British subjects who had settled west of the Magaguadavic.

The Province of New Brunswick had been created in 1784, and this letter was forwarded to its governor. In his reply to the Governor of Massachusetts he claimed that the Scoodic was the St. Croix of the treaty of 1783; which opinion, he had been informed, would be maintained by the Government of Great Britain.

Other suggestions and proposals with regard to this question were made in the next few years, but nothing definite was done until 1794, when, after lengthy negotiations, a treaty commonly known as Jay's treaty was signed, providing for a commission to determine the St. Croix River.

The treaty reads in part as follows:

"Whereas doubts have arisen what river was truly intended under the name of the River St. Croix, mentioned in the said treaty of peace, and forming a part of the boundary therein described; that question shall be referred to the final decision of commissioners to be appointed in the following manner, viz: \* \* \* The said commissioners shall, by a declaration, under their hands and seals, decide what river is the river St. Croix intended by the treaty. The said declaration shall contain a description of the said river, and shall particularize the latitude and longitude of its mouth and of its source \* \* \* And both parties agree to consider such decision as final and conclusive, so that the same shall never hereafter be called into question, or made the subject of dispute or difference between them."

The United States commissioner was David Howell, of Rhode Island; the British commissioner, Thomas Barclay, of Annapolis. Each Government was represented by an agent; the United States by James Sullivan, of Massachusetts,

#### APPENDIX I

and Great Britain by Ward Chipman, solicitor general of New Brunswick. The first meeting of the commission took place at Halifax in 1796, when the agents were advised to have surveys made of the rivers claimed by them to be the St. Croix. Also, at this meeting the two commissioners agreed upon a third commissioner, Egbert Benson, of New York.

The full commission met shortly afterwards in St. Andrews, when the agents filed their claims for their respective Governments, Sullivan claiming the Magaguadavic as the St. Croix—Chipman, the Scoodic. The commissioners visited both rivers, and the respective agents attempted to identify the Isle St. Croix described by Champlain. The testimony of Indians and white settlers as to what river had been known as the St. Croix was also secured. The commission then adjourned until the surveys could be completed.

They met again at Boston in 1797, when the agents presented their respective arguments. Sullivan, the United States agent, claimed that the decision as to what river was the St. Croix of the treaty should not of necessity depend upon the identification of a river with the historic St. Croix. He maintained that the Nova Scotia of 1783, owned by England and mentioned in the treaty, had no connection with the Nova Scotia granted to Alexander in 1621, since all territory east of Massachusetts had been granted to Massachusetts Bay in 1691, and that that territory was first limited by the treaty of 1783. As a deduction from this, he claimed that the St. Croix of the treaty was not the St. Croix described by Champlain, but a new St. Croix brought into existence by the treaty.

He stated that inasmuch as the negotiators of the treaty had made use of Mitchell's map of 1755, the river to be identified was the St. Croix River of that map, which was shown thereon as being the easternmost of those rivers flowing into Passamaquoddy Bay. He claimed that when the United States negotiators of the treaty of 1783 abandoned their claim to the St. John River as the boundary they insisted upon the St. Croix River, the first river shown on Mitchell's map west of the St. John, and that that river, the St. Croix of Mitchell's map, was the river to be determined, and he maintained that this was the Magaguadavic.

Chipman, the British agent, maintained on his part that the St. Croix of the treaty of 1783 was the historic St. Croix described by Champlain and mentioned as the boundary of Nova Scotia in the charter granting that Province to Sir William Alexander in 1621. He, of course, identified the Scoodic as the St. Croix.

Subsequent to the hearing of these arguments the commission obtained the evidence of John Jay and John Adams, two of the negotiators of the treaty of 1783. They testified that the St. Croix, which the negotiators of the treaty intended to make the boundary, was the St. Croix which was the former boundary of Massachusetts Bay. They stated that this was supposed to be the St. Croix marked on Mitchell's map, but that no attention had been paid to the fact that the map might be inaccurate.

In the meantime a copy of the edition of 1613 of Champlain's Voyages had been obtained from Europe, permitting the commission to have a fuller description of the St. Croix River and Isle St. Croix according to Champlain than they had had hitherto.





HISTORICAL SKETCH

Chipman, the British agent, had excavations made on Bone, or Dochet, Island, a short distance up the Scoodic from its mouth, and remains of an ancient settlement were found. This island was also surveyed, and a map of it was found to correspond closely with Champlain's descriptions of Isle St. Croix. Chipman claimed that this and the relics found upon the island identified it as Isle St. Croix and that, therefore, the Scoodic was the St. Croix River.

As the surveys were still unfinished in 1797, the commission adjourned until June, 1798, when they again adjourned for the same reason until September of that year.

They then heard anew the arguments of the agents and gave their decision. This was to the effect that the river intended under the name of the River St. Croix in the treaty of peace of 1783, forming a part of the boundary therein described, had its mouth in Passamaquoddy Bay at Joes Point, in north latitude  $45^{\circ}$  05' 05'' and in longitude  $67^{\circ}$  12' 30'' west.

They decided that the boundary should follow the northern or Chiputneticook Branch to its source, which point was marked by the commission's surveyors.

A map of the river was compiled from the surveys made by order of the commissioners and from various earlier surveys, and a copy, upon which the commissioners designated the River St. Croix, was annexed to the report. A copy of a portion of this map appears opposite the following page.

Although the commissioners did not submit any report showing their reasons for their decisions on various points, these are known from other sources, such as correspondence and a report made by Commissioner Benson to the President of the United States.

The commissioners rejected the claim that the river intended by the treaty of 1783 to be the St. Croix must be the St. Croix of Mitchell's map, and decided that it was the historic St. Croix described by Champlain, the boundary of Alexander's grant of 1621 and of Massachusetts Bay in 1691. They decided that Dochet or Bone Island was the only island which agreed with Champlain's maps and descriptions of Isle St. Croix; that the finding of the relics verified this, and that, therefore, the Scoodic River, in which Dochet Island is, was the St. Croix.

In spite of the wishes of the United States agent that the mouth of the river should be fixed among the islands of Passamaquoddy Bay, the commissioners held that that bay was part of the Bay of Fundy and that to define the boundary among its islands exceeded their authority. For that reason, and in agreement with Champlain, they fixed the mouth of the river at Joes Point. On some other points they were not all in agreement, and their final verdict was, in part at any rate, in the nature of a compromise.

After the commissioners had decided that the St. Croix of the treaty of 1783 was the St. Croix of Champlain and of Alexander's grant, the British agent claimed that the words in Alexander's charter, "to the remotest springs or source from the western side of the same which empty into the first mentioned river," would indicate the most western source of the Scoodic branch. The United States agent claimed that they meant the most remote spring entering from the western side, or the most western source of the Chiputneticook.

The British agent claimed that a due north line from that point would not reach such highlands as are described in the treaty, while one from the source of

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the western branch of the Scoodic would, but on this point he was in error, as a modern map will show. The United States agent claimed that this point was irrelevant, and his contention was sustained by the commission.

The British commissioner, Barclay, gave the opinion that the western branch to its extreme source should be the boundary in accordance with the treaty. Benson concurred in this, but not to the extreme source; only to the outlet of the lake from which it flowed. Howell, the United States commissioner, thought that the Chiputneticook branch should be chosen and that the principle suggested by Benson should be applied to it.

Barclay and Benson finally agreed to the outlet of the easternmost of the Scoodic Lakes as the source of the St. Croix, with Howell dissenting. A line north from this point would have inclosed in New Brunswick some United States grants lying between the two branches and would have inclosed in the United States the Grand Falls of the St. John River and a British military post at Presque Isle. The United States agent proposed, and the British agent, with the consent of the British Ambassador, Mr. Liston, agreed, that the extreme source of the Chiputneticook should instead be chosen, whereupon this alteration was agreed to by all the commissioners and their decision accordingly rendered.

The following reference to the islands in Passamaquoddy Bay is contained in the second article of the treaty of 1783:

" \* \* \* comprehending all islands within twenty leagues of any part of the shores of the United States, and lying between lines to be drawn due east from the points where the aforesaid boundaries between Nova Scotia on the one part, and East Florida on the other, shall respectively touch the Bay of Fundy and the Atlantic Ocean; excepting such islands as now are, or heretofore have been, within the limits of the said Province of Nova Scotia."

On referring to any modern map it will be found that Grand Manan Island, nearly all the islands in Passamaquoddy Bay, and some of the islands outside, lie south of a line drawn due east from the mouth of the St. Croix and within 20 leagues of the United States. These islands would therefore belong to the United States were it not for the clause of the treaty "excepting such islands as now are, or heretofore have been, within the limits of the said Province of Nova Scotia."

Previous to the treaty of 1783 Nova Scotia had exercised jurisdiction over some of the islands in question. In 1764 Nova Scotia included Moose Island in a grant of land lying between the Cobscook and the Scoodic made to Governor Bernard of Massachusetts and others; in 1767 a grant was made of Campobello and Deer Islands and the right to grant Grand Manan Island was assumed. In addition Nova Scotia had held courts at Campobello and St. Andrews, which had exercised jurisdiction over Moose Island and the other islands thereabouts.

While Massachusetts had never exercised jurisdiction over these islands previous to the treaty of 1783, immediately after the treaty was concluded she laid claim to Moose, Dudley,<sup>2</sup> and Frederick <sup>3</sup> Islands. In 1784 the islands were surveyed by order of the State and Dudley Island was later sold.

Similarly in 1785 and 1786 the newly erected Province of New Brunswick claimed these last three islands by including them in Charlotte County and the

<sup>&</sup>lt;sup>2</sup> Now called Treat Island.

<sup>&</sup>lt;sup>3</sup> Now called Dudley Island. The old names have been retained throughout this appendix.

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#### HISTORICAL SKETCH

Parish of West Isles. Some of the inhabitants of Moose Island were summoned by the sheriff of Charlotte County to serve as jurymen at the court of St. Andrews, New Brunswick. The Governor of Massachusetts protested this action to the Governor of New Brunswick, but the inhabitants of Moose Island were occasionally impressed for jury service at St. Andrews until 1791, when Massachusetts surveyed Moose Island and subdivided it into lots, granted these to any of the inhabitants who would take the oath of allegiance to the United States, and collected taxes from some of them.

In the meantime negotiations for a settlement of the question of the nationality of the islands had been opened in London by the United States ambassador, but nothing definite was accomplished.

No further negotiations regarding the islands were undertaken until after the St. Croix Commission had given its decision, for, of course, the decision as to what river was intended as the St. Croix River by the treaty of 1783 would greatly affect any decision that might be made concerning the islands. As has been stated, the United States agent before the St. Croix Commission requested that body to fix the mouth of the St. Croix River among the islands, thus determining their ownership, but the commissioners decided that the mouth of the St. Croix was at Joes Point and that to decide upon the ownership of the islands exceeded their authority.

Negotiations were resumed again in London and a convention was concluded in 1803 by which the boundary was to be drawn from the mouth of the St. Croix, as recently determined, through the channel between Deer Island and Moose Island, and thence out into the Bay of Fundy, passing around the northeastern end of Campobello Island. All islands north and east of this line were to belong to Great Britain, and all those south and west of it were to belong to the United States except Campobello Island, which was to belong to Great Britain. The question of ownership of Grand Manan Island apparently was not discussed.

Just what complications might have arisen from this decision, which would have given to one country an island within the boundaries of another, can only be surmised but, perhaps fortunately, the convention was not ratified.

Similar negotiations were attempted in 1807 but nothing was accomplished; and all efforts to determine the ownership of the islands were abandoned until after the close of the War of 1812 between Great Britain and the United States.

During the war Eastport, Me., was captured and occupied by British forces. The negotiations which led up to the treaty of peace signed at Ghent on December 24, 1814, were based on the general agreement that territory captured by either party from the other during the war should be restored. Nevertheless it was specifically provided that any islands of Passamaquoddy Bay which had previously been claimed by both parties should remain in the possession of the party occupying them at the time of the exchange of the ratifications of the treaty, without prejudice to the rights of either party, until the ownership should be settled.

Article IV of the treaty of Ghent provided that the question of ownership was to be decided by two commissioners (one appointed by each Government) according to the evidence submitted to them by agents selected by both countries. This article also provided that if they could not agree on a decision the question was to be referred to some friendly ruler or State.

The United States commissioner was John Holmes, of Massachusetts, and the agent, James T. Austin, of the same State. The commissioner for Great Britain was Thomas Barclay and the agent, Ward Chipman, both of whom had served in similar capacities on the St. Croix Commission. Chipman was aided by his son, Ward Chipman, jr.

The first meeting of the commission was held at St. Andrews in September, 1816, when the two agents presented their formal claims. Chipman claimed for Great Britain all the islands in Passamaquoddy Bay and Grand Manan Island, also as having been a part of the Nova Scotia which had been granted to Alexander in 1621 and as having been under the jurisdiction of that Province ever since. Austin claimed for the United States all the islands in Passamaquoddy Bay and Grand Manan Island, as having been annexed to Massachusetts in 1691 and as never having been taken from her or given up.

The next meeting was held in Boston in June, 1817, when the agents presented their complete arguments in support of their claims.

The British agent again claimed for Great Britain all the islands in Passamaquoddy Bay, as well as Grand Manan Island, on the ground that they had been a part of the Nova Scotia granted to Alexander in 1621, which he maintained was identical with the Nova Scotia of the treaty of 1783, and that therefore their nationality was fixed by provisions of the second article of the treaty of 1783, "excepting such islands as now are, or heretofore have been, within the limits of the said province of Nova Scotia." He pointed out that Alexander's Nova Scotia was intended to include all islands within six leagues of the coasts, or of the circumference of the coasts, of Nova Scotia, and that the charter given to Alexander provided that doubtful cases were to be decided in his favor. He submitted evidence to show that, prior to the treaty of 1783, the islands had been under the jurisdiction of Nova Scotia and that Massachusetts had not exercised authority there up to that time; he also maintained that the first claim of the United States to Grand Manan Island was made in 1806 by Secretary of State Madison.

The United States agent again claimed for the United States the islands in Passamaquoddy Bay and Grand Manan Island on the ground that the Nova Scotia of 1783 was not the same Nova Scotia granted to Alexander in 1621; that when Nova Scotia was included in the territories belonging to Massachusetts under the new charter given to that colony in 1691 the islands also were included and that these were not taken away when Nova Scotia was again created a separate province in 1719, and that they therefore were not to be considered in that class of islands to which the exception in the treaty of 1783 refers.

The commission next met in September of the same year, when the agents' replies to each other's arguments were heard. Both agents desired a further hearing, but the commissioners decided that another hearing was unnecessary and on November 24 gave their decision, which was as follows:

#### HISTORICAL SKETCH

# DECISION OF THE COMMISSIONERS UNDER THE FOURTH ARTICLE OF THE TREATY OF GHENT. NOVEMBER 24, 1817

"By Thomas Barclay and John Holmes, Esquires, Commissioners, appointed by virtue of the fourth article of the treaty of peace and amity between His Britannic Majesty and the United States of America, concluded at Ghent on the twenty-fourth day of December, one thousand eight hundred and fourteen to decide to which of the two contracting parties to the said treaty the several islands in the Bay of Passamaquoddy, which is part of the Bay of Fundy, and the Island of Grand Menan, in the said Bay of Fundy, do respectively belong, in conformity with the true intent of the second article of the treaty of peace of one thousand seven hundred and eighty-three between His said Britannic Majesty and the aforesaid United States of America.

"We, the said Thomas Barclay and John Holmes, Commissioners as aforesaid, having been duly sworn impartially to examine and decide upon the said claims according to such evidence as should be laid before us on the part of His Britannic Majesty and the United States, respectively, have decided, and do decide, that Moose Island, Dudley Island, and Frederick Island, in the Bay of Passamaquoddy, which is part of the Bay of Fundy, do, and each of them does, belong to the United States of America; and we have also decided, and do decide, that all the other islands, and each and every [one] of them in the said Bay of Passamaquoddy, which is part of the Bay of Fundy, and the Island of Grand Menan, in the said Bay of Fundy, do belong to His said Britannic Majesty, in conformity with the true intent of the said second article of said treaty of one thousand seven hundred and eighty-three.

"In faith and testimony whereof we have set our hands and affixed our seals, at the city of New York, in the State of New York, in the United States of America, this twenty-fourth day of November, in the year of our Lord one thousand eight hundred and seventeen.

[SEAL]

"Witness: JAMES T. AUSTIN, Agt. U. S. A. "ANTH. BARCLAY, See'y."

In reporting their decision to the two Governments the commissioners stated that it was in part a compromise, saying:

"In making this decision it became necessary that each of the commissioners should yield a part of his individual opinion. Several reasons induced them to adopt this measure; one of which was the impression and belief that the navigable waters of the Bay of Passamaquoddy, which, by the treaty of Ghent, is said to be part of the Bay of Fundy, are common to both parties for the purpose of all lawful and direct communication with their own territories and foreign ports."

The grounds on which the commissioners based their decisions are known from Barclay's correspondence. They decided, as had the St. Croix Commission formerly, that Alexander's Nova Scotia and the Nova Scotia of the treaty of 1783 were roughly the same. As all the islands in dispute would have fallen to the United States under that treaty, except those which had formerly been within the limits of Nova Scotia, it became necessary to determine which islands had been granted to Alexander in 1621.

The charter to Alexander, already quoted, gave him territory "including and containing within the said coasts and their circumference from sea to sea all lands of the continent with the rivers, falls, bays, shores, islands, or seas, lying near or within 6 leagues on any side of the same on the west, north, or east sides of the same coasts and bounds." The boundary of Nova Scotia, described in this charter as being drawn from St. Marys Bay to the mouth of the St. Croix, would cut Grand Manan, Campobello, and Deer Islands; but all the islands fall within 6 leagues of the coast of the mainland required by the charter except Grand Manan, of which only the northern end lies within that limit. The British agent claimed that the

"JOHN HOLMES.

"THO. BARCLAY.

#### APPENDIX I

grant of 1621 was meant to include all the islands within 6 leagues of the boundaries of Nova Scotia, and not simply of the coasts, supporting this contention by reference to the word "circumference" in the charter. He thus maintained that all islands within 6 leagues of the line drawn from St. Marys Bay to the mouth of the St. Croix, which would include Grand Manan Island, belonged to Nova Scotia.

The United States agent, in objecting to this, pointed out that the commission to Governor Wilmot of Nova Scotia in 1763, and subsequent commissions, although generally following the terms of Alexander's charter and in particular mentioning the islands on the north, east, and south, substitute, for the line from St. Marys Bay to the St. Croix River, a line from Cape Sable to the St. Croix River, and say nothing about either circumferences or any islands on the west.

The United States was especially anxious to retain Moose, Frederick, and Dudley Islands, as they were settled by her citizens and had been under her jurisdiction for a long time; and the British Government by the unratified conventions of 1803 and 1807 had shown its willingness to leave them in the possession of the United States. Great Britain, for similar reasons, wanted to keep Grand Manan Island.

The United States commissioner, in return for yielding claim to Grand Manan Island, wanted not only Moose, Frederick, and Dudley Islands but also Campobello Island. He finally yielded claim to the last named, however, in return for the support of the British commissioner in recommending that the navigation of the channel between Deer and Campobello Islands should be open to both nations.

While the commissioners under Article IV of the treaty of Ghent had decided to which country the various islands belonged, they did not define the position of the boundary in the channel between the islands. Local disputes over the right of using certain fishing grounds took place from time to time, and the difficulties of the customs officers of both countries in carrying out their duties were increased by the fact that the exact position of the boundary was not known. However, none of these troubles assumed a national character until 1891 when a Canadian fishery patrol vessel seized seven fishing boats owned and operated by citizens of Eastport, Me., while fishing on what was known as Cochrane's Ledge, opposite that town, on the ground that they were fishing in Canadian waters. The owners of the boats claimed that they were in United States waters at the time of seizure and referred the question to the Department of State at Washington.

It was evident that future conflicts of authority and disputes over jurisdiction could be avoided only by definitely settling the exact location of the boundary in the waters of Passamaquoddy Bay. A convention was accordingly concluded in 1892 between the United States and Great Britain, by the terms of which it was agreed that each nation should appoint a commissioner to determine upon a method of more accurately marking the boundary line between the two countries in the waters of Passamaquoddy Bay in front of and adjacent to Eastport in the State of Maine, and to place buoys and fix such other boundary marks as they might determine to be necessary. The wording of this article of the convention is somewhat vague in that it instructs the commissioners to determine a method of more accurately marking the boundary, apparently assuming that some attempt to mark it had been made before, which was not the case. A difference of opinion arose later between the commissioners as to whether this article authorized them to settle all disputed points without any further reference to their two Govern-



A fishing fleet near Eastport, Me., Passamaquoddy Bay

ments. The wording of the convention also permitted the interpretation that only that portion of the boundary in the immediate vicinity of Eastport, rather than the entire boundary through Passamaquoddy Bay, was to be dealt with under the treaty.

Under this convention the United States appointed Dr. T. C. Mendenhall as commissioner, and Great Britain appointed Dr. W. F. King.

The commissioners met at Ottawa in November, 1892, and at Washington in March, 1893. At these meetings they agreed that, since the boundary had previously been defined only in general terms and no rule had been established by which it should be laid down, the principle to which they would adhere in determining its exact location would be that of giving equal water areas of the boundary waterways to each country. The commissioners laid down upon charts of the United States Coast and Geodetic Survey, portions of a tentative boundary consisting of a series of straight lines from a point in the mouth of the St. Croix River



A catch of pollock taken near Kendall Head, Passamaquoddy Bay

midway between Joes Point and Robbinston to a point opposite Friar Head, a curved line following the line of the deep water from the northern end of the Lubec Narrows to a point south of the Lubec Channel Lighthouse, and from that point two connected straight lines to a point in the Bay of Fundy between Liberty Point and West Quoddy Head.

They could not agree even tentatively on the boundary just north of Lubec. Each commissioner claimed for his country the small island, just north of the Lubec Narrows, now known as "Pope's Folly," formerly called Mark Island or Green Island. A decision as to the nationality of this island would have determined which channel the boundary should follow.

The commissioners agreed to meet at Eastport in July, 1893, for the purpose of having range marks constructed to define those portions of the boundary tentatively agreed upon at Washington, and of having buoys placed at the turning points of the line. They also agreed to search in the neighborhood of Pope's Folly for information regarding the jurisdiction exercised over that island.

These plans were carried out and range marks consisting of large cairns of stones were erected. Buoys were placed to locate the turning points only opposite and north of Eastport, as experience had shown that only those buoys near Eastport would remain in position; at other points they would be displaced by the violent tidal currents which prevail in these waters. The range marks were located by triangulation and marked by underground marks so that if the range marks were destroyed their exact sites could be recovered.

The investigations made by the commissioners did not enable them to reach any agreement regarding the ownership of Pope's Folly Island. The British commissioner maintained that, since the decision of the commissioners acting under Article IV of the treaty of Ghent was that Moose Island, Dudley Island, and Frederick Island in the Bay of Passamaquoddy belonged to the United States and that all other islands in that bay belonged to Great Britain, Pope's Folly Island must therefore belong to Great Britain.

The United States commissioner maintained that the commissioners in 1817 restricted their decision to those islands of which the ownership was in dispute, and that the ownership of Pope's Folly Island was not considered by them. He claimed that it could not be shown that Pope's Folly Island had belonged to Nova Scotia in 1783, and submitted evidence to show that it had been owned by United States citizens previous to 1808, and had remained in the possession of United



Friar Head (at right) looking across Friar Bay from Welshpool, New Brunswick
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States citizens since that time. He submitted old maps from British sources which placed this island in the United States, and also claimed that the principal ship channel was between it and Campobello Island. The two commissioners were unable to reach an agreement on this question of the nationality of Pope's Folly Island.

On two portions of their tentative boundary the commissioners were unable to reach an agreement. The British commissioner wished to add to the lines proposed at the Washington conference another short line which would have kept Cochrane's Ledge within Canadian waters; but to this the United States commissioner could not agree. The other disputed point was in regard to the course of the boundary from Lubec Narrows through Quoddy Roads to the Bay of Fundy. Though the United States commissioner was at first inclined to accept a line following the dredged channel and thence to the sea, it was claimed by local interested residents that the original channel, which had since been nearly filled up, ran very close to Campobello Island and that the boundary should follow it rather than the dredged channel. This would have had the effect of leaving within United States waters an area known as the Upper Middle Ground, on which were situated certain fish weirs, the property of United States citizens.

These divergent views were expressed in numerous proposals and counterproposals made by the United States and the British commissioners. In 1894 and 1895 a number of conferences were held between the two commissioners, but finally, as agreement on the boundary could not be reached, it was decided that the United States commissioner should prepare a draft of a proposed joint report in which the principal lines of agreement and disagreement should be briefly set forth.

When this draft had been prepared the British commissioner objected to it, claiming that it seemed "liable to convey the impression that we agree in recommending the acceptance of the range lines which we marked and that we differ only with regard to two portions of the line, at Pope's Folly Island and at the Middle Ground." He accordingly prepared a report setting forth his views.

These two reports are as follows:

### DRAFT OF PROPOSED JOINT REPORT, BY DR. T. C. MENDENHALL

"The undersigned, Thomas C. Mendenhall, Commissioner on the part of the United States, and W. F. King, Commissioner on the part of Canada (Great Britain) having been appointed under the Convention of July 22, 1892, between the United States and Great Britain, which convention reads as follows: ste

respectfully submit the following joint report upon that part of the duties of said Commissioners relating to the marking of the boundary line between Maine and New Brunswick in Passamaquoddy Bay in front of and adjacent to the city of Eastport.

"On March 9th, 10th, and 11th, 1893, we conferred together in Washington, examining the original sheets of the survey of the Bay and vicinity made by the United States Coast and Geodetic Survey. On these sheets we drew certain lines indicating tentatively the proposed location of the boundary line. In the original definition of the boundaries of the United States in the treaty of 1783, this part is described as follows:

East by a line to be drawn along the middle of the river St. Croix from its mouth in the Bay of Fundy to its source.

In the treaty of Ghent (1814) it was agreed to appoint Commissioners to determine which of

the islands in Passamaquoddy Bay belonged to the United States and which to Great Britain, and in 1817 these Commissioners made a decision declaring substantially that Moose Island, Dudley Island, and Frederick Island belonged to the United States and that all other islands



Fish weir near Treat Island, Passamaquoddy Bay

in Passamaquoddy Bay, which is a part of the Bay of Fundy, belong to Great Britain. The boundary line from the open ocean to the mouth of the St. Croix River at Joe's Point (about twelve miles above Eastport) has been provisionally regarded as drawn in general accord with this partition of the islands.

"It was agreed at the conference in Washington that as far as possible the turning points in the line should be marked by firstclass can buoys and that the direction of the line between such points should be fixed by range marks upon the shore, such marks to be monuments easily visible at sea in fair weather and of a stable and permanent character to be determined when on the ground. It was also agreed that the turn-

ing points should be located by shore ranges in similar manner. Arrangements were made to purchase the buoys and necessary chain and anchors through the United States Light-House Establishment.

"It was further agreed to meet at Eastport about July 1st, (1893) equipped with the necessary instruments and assistance to make a survey for the location of the proposed range marks, and to connect the same with the primary triangulations of the United States Coast and Geodetic Survey covering that region, so that said marks could be accurately replaced if ever destroyed. On July 6th, we met at Eastport as agreed upon and began the survey for range lines. The weather was favorable for the first two weeks, but after that the work was often much interfered with by the fogs which are prevalent at that season. It was found that the most convenient and efficient range marks could be built of bowlders and rock fragments, laid up without mortar or cement, conical in form and from ten feet to twenty feet in height. They were compactly built and are likely to remain substantially as put up for many years. Many of them were coated with a covering of white-wash, to make them more easily visible against a dark back-ground. In a few cases of secondary importance,—such as cross ranges,—parts of buildings, chimneys, etc., were selected as range marks. In every such case the building was one not likely to be disturbed for a long time to come.

"The lines thus designated by range marks are as follows:

"The Commissioners were desirous of making a liberal interpretation of the words of the Convention under which they were appointed and hoped to jointly recommend to their respective governments a continuous line from the open sea to the mouth of the St. Croix at Joe's Point. They found themselves unable to agree, however, upon that portion of the line extending from the southern extremity of Lubec Channel<sup>4</sup> southwest [southeast] to the ocean, and also that part of the line in the vicinity of the small island just north of Lubec, known as Pope's Folly. Upon these points they will submit separate reports. They are agreed that the principle by which they ought to be guided is that a fair and equal division of the water area should be made, keeping in mind the fact that it is impracticable to have numerous turning points and changes in direction of a boundary line of the unique character of that under consideration, but questions of jurisdiction over Pope's Folly Island and of natural and artificial channels south of Lubec have prevented their coming to an agreement. Feeling that they had no power to settle these important questions by yielding on either the one side or the other, they have agreed to submit this joint report of work actually done which can easily be made complete by agreement of representatives of the two governments with full power to settle such questions as have arisen."

<sup>&</sup>lt;sup>4</sup> This point is at the southern end of Lubec Narrows, not the southern end of the dredged channel.

#### DRAFT OF PROPOSED JOINT REPORT, BY DR. W. F. KING

"We, the undersigned, Thomas C. Mendenhall, Commissioner on the part of the United States, and William Frederick King, Commissioner on behalf of Her Britannic Majesty, having been appointed under the Convention of July 22d, 1892, between the United States and the United Kingdom of Great Britain and Ireland, respectfully submit the following joint report of our proceedings and transactions under the second article of the said Convention, which reads as follows:

'The High Contracting Parties agree that the governments of the United States and of Her Britannic Majesty, in behalf of the Dominion of Canada, shall, with as little delay as possible, appoint two Commissioners, one to be named by each party, to determine upon a method of more accurately marking the boundary line between the two countries in the waters of Passamaquoddy Bay in front of and adjacent to Eastport, in the State of Maine, and to place buoys or fix such other boundary marks as they may determine to be necessary. Each Government shall pay the expenses of its own Commissioner, and cost of marking the boundary in such a manner as shall be determined upon shall be defrayed by the High Contracting Parties in equal moieties.'

"In the original definition of the boundaries of the United States contained in the Treaty of 1783 between Great Britain and the United States, this part of the boundary is described as follows:

'Comprehending all islands within twenty leagues of any part of the shores of the United States and lying between lines to be drawn due East from the points where the aforesaid boundaries between Nova Scotia on the one part and East Florida on the other shall respectively touch the Bay of Fundy and the Atlantic Ocean; excepting such islands as now are, or heretofore have been, within the limits of the said Province of Nova Scotia.'

"In accordance with the Treaty of Ghent, (1814) Commissioners were appointed to determine which of the islands in Passamaquoddy Bay belonged to the United States and which to Great Britain, and in 1817 these Commissioners reported their decision, "That Moose Island, Dudley Island, and Frederick Island in the Bay of Passama-

'That Moose Island, Dudley Island, and Frederick Island in the Bay of Passamaquoddy, which is part of the Bay of Fundy, do, and each of them does, belong to the United States of America; and we have also decided and do decide, that all the other islands, and each and every one of them, in the said Bay of Passamaquoddy, which is part of the Bay of Fundy, and the island of Grand Manan, in said Bay of Fundy, do belong to His said Britannic Majesty, in conformity with the true intent of the said second article of the said Treaty of 1783.'

"The sovereignty in and over the islands having been thus determined, the duty of the undersigned was not to make any partition of territory, but to devise means of marking in a practical way the boundary in the waters separating the various islands and lands in question and to mark the boundary accordingly.

and to mark the boundary accordingly. "At our first meeting in Ottawa, on the 28th November, 1892, we came to the conclusion that the words 'adjacent to Eastport' in the Convention were sufficient to permit of our marking the boundary line through the whole extent of Passamaquoddy Bay, namely, from the mouth of the St. Croix River to the open waters of the Bay of Fundy between West Quoddy Head on the main land and Liberty Point on Campobello Island.

"Having agreed to the principle that the boundary line should be placed as nearly as possible midway between the islands and lands of the High Contracting Parties, keeping in mind the fact that it is inadvisable as regards the practical utility of the line as marked to have numerous turning points and changes in direction, we, at our second meeting in Washington, on March 9th, 10th and 11th, 1893, examined the original sheets of the survey of the Bay and vicinity made by the United States Coast and Geodetic Survey, and on these sheets we drew certain lines indicating tentatively the proposed location of the boundary line between the points hereinbefore named, that is to say, the mouth of the St. Croix River at Joe's Point and the Bay of Fundy off West Quoddy Head. At this time, however, we were unable to agree as to the location of the boundary line between the Northern entrance to the Lubec Narrows and a point opposite to Friar's Head on Campobello Island, this portion of the line being in the vicinity of the island called Pope's Folly or Mark Island, and we left it open until we should have opportunity to look it over on the spot.

"It was agreed that the several courses or directions of the line should be marked by range marks upon the shore, such range marks to be monuments easily visible at sea and of a stable and permanent character. The points for these range marks were to be determined by actual survey, for which purpose we arranged to meet at Eastport in July, 1893, properly equipped to make such survey and connect it with the primary triangulation of the United States Coast and

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Cairn range mark on Treat Island; Friar Head in distance

Geodetic Survey covering that region, so that our marks could be accurately replaced if ever destroyed or displaced.

"It was further agreed that, in view of the fact that the range marks would be visible in fine weather only, firstclass can buoys should be placed at the intersections of the range lines in order to indicate as closely as possible in foggy weather the location of the turning points. For convenience in replacing the buoys, which on account of the very strong tides and currents prevailing in the Bay are subject to displacement, it was determined to further mark the turning points by short cross ranges.

On July 6th, we met at Eastport as agreed upon, and began the survey for range lines. We selected points for range signals over the greatest portion of the line covered by the tenta-tive agreement made in Washington, and marked them by range marks constructed of boulders and rock fragments, laid up without mortar or cement, conical in form and from ten to twenty feet in height. They were compactly built and many of them coated with white-wash to make them more easily visible against a dark background. One or two of these marks having been placed at points selected by means of a small scale chart, proved on subsequent survey, to require adjustment. This adjustment, however, has not been made, on account of differences which arose between us as the work under our tentative agreement progressed.

"These differences had their origin in questions relating to that portion of the boundary line adjacent to Pope's Folly or Mark Island, hereinbefore referred to, and subsequently developed so as to involve other portions of our tentative line, and finally became so serious as to preclude any agreement between us.

We have therefore to report that we are not prepared to join in any recommendation as to any portion of the line. Separate reports will be submitted by us upon the points of difference.

The British commissioner proposed another conference, believing that he and his colleague were now so near together that another meeting would make a definite

agreement possible; but on June 25, 1895, the United States commissioner was informed by the Secretary of State that his services as commissioner had been terminated. He was thus without authority to sign a joint report.

Doctor Mendenhall was succeeded as boundary commissioner by Gen. W. W. Duffield, Superintendent of the United States Coast and Geodetic Survey. The British commis-



Cairn range mark on Campobello Island, north of Welshpool, New Brunswick

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sioner proposed to him in February, 1896, that the question be taken up anew, making use of the work done and the information already secured. This, however, was not done.

In 1898 an attempt was made by the Joint High Commission to harmonize the differences between the two Governments on the question but no agreement was arrived at and the matter remained in abeyance until 1908.

The treaty of April 11, 1908, formally adopted the portions of the boundary upon which the commissioners under the convention of 1892 were agreed and provided for the settlement of the remainder of the line. It provided that each Government should present to the other within six months a full, printed statement of the evidence and the arguments upon which it based its contention, with a view to coming to an agreement upon the matter. The treaty also provided that if an agreement

was not reached within six months after the date of exchanging the printed statements the question should be settled by arbitration. The statements were exchanged, but no agreement was reached within the prescribed six months.

Early in 1910, before arbitration proceedings provided for under the treaty of 1908 had taken form, Doctor King, the British commissioner, and Dr. O. H. Tittmann, Superintendent of the United States Coast and Geodetic Survey, who had been appointed United States com-



Liberty Point, southern end of Campobello Island, at entrance to Quoddy Roads

missioner, were instructed by their Governments to describe a proposed boundary which would give Pope's Folly Island to the United States and the Upper Middle Ground to Canada. This was done, the commissioners proposing as the course of the boundary line a series of seven connecting straight lines which they believed would satisfactorily divide the waters from Treat Island to a terminus of the boundary at the middle of Grand Manan Channel. By the treaty of May 21, 1910, the line as described by Commissioners King and Tittmann was formally agreed to.

In later years, however, it was found that this line did not extend to the high seas. After the work of surveying, ranging, and monumenting the boundary through Passamaquoddy Bay had been completed under the treaties of 1908 and 1910, a careful study of the resulting data showed that the terminus of the boundary line defined by the treaty of 1910 at the middle of Grand Manan Channel was less than APPENDIX I



Lubec Narrows and Mulholland Point Lighthouse, looking across the boundary from Lubec Breakwater

3 nautical miles distant from the shore line of Grand Manan Island and from the shore line of the State of Maine, thereby leaving a small zone of controvertible jurisdiction in Grand Manan Channel, between the terminus of the boundary and the high seas.

The commissioners thereupon recommended to the two Governments that the boundary be extended south 34° 42′ west for a distance of 2,383 meters through Grand Manan Channel to a point 3 nautical miles distant from each shore line. This additional course was provided for in Article III of the treaty between the United States and His Britannic Majesty in respect of Canada concluded February 24, 1925, as follows:

"The Contracting Parties, in order completely to define the boundary line between the United States and the Dominion of Canada in the Grand Manan Channel, hereby agree that an additional course shall be extended from the terminus of the boundary line defined by the said Treaty of May 21, 1910, south 34° 42′ west, for a distance of two thousand three hundred eighty-three (2,383) meters, through the middle of Grand Manan Channel, to the High Seas."

### HISTORICAL SKETCH

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## APPENDIX II

## TREATIES AND CONVENTIONS PERTAINING TO THE BOUNDARY PREVIOUS TO THE TREATY OF 1908<sup>1</sup>

The first definition of the international boundary from the source to the mouth of the St. Croix River appears in the provisional articles of peace, concluded November 30, 1782, between the United States and Great Britain. This description of the boundary was repeated in the definitive treaty of peace of 1783 as Article II, the full text of which is here reprinted. The boundary through Passamaquoddy Bay was left to be determined by the last part of Article II which was intended to fix the nationality of the islands, leaving the boundary to be adjusted in the channels separating islands of unlike nationality.

### DEFINITIVE TREATY OF PEACE

(Concluded at Paris September 3, 1783; ratified by the Congress of the United States January 14, 1784; ratified by Great Britain April 9, 1784)

sic

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ARTICLE II

\* \* \*

And that all disputes which might arise in future, on the subject of the boundaries of the said United States may be prevented, it is hereby agreed and declared, that the following are, and shall be their boundaries, viz: From the northwest angle of Nova Scotia, viz. that angle which is formed by a line drawn due north from the source of Saint Croix River to the Highlands; along the said Highlands which divide those rivers that empty themselves into the river St. Lawrence, from those which fall into the Atlantic Ocean, to the northwesternmost head of Connecticut River; thence down along the middle of that river, to the forty-fifth degree of north latitude; from thence, by a line due west on said latitude, until it strikes the river Iroquois or Cataraquy; thence along the middle of said river into Lake Ontario, through the middle of said lake until it strikes the communication by water between that lake and Lake Erie; thence along the middle of said communication into Lake Erie, through the middle of said lake until it arrives at the water communication between that lake and Lake Huron; thence along the middle of said water communication between that lake Huron; thence through the middle of said lake to the water communication between that lake and Lake Superior; thence through Lake Superior northward of the Isles Royal and Phelipeaux, to the Long Lake; thence through the middle of said Long Lake, and the water communication between it and the Lake of the Woods, to the said Lake of the Woods; thence through the said lake to the most northwestern point thereof, and from thence on a due west course to the river Mississippi; thence by a line to be drawn along the middle of the said river Mississippi until it shall intersect thence by a line to be drawn along the middle of the said river Mississippi until it shall intersect the northernmost part of the thirty-first degree of north latitude. South, by a line to be drawn due east from the determination of the line last mentioned, in the latitude of thirty-one degrees north of the Equator, to the middle of the river Apalachicola or Catahouche; thence along the middle thereof to its junction with the Flint River; thence strait to the head of St. Mary's River; and thence down along the middle of St. Mary's River to the Atlantic Ocean. East, by a line to be drawn along the middle of the river St. Croix, from its mouth in the Bay of Fundy to its source, and from its source directly north to the aforesaid Highlands, which divide the rivers that fall into the Atlantic Ocean from those which fall into the river which divide the rivers that fall into the Atlantic Ocean from those which fall into the river St. Lawrence; comprehending all islands within twenty leagues of any part of the shores of the United States, and lying between lines to be drawn due east from the points where the aforesaid boundaries between Nova Scotia on the one part, and East Florida on the other, shall respectively touch the Bay of Fundy and the Atlantic Ocean; excepting such islands as now are, or heretofore have been, within the limits of the said province of Nova Scotia.

<sup>&</sup>lt;sup>1</sup> The text of the treaties and conventions has been taken from "Treaties, Conventions, International Acts, Protocols, and Agreements between the United States of America and other Powers," Vol. I, by W. M. Malloy. This differs from other published texts only in unimportant details of punctuation, capitalization, division into paragraphs, and order of precedence.

### EARLY TREATIES AND CONVENTIONS

The only official record of the intentions of the negotiators of the treaty of 1783 as to the actual location of the boundary is contained in the text of the treaty, for the negotiators did not attach to the treaty a copy of the map used by them in arriving at their agreements. They failed to realize that, owing to the imperfect knowledge of the topography of the country at that time, the identification of places named in the treaty might be disputed. Disputes soon occurred, the first over the identification of the St. Croix River. Much discussion followed, but no successful steps in the settlement of this difference of opinion were taken until, in the negotiation of the treaty of 1794, an article was included providing for a joint commission to decide this question.

The text of this article follows:

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### TREATY OF AMITY, COMMERCE, AND NAVIGATION

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(Concluded November 19, 1794; ratifications exchanged October 28, 1795) \*

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#### ARTICLE V

Whereas doubts have arisen what river was truly intended under the name of the river St. Croix, mentioned in the said treaty of peace, and forming a part of the boundary therein described; that question shall be referred to the final decision of commissioners to be appointed

in the following manner, viz: One commissioner shall be named by His Majesty, and one by the President of the United States, by and with the advice and consent of the Senate thereof, and the said two commissioners shall agree on the choice of a third; or if they can not so agree, they shall each propose one person, and of the two names so proposed, one shall be drawn by lot in the presence of the two original Commissioners. And the three Commissioners so appointed shall be sworn, impartially to examine and decide the said question, according to such evidence as shall respectively be laid before them on the part of the British Government and of the United States. The said Commissioners shall meet at Halifax, and shall have power to adjourn to such other place or places as they shall think fit. They shall have power to appoint a Secretary, and to employ such surveyors or other persons as they shall judge necessary. The said Commissioners shall, by a declaration, under their hands and seals, decide what river is the river St. Croix, intended by the treaty. The said declaration shall contain a description of the said river, and shall par-ticularize the latitude and longitude of its mouth and of its source. Duplicates of this declara-tion, and of the statements of their accounts, and of the journal of their proceedings, shall be delivered by them to the agent of His Majesty, and to the agent of the United States, who may be respectively appointed and authorized to manage the business on behalf of the respective Governments. And both parties agree to consider such decision as final and conclusive, so as that the same shall never thereafter be called into question, or made the subject of dispute or difference between them.

The commission authorized by Article V of the treaty of 1794 was organized October 4, 1796, and under its direction surveys were made of Passamaquoddy Bay and the rivers entering into the dispute. Much evidence was considered, but before a decision was handed down the commissioners asked for modifications of their instructions. These were negotiated and made a part of the treaty of 1794 by the acceptance by both Governments of the following explanatory article:

EXPLANATORY ARTICLE (1798) TO THE TREATY OF NOVEMBER 19, 1794, RELEASING THE COMMISSIONERS UNDER THE FIFTH ARTICLE FROM PARTICULARIZING THE LATITUDE AND LONGITUDE OF THE RIVER ST. CROIX

### (Concluded March 15, 1798)

Whereas by the twenty-eighth article of the treaty of amity, commerce, and navigation between His Britannic Majesty and the United States, signed at London on the nineteenth day 47378°-34-12

of November, one thousand seven hundred and ninety-four, it was agreed that the contracting parties would, from time to time, readily treat of and concerning such further articles as might be proposed; that they would sincerely endeavour so to form such articles as that they might conduce to mutual convenience and tend to promote mutual satisfaction and friendship; and that such articles, after having been duly ratified, should be added to and make a part of that treaty: And whereas difficulties have arisen with respect to the execution of so much of the fifth article of the said treaty as requires that the Commissioners appointed under the same should in their description particularize the latitude and longitude of the source of the river which may be found to be the one truly intended in the treaty of peace between His Britannic Majesty and the United States, under the name of the river St. Croix, by reason whereof it is expedient that the said Commissioners should be released from the obligation of conforming to the provisions of the said article in this respect. The undersigned being respectively named by His Britannic Majesty and the United States of America their Plenipotentiaries for the purpose of treating of and concluding such articles as may be proper to be added to the said treaty, in conformity to the above-mentioned stipulation, and having communicated to each other their respective full powers, have agreed and concluded, and do hereby declare in the name of His Britannic Majesty and of the United States of America, that the Commissioners appointed under the fifth article of the above-mentioned treaty shall not be obliged to particularize, in their description, the latitude and longitude of the source of the river which may be found to be the one truly intended in the aforesaid treaty of peace under the name of the river St. Croix, but they shall be at liberty to describe the said river, in such other manner as they may judge expedient, which description shall be considered as a complete execution of the duty required of the said Commissioners in this respect by the article aforesaid. And to the end that no uncertainty may hereafter exist on this subject, it is further agreed, That as soon as may be after the decision of the said Commissioners, measures shall be concerted between the Government of the United States and His Britannic Majesty's Governors or Lieutenant Governors in America, in order to erect and keep in repair a suitable monument at the place ascertained and described to be the source of the said river St. Croix, which measures shall immediately thereupon, and as often afterwards as may be requisite, be duly executed on both sides with punctuality and good faith

This explanatory article, when the same shall have been ratified by His Majesty and by the President of the United States, by and with the advice and consent of their Senate, and the respective ratifications mutually exchanged, shall be added to and make a part of the treaty of amity, commerce, and navigation between His Majesty and the United States, signed at London on the nineteenth day of November, one thousand seven hundred and ninety-four, and shall be permanently binding upon His Majesty and the United States.

In witness whereof we, the said undersigned Plenipotentiaries of His Britannic Majesty and the United States of America, have signed this present article, and have caused to be affixed thereto the seal of our arms.

Done at London this fifteenth day of March, one thousand seven hundred and ninety-eight. [SEAL.] GRENVILLE.

[SEAL.]

RUFUS KING.

The commissioners gave their decision on October 25, 1798, which was as follows:

## Declaration of the Commissioners under the Fifth Article of the Treaty of 1794

"Declaration of the Commissioners under the Fifth Article of the Treaty of 1794, between the United States and Great Britain, respecting the true River St. Croix, by Thomas Barclay, David Howell and Egbert Benson, Commissioners appointed in pursuance of the 5th Article of the Treaty of Amity, Commerce, and Navigation, between His Britannic Majesty and the United States of America, finally to decide the question, 'What River was truly intended under the name of the River Saint Croix mentioned in the treaty of Peace between His Majesty and the United States, forming a part of the boundary therein described.'

"We, the said Commissioners, having been sworn 'impartially to examine and decide the said question, according to such evidence as should respectively be laid before us, on the part of the British Government, and of the United States,' and having heard the evidence which hath been laid before us, by the Agent of His Majesty, and the Agent of the United States, respectively appointed and authorized to manage the business on behalf of the respective Governments, have decided, and hereby do decide, the River, hereinafter particularly described and mentioned, to be the River truly intended under the name of the River Saint Croix, in the said Treaty of Peace, and forming a part of the boundary therein described; that is to say, the mouth of the said river is in Passamaquoddy Bay, at a point of land called Joe's Point,<sup>2</sup> about one mile northward from the northern part of Saint Andrew's Island, and 'in the latitude of forty-five degrees five minutes and five seconds north, and in the longitude of sixty-seven degrees twelve minutes and thirty seconds west, from the Royal Observatory at Greenwich, in Great Britain, and three degrees fifty-four minutes and fifteen seconds east from Harvard College, in the University of Cambridge, in the State of Massachusetts, and the course of the said river up from its said mouth, is northerly to a point of land called the Devil's Head, then turning the said point, is westerly to where it divides into two streams, the one coming from the westward, and the other coming from the northward, having the Indian name of Chiputnaticook or Chibuitcook, as the same may be variously spelt, then up the said stream, so coming from the northward to its source, which is at a stake near a Yellow Birch Tree, hooped with iron, and marked S. T. and J. H. 1797, by Samuel Titcomb and John Harris, the Surveyors employed to survey the above mentioned stream, coming from the northward. And the said River is designated on the Map hereunto annexed, and hereby referred to as farther descriptive of it, by the letters A B C D E F G H I K and L, the letter A being at its said mouth, and the letter L being at its said source; and the course and distance of the said source from the Island, at the confluence of the above-mentioned two streams, is, as laid down on the said map, north five degrees and about fifteen minutes west, by the magnet, about forty-eight miles and one quarter.

"In testimony whereof, we have hereunto set our hands and seals, at Providence, in the State of Rhode Island, the twenty-fifth day of October, in the year one thousand seven hundred and ninety-eight.

('(L. S.) THOMAS BARCLAY,
('(L. S.) DAVID HOWELL,
('(L. S.) EGBERT BENSON.

"Witness, ED. WINSLOW, "Secretary to the Commissioners."

An attempt was made to settle the ownership of the Passamaquoddy Islands by a convention concluded in 1803, but this convention was not ratified. A similar convention negotiated in 1807 met with a like fate, and nothing was accomplished until the treaty of Ghent was signed in which provision for the appointment of a commission to decide the ownership of the islands was included.

The text of Article IV of the treaty of Ghent follows:

### TREATY OF PEACE AND AMITY (TREATY OF GHENT)

(Concluded at Ghent, December 24, 1814; ratifications exchanged February 17, 1815) \* \* \* \* \* \* \* \* \* \* \* \*

#### ARTICLE IV

Whereas it was stipulated by the second article in the treaty of peace of one thousand seven hundred and eighty-three, between His Britannic Majesty and the United States of America, that the boundary of the United States should comprehend all islands within twenty leagues of any part of the shores of the United States, and lying between lines to be drawn due east from the points where the aforesaid boundaries, between Nova Scotia on the one part, and East Florida on the other, shall respectively touch the Bay of Fundy and the Atlantic Ocean, excepting such islands as now are, or heretofore have been, within the limits of Nova Scotia; and whereas the several islands in the Bay of Passamaquoddy, which is part of the Bay of Fundy, and the Island of Grand Menan, in the said Bay of Fundy, are claimed by the United States as being comprehended within their aforesaid boundaries, which said islands are claimed as belonging to His Britannic Majesty, as having been, at the time of and previous to the aforesaid treaty of one thousand seven hundred and eighty-three, within the limits of the Province of Nova Scotia; In order, therefore, finally to decide upon these claims, it is agreed that they shall be referred to two Commissioners to be appointed in the following manner, viz: One Commissioner

<sup>&</sup>lt;sup>2</sup> This is "Ive's Point" in some of the copies of the award, but in the original it is properly given as Joe's Point.

shall be appointed by His Britannic Majesty, and one by the President of the United States, by and with the advice and consent of the Senate thereof; and the said two Commissioners so appointed shall be sworn impartially to examine and decide upon the said claims according to such evidence as shall be laid before them on the part of His Britannic Majesty and of the The said Commissioners shall meet at St. Andrews, in the Province United States respectively. of New Brunswick, and shall have power to adjourn to such other place or places as they shall think fit. The said Commissioners shall, by a declaration or report under their hands and seals, decide to which of the two contracting parties the several islands aforesaid do respectively belong, in conformity with the true intent of the said treaty of peace of one thousand seven hundred and eighty-three. And if the said Commissioners shall agree in their decision, both parties shall consider such decision as final and conclusive. It is further agreed that, in event of the two Commissioners differing upon all or any of the matters so referred to them, or in the event of both or either of the said Commissioners refusing, or declining, or wilfully omitting to act as such, they shall make, jointly or separately, a report or reports, as well to the Government of His Britannic Majesty as to that of the United States, stating in detail the points on which they differ, and the grounds upon which their respective opinions have been formed, or the grounds upon which they, or either of them, have so refused, declined, or omitted to act. And His Britannic Majesty and the Government of the United States hereby agree to refer the report or reports of the said Commissioners to some friendly sovereign or State, to be then named for that purpose, and who shall be requested to decide on the differences which may be stated in the said report or reports, or upon the report of one Commissioner, together with the grounds upon which the other Commissioner shall have refused, declined or omitted to act, as the case may be. And if the Commissioner so refusing, declining or omitting to act, shall also wilfully omit to state the grounds upon which he has so done, in such manner that the said statement may be referred to such friendly sovereign or State, together with the report of such other Commissioner, then such sovereign or State shall decide ex parte upon the said report alone. And His Britannic Majesty and the Government of the United States engage to consider the decision of such friendly sovereign or State to be final and conclusive on all the matters so referred.

On November 24, 1817, the commissioners gave their decision, which was as follows:

### DECISION OF THE COMMISSIONERS UNDER THE FOURTH ARTICLE OF THE TREATY OF GHENT. NOVEMBER 24, 1817

"By Thomas Barclay and John Holmes, Esquires, Commissioners, appointed by virtue of the fourth article of the treaty of peace and amity between His Britannic Majesty and the United States of America, concluded at Ghent on the twenty-fourth day of December, one thousand eight hundred and fourteen to decide to which of the two contracting parties to the said treaty the several Islands in the Bay of Passamaquoddy, which is part of the Bay of Fundy, and the Island of Grand Menan, in the said Bay of Fundy, do respectively belong, in conformity with the true intent of the second article of the treaty of peace of one thousand seven hundred and eighty-three, between His said Britannic Majesty and the aforesaid United States of America.

"We, the said Thomas Barclay and John Holmes, Commissioners as aforesaid, having been duly sworn impartially to examine and decide upon the said claims according to such evidence as should be laid before us on the part of His Britannic Majesty and the United States, respectively, have decided, and do decide, that Moose Island, Dudley Island, and Frederick Island, in the Bay of Passamaquoddy, which is part of the Bay of Fundy, do, and each of them does, belong to the United States of America; and we have also decided, and do decide, that all the other islands, and each and every [one] of them, in the said Bay of Passamaquoddy, which is part of the Bay of Fundy, and the Island of Grand Menan, in the said Bay of Fundy, do belong to His said Britannic Majesty, in conformity with the true intent of the said second article of said treaty of one thousand seven hundred and eighty-three.

"In faith and testimony whereof we have set our hands and affixed our seals, at the city of New York, in the State of New York, in the United States of America, this twenty-fourth day of November, in the year of our Lord one thousand eight hundred and seventeen."

[SEAL]

"Witness:

"JAMES T. AUSTIN, Agt. U. S. A. "ANTH. BARCLAY. Sec'y." "John Holmes. "Tho. Barclay. While this decision presumably settled the ownership of the islands of Passamaquoddy Bay, it made no reference as to where the boundary lay in the channels which separate the islands from each other and from the mainland. Disputes having occurred over the right of fishing in boundary waters, a convention was concluded in 1892 which provided for the appointment of a commission "to determine upon a method of more accurately marking the boundary line between the two countries in the waters of Passamaquoddy Bay."

The text of Article II of the convention of 1892 follows:

# Convention of 1892, Respecting the Boundary Between the Dominion of Canada and the United States

## (Concluded July 22, 1892; ratifications exchanged August 23, 1892)

#### ARTICLE II

The High Contracting Parties agree that the Governments of the United States and of Her Britannic Majesty in behalf of the Dominion of Canada shall, with as little delay as possible, appoint two Commissioners, one to be named by each party, to determine upon a method of more accurately marking the boundary line between the two countries in the waters of Passamaquoddy Bay in front of and adjacent to Eastport, in the State of Maine, and to place buoys or fix such other boundary marks as they may determine to be necessary.

Each Government shall pay the expenses of its own Commissioner, and cost of marking the boundary in such manner as shall be determined upon shall be defrayed by the High Contracting Parties in equal moieties.

Although the commissioners appointed were able to agree upon the location of the boundary through the greater part of the boundary channels, there were sections regarding which they could not agree and as a consequence they made no formal decisions nor did they present any joint report, but each commissioner made a separate report to his own Government. The matter then remained in abeyance until the ratification of the treaty of 1908. Article I of this treaty provided for the appointment of commissioners to define the boundary in Passamaquoddy Bay, following the line of the former commissioners where they had been able to agree upon one, and for the settlement by agreement or arbitration of the remainder of the line. Article II of the same treaty provided for the determination of the boundary in the St. Croix River.

## APPENDIX III

## ELEVATIONS AND DESCRIPTIONS OF BENCH MARKS

Under this heading are given the elevations and descriptions of all permanent second-order-level bench marks established during the survey of the boundary from the source of the St. Croix River to the Atlantic Ocean. Included in this list are several bench marks, established by other bureaus, which were used for vertical control of the topographic surveys along the boundary. The elevations are given in feet and are referred to mean sea-level datum. (See footnote, p. 168.)

Initial monument, Aroostook County, Maine; York County, New Brunswick; at the source of th St. Croix River; bronze disk set in the north side of the top of the concrete base, 6 inches from th cast-iron post	(leet) ne _ 540. 39
The Thoroughfare, Aroostook County, Me.; at the western end of The Thoroughfare bridge at the north end of Grand Lake, 4.8 meters from the southwest corner of the Watson warehouse and 1 meters from the approach to the bridge; bronze disk set in a drill hole and inclosed within a triang cut in the top of a granite bowlder whose exposed dimensions are about 1.1 by 1.4 meters in cross section and 0.7 meter high.	te 5 le - 440.00
Butterfield Landing, Aroostook County, Me.; about 4 miles north of Danforth, Me., 20 meters to the right of the road, approaching Butterfield Landing, and 30 meters from the shore of Grand Lake bronze disk marked "U. S. & C. B. Survey B. M. 437," set in a large dome-shaped bowlder about 0.7 meter in diameter and projecting about 0.3 meter above the surface of the ground	ue e; ut _ 436, 92
Forest City, Washington County, Me., 4 miles south of; on the east side of the road connecting Fores City and Forest Station, Me., and about 50 meters northeast of the east end of the bridge that crosse the southern arm of Grand Lake; bronze disk marked "U. S. & C. B. Survey," set in a large bowlder	st - 441. 84
Forest City, Washington County, Me., 4½ miles southeast of; on the west shore of Spruce Mountai Cove, an arm of Spednik Lake; 30 meters southeast of a logging road that runs west to the sout end of Grand Lake and to the main road between Forest Station and Forest City, Me.; bronze dis marked "U. S. & C. B. Survey," set in a dome-shaped bowlder about 0.7 meter high the base of which is about 1 meter in diameter.	n h k _ 386.02
Vanceboro, Washington County, Me.; bronze bench-mark disk on the west abutment of the Canadia Pacific Railway bridge over the St. Croix River; on the south side of the tracks; United States Coast and Geodetic Survey B. M. No. V <sub>3</sub>	n _ 391. 59
Vanceboro, Washington County, Me.; "West Abutment" triangulation station; bronze triangulation disk on the west abutment of the Canadian Pacific Railway bridge over the St. Croix River; o the north side of the tracks; United States Coast and Geodetic Survey B. M. No. W <sub>3</sub>	n n _ 391. 56
St. Croix, York County, New Brunswick; copper bolt in the vertical face of the third course of masonr below the top of the east abutment of the Canadian Pacific Railway bridge over the St. Croix River on the south side of the tracks; Geodetic Survey of Canada B. M. No. 13–B	y r; _ 388.42
St. Croix, York County, New Brunswick; 100 meters east of the Canadian Pacific Railway bridg over the St. Croix River; copper bolt in the face of the east abutment wall of the subway under th railroad, in the sixth course of masonry below the bridge seat and in the second stone from the nort end; Geodetic Survey of Canada B. M. No. 12–B.	e e h _ 382.64
Reference monument 138, 7 meters west of; Washington County, Me.; about 3½ miles south of Vanceboro; bronze disk marked "U. S. & C. B. Survey B. M. 347," set in a rock in the woods about 18 meters from the bank of the St. Croix River and about 52 meters south of the meadow	of t _ 347.43
Reference monument 146, 1.22 meters southwest of; Washington County, Me.; about 4 miles sout of Vanceboro; about 2 meters from the bank of the St. Croix River near the middle of Little Falls bronze disk marked "U. S. & C. B. Survey B. M. 329," set in the rock in which reference monu ment 146 is set	h ; - - 329. 12
100	

# ELEVATIONS AND DESCRIPTIONS OF BENCH MARKS

	Ele (	vatio (feet)	on
Boot Point, Washington County, Me.; about 5 miles southwest of Vanceboro, at the bend in the should be upstream from Boot Point, 147 meters north-northeast of reference monument 150; brond disk marked "U. S. & C. B. Survey B. M. 298," set in a large bowlder on the river bank	re re 29	98. 1	16
Reference monument 154–A, 0.235 meter east of; Washington County, Me.; about 50 meters southea of the river-drivers' cabin at Rocky Rips; bronze disk marked "U. S. & C. B. Survey B. M. 270 set in a large bowlder on the river bank	st ,'' 20	69. I	56
Grassy Islands, Washington County, Me.; on the bank of the St. Croix River on the edge of an op- field and opposite the head of the largest island of the middle group of the Grassy Islands, 1. meters south of reference monument 160; bronze disk marked "U. S. & C. B. Survey B. M. 243 set in a large rock	en 53 ,'' 2	42. '	70
Reference monument 166, 180 meters northwest of; Washington County, Me.; about 900 meters us stream from the mouth of Canoose River and about 5 meters northeast of the Canoose rive drivers' cabin; bronze disk marked "U. S. & C. B. Survey B. M. 239," set in a large rock	p- er- 2	38.	94
Gleason Point, Charlotte County, New Brunswick; triangulation station "McNicholl;" on Gleaso Point on the north side of the Gleason Point Road about 30 meters northeast of the concre swimming tank, and about 80 meters southwest of reference monument 171; bronze triangulati disk marked "U. S. & C. B. Survey 209"	on ete on 2	:08.	89
Reference monument 173, Charlotte County, New Brunswick; on the east shore of the St. Croix Riv at Clark Point at the end of the Pomeroy Ridge Road from St. Stephen, and about 9 meters u stream from an old dock; standard 8-inch bronze reference post marked "173," set in a ro about 2 meters out from shore. The following elevation is that of the top of the bronze post	ver ip- ck 2	208.	27
Reference monument 177, 0.3 meter southwest of; Charlotte County, New Brunswick, at the brink Spednik Falls on the St. Croix River; bronze triangulation disk marked "U. S. & C. B. Surv 206," set in a ledge projecting into the river	of rey	205.	86
Reference monument 181, Charlotte County, New Brunswick; in the top of the northwest corner the wing-wall of the Grand Falls Dam, about 12 meters from the Canadian shore of the St. Cr River; standard 8-inch bronze reference post marked "181." The following elevation is that the surface of the concrete at the bronze post	of oix of	205.	31
Pomeroy Ridge Road, Charlotte County, New Brunswick; about 9 miles northwest of St. Stepl and about 2½ miles southeast of Clark Point; 10 feet west of the intersection of the Pome Ridge Road with a crossroad from the Scotch Ridge or Gleason Point Road; bronze disk mar "U. S. & C. B. Survey B. M. 304," set in a rock	ien roy ked	303.	. 93
Little Ridge Road, Charlotte County, New Brunswick; about 8 miles northwest of St. Stephen a 2 miles southeast of the Grand Falls Dam; on the Little Ridge Road about 220 meters nor west of the crossroad from Pomeroy Ridge and about 6 meters southwest of Little Ridge Presbyter Church; bronze disk marked "U. S. & C. B. Survey B. M. 291"	th- ian	290	. 66
Pomeroy Landing, Charlotte County, New Brunswick; about 70 meters south of the end of the m road at Pomeroy Landing, about 15 meters south of the south cabin, on the south side of a su brook and about 4 meters from the river's edge; bronze disk marked "U. S. & C. B. Survey B. set in a rock (see description of "Pomhanan" triangulation station, p. 267)	ain nall M.''	147	. 30
Woodland, Washington County, Me.; in the concrete abutment at the east end of the St. Croix Pa Co.'s dam, 0.6 meter east of the north leg of the transmission tower and about 6 meters no of reference monument 195; bronze disk marked "U. S. & C. B. Survey B. M. 144"	orth	144	. 32
Upper Mills, Charlotte County, New Brunswick, 1½ miles west of; 3 meters north of the Maine Cer Railway track and about 940 meters east of Mile Post 270; bronze disk marked "U.S. & C Survey B. M. 138"	.tral 2. B.	138	8. 01
Baring, Washington County, Me.; in a large rock on the southwest side of the road, opposite the office; bronze disk marked "U. S. & C. B. Survey B. M. 91"	post	90	). 85
Milltown, Washington County, Me.; in the foundation of the water tank of the Maine Central Rail opposite the Canadian cotton mill; bronze disk marked "U. S. & C. B. Survey B. M. 55"	way	54	4. 87
St. Stephen, Charlotte County, New Brunswick, 4 miles west of; on the the Little Ridge Road in a about 25 meters northwest of the highway bridge over Mohannas Creek; bronze disk ma "U.S. & C. B. Survey B. M. 132"	rock rked	13:	2.00

## APPENDIX III

<ul> <li>St. Stephen, Charlotte County, New Brunswick; in the first course of masonry below the water-table, in the south end of the east wall of the Bank of British North America; copper bolt marked "G. S. C., B. M. 2-B" (Geodetic Survey of Canada B. M. No. 2-B)</li></ul>	Elevation (feet) 26.06
Calais, Washington County, Me.; in the northeast wall of the rear section of the city building on Church Street, 0.6 meter above ground and 1.1 meters to the rear of the front section of the building; copper bolt marked "G. S. C., B. M. 1–B" (Geodetic Survey of Canada B. M. No. 1–B)	53. 58
Eastport, Washington County, Me.; on top of the south curbing of the steps leading to the library at the corner of Key and Water Streets; bronze disk marked "U. S. Coast & Geodetic Survey Bench mark No. 3"	37 35
Eastport, Washington County, Me.; in the west face of the southwest corner of the granite belting course of the Federal Building; aluminum bronze disk marked "U. S. Geological Survey B. M."	40. 54

#### NOTE

The elevations of all bench marks listed on pages 166, 167, and 168 are based on mean sea-level datum. The elevations of all the bench marks, with the exception of the two bench marks at Eastport, Me., the last two in the foregoing list, were determined from the elevations of the precise-level bench marks of the Geodetic Survey of Canada and of the United States Coast and Geodetic Survey, which are listed herein as furnished by these organizations in 1917, the year in which the boundary bench marks were established. The elevations of the two bench marks at Eastport were determined directly from a series of tidal observations.

Reference is made to the fact that in 1928 and 1929 comprehensive readjustments were made by the two Governments, respectively, of the level net of Canada and of the level net of the United States. As these readjustments gave two slightly different values for the elevations of some of the controlling precise bench marks and as these elevations differed only slightly from their former values, it was not considered advisable to attempt to readjust the elevations of the boundary bench marks to conform with either of these redeterminations.

## APPENDIX IV

## GEOGRAPHIC POSITIONS AND DESCRIPTIONS OF TRIANGULATION AND TRAVERSE STATIONS

This appendix contains: Three tables of geographic positions of the major and minor triangulation stations and of certain minor traverse stations used in determining the positions of the boundary reference monuments; the descriptions of all the boundary reference monuments and of most of the triangulation and traverse stations; the usual triangulation and traverse sketches; and a station index to the tables and sketches.

## EXPLANATION OF THE TABLES

All latitudes and longitudes are given in terms of the original North American geodetic datum. The latitudes and longitudes of the major scheme stations are given to thousandths of seconds and of the minor schemes, to hundredths of seconds. All azimuths are reckoned clockwise from the south. The azimuth and length of any line will be found opposite the second of the two stations of that line in the order in which they are listed. All distances are given in meters and are reduced to their mean sea-level values. Note should be made of the fact that the logarithms of the distances have been derived from the computations and the distances have been obtained from their corresponding logarithms, not vice versa. The following abbreviations have been used: "Mon." for Monument, "Ref." for Reference, and "ecc." for eccentric station.

In selecting stations upon which to base new triangulation, points of the major schemes of triangulation should be chosen in preference to those of a lower order. In searching for a particular triangulation station on the ground, reference should be made to the boundary maps and the triangulation sketches as well as to the printed description of the station.

GEOGRAPHIC POSITIONS OF TRIANGULATION STATIONS, SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN, MAJOR SCHEME

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	o / //	0 / //	0 / //			
& G. S.).	45 57 18. 400 67 46 59. 789					
Kennedy (U. S. C. & G. S.).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	113 09 15.54	293 06 44.33	Pole Hill	4, 927. 81	3. 6926543
Monument 1 (ini- tial monument).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pole Hill Kennedy	1, 282. 8 4, 471. 4	$\begin{array}{c} 3. \ 108175 \\ 3. \ 650440 \end{array}$
McInelly (U. S. C. & G. S.).	45 50 16.449 67 42 09.903	154 24 04.97 171 13 22.77	334 20 36.81 351 12 25.70	Pole Hill	14, 448. 98 11, 223. 22	4. 1598373 4. 0501177

## APPENDIX IV

SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN, MAJOR SCHEME-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
Spring Hill(U.S.C. & G. S.).	$\begin{array}{c}\circ&\prime&\prime\prime\\45&54&31.\ 207\\67&50&48.\ 366\end{array}$	° ' '' 251 07 25.99 305 04 17.74	° / // 71 12 41.35 125 10 29.89	Kennedy McInelly	9, 993. 87 13, 671, 17	$\begin{array}{c} 3. \ 9997335\\ 4. \ 1358056 \end{array}$
Green Mountain (U.S.C.&G.S.).	45 47 03.387 67 45 36.603	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spring Hill Pole Hill Kennedy McInelly	$\begin{array}{c} 15,375.86\\ 19,072.77\\ 17,271.56\\ 7,446.27\end{array}$	$\begin{array}{c} 4. \ 1868394 \\ 4. \ 2804138 \\ 4. \ 2373316 \\ 3. \ 8719386 \end{array}$
Spruce (U. S. C. & G. S.).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	McInelly Green Mountain	$ \begin{array}{c} 6, 071. \\ 7, 081. 3 \end{array} $	$\begin{array}{c} 3.\ 783312\\ 3.\ 850116 \end{array}$
Poplar Mountain	45 53 36.897 67 46 48.455	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spring Hill McInelly Green Mountain	5, 436. 7 8, 625. 7 12, 247. 9	$\begin{array}{c} 3.\ 735334\\ 3.\ 935792\\ 4.\ 088062 \end{array}$
Peekaboo Moun- tain(U.S.C.&G. S.).	45 44 47.047 67 52 49.073	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spring Hill Pole Hill Kennedy McInelly Green Mountain	18, 222, 72 24, 390, 96 24, 452, 32 17, 146, 79 10, 249, 51	$\begin{array}{c} 4.\ 2606133\\ 4.\ 3872288\\ 4.\ 3883201\\ 4.\ 2341828\\ 4.\ 0107031 \end{array}$
Spruce Mountain (U.S.C.&G.S.).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Peekaboo Mountain_ Green Mountain	22, 800, 83 21, 503, 75	$\begin{array}{c} 4. \ 3579506 \\ 4. \ 3325143 \end{array}$
Mount Henry (U.S. C. & G. Š.).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spruce Mountain Green Mountain	20, 208. 24 31, 323. 09	$\begin{array}{c} 4. \ 3055284 \\ 4. \ 4958647 \end{array}$
Walls Hill (U. S. C. & G. S.).	45 38 41.925 67 43 17.391	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Peekaboo Mountain Green Mountain Mount Henry Spruce Mountain	$\begin{array}{c} 16,734,99\\ 15,772,00\\ 23,520,37\\ 6,155,66 \end{array}$	$\begin{array}{c} 4.\ 2236254\\ 4.\ 1978868\\ 4.\ 3714442\\ 3.\ 7892743 \end{array}$
Walls Hill North (U.S.C.&G.S.).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Walls Hill Spruce Mountain	758. 8 5, 701. 0	$\begin{array}{c} 2. \ 880143 \\ 3. \ 755948 \end{array}$
Pemberton Ridge (U. S. C. & G. S.).	45 42 31.840 67 45 01.276	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Peekaboo Mountain_ Green Mountain Spruce Mountain	$\begin{array}{c} 10,942.9\\ 8,418.4\\ 13,424.7 \end{array}$	$\begin{array}{c} 4.\ 039133\\ 3.\ 925229\\ 4.\ 127905 \end{array}$
Forest City, Me., church spire (U. S. C. & G. S.).	45 39 44.20 67 43 52.39	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Peekaboo Mountain_ Pemberton Ridge	14,906.8 5,386.2	4. 173385 3. 731280
Table Rock (U. S. C. & G. S.).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	288 05 11.9 177 01 46.3	Walls Hill North Spruce Mountain	2,798.7 4,061.0	$\begin{array}{c} 3.\ 446953\\ 3.\ 608631 \end{array}$
McAllister (U.S.C. & G.S.).	45 37 17.893 67 38 55.421	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spruce Mountain Walls Hill North	$3, 137.1 \\ 5, 537.4$	$\begin{array}{c} 3.\ 496532\\ 3.\ 743308 \end{array}$
Vance Mountain (U.S.C.&G.S.).	45 33 53.946 67 30 59.684	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spruce Mountain Walls Hill Mount Henry	12, 967, 59 18, 292, 67 10, 703, 83	$\begin{array}{c} 4.\ 1128592\\ 4.\ 2622771\\ 4.\ 0295390 \end{array}$
Tomah Mountain (U.S.C.&G.S.).	45 27 18.987 67 41 17.691	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spruce Mountain Mount Henry Vance Mountain	$\begin{array}{c} 16,145,55\\ 28,821,74\\ 18,128,65 \end{array}$	$\begin{array}{c} 4.\ 2080528\\ 4.\ 4597202\\ 4.\ 2583655 \end{array}$
Brandy Hill (U. S. C. & G. S.).	45 31 58 887 67 20 57 658	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Tomah Mountain Vance Mountain Mount Henry	27, 864, 86 13, 533, 85 12, 470, 33	$\begin{array}{c} 4. \ 4450569 \\ 4. \ 1314215 \\ 4. \ 0958779 \end{array}$
Indian Island (U. S. C. & G. S.).	45 36 27.790 67 27 53.489	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Vance Mountain Mount Henry Brandy Hill	$\begin{array}{c} 6,233.\ 0 \\ 4,511.\ 0 \\ 12,256.\ 6 \end{array}$	$\begin{array}{c} 3.\ 794700\\ 3.\ 654272\\ 4.\ 088371 \end{array}$
Elbow Rip (U. S. C. & G. S.).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Tomah Mountain Vance Mountain Mount Henry Brandy Hill	$21, 127, 2 \\8, 451, 3 \\12, 992, 7 \\6, 747, 4$	$\begin{array}{c} 4.\ 324841\\ 3.\ 926923\\ 4.\ 113699\\ 2.\ 520124 \end{array}$

# SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN, MAJOR SCHEME-Continued

Station	L lo	atit an ngit	ude d tude		Az	imu	ith		] az	Bac	ck uth		To station	Dis (me	tance sters)	I	Jogi	arithm
Oak (U. S. C. & G. S.)	。 45 67	' 19 19	'' 44. 40.	$627 \\ 374$	。 116 150 175	$' \\ 33 \\ 41 \\ 46$	,, 29. 13. 08.	$22 \\ 04 \\ 84$	。 296 330 355	, 18 33 45	// 05. 08. 13.	62 96 77	Tomah Mountain Vance Mountain Brandy Hill	31, 30, 922, 922, 922, 922, 922, 922, 922, 92	513.80 090.4 730.2	6 1 8	4.4 4.4 4.3	$985016 \\784281 \\566048$
Neal (U. S. C. & G. S.)	45 67	19 41	00. 02.	$\frac{460}{919}$	$     \begin{array}{r}       178 \\       205 \\       267     \end{array} $	$48 \\ 21 \\ 04$	18. 44. 43.	75 06 58	$358 \\ 25 \\ 87$	48 28 19	08. 53. 55.	$23 \\ 88 \\ 57$	Tomah Mountain Vance Mountain Oak	$   \begin{array}{c}     15, \\     30, \\     27,   \end{array} $	$393.7' \\541.0 \\965.9'$	7 1 9	$\begin{array}{c} 4. \ 1 \\ 4. \ 4 \\ 4. \ 4 \end{array}$	$873450 \\ 848835 \\ 466302$
McGlinchy, 1917	45 67	28 29	03. 46.	303 760	84 171 319	$51 \\ 41 \\ 21$	$38. \\ 19. \\ 11.$	7 0 3	$264 \\ 351 \\ 139$	43 40 28	26. 26. 23.	$     \begin{array}{c}       3 \\       9 \\       1     \end{array}   $	Tomah Mountain Vance Mountain Oak	15, 10, 20,	$\begin{array}{c} 073. \ 4\\ 940. \ 3\\ 272. \ 1\end{array}$		$\begin{array}{c} 4. \ 1 \\ 4. \ 0 \\ 4. \ 3 \end{array}$	.78212 039031 06899
Howland, 1917	45 67	$35 \\ 24$	44. 54.	691 260		$55 \\ 02 \\ 41 \\ 37$	01. 44. 35. 19.	$\begin{array}{c}1\\7\\2\\4\end{array}$	$188 \\ 203 \\ 246 \\ 143$	54 59 37 40	$ \begin{array}{c} 15 \\ 15 \\ 15 \\ 14 \\ 08 \end{array} $	9 8 2 3	Elbow Rip McGlinchy, 1917 Vance Mountain Brandy Hill	8, 15, 8, 8, 8, 8, 8	$\begin{array}{c} 860. \ 1 \\ 594. \ 4 \\ 628. \ 8 \\ 656. \ 0 \end{array}$		3. 9 4. 1 3. 9 3. 9	)47438 192967 )35949 )37316
St. Croix	45 67	$33 \\ 25$	59. 26.	$443 \\ 654$	$\begin{array}{c} 192 \\ 302 \end{array}$	$\frac{11}{30}$	33. 18.	$\begin{array}{c} 2\\ 1 \end{array}$	$\begin{array}{c} 12\\122\end{array}$	11 33	56 3 30	3	Howland, 1917 Brandy Hill	3, 6,	$324. 3 \\ 921. 0$		3. 5 3. 8	$521706 \\ 840171$
Vanceboro school- house flagstaff, 1924.	45 67	$33 \\ 25$	57. 54.	586 517	$\begin{array}{c} 201 \\ 264 \end{array}$	33 35	06. 01.	$2 \\ 2$	21 84	38 38	$3 49 \\ 5 21$	. 3	Howland, 1917 St. Croix	3,	555.3 606.9	;	3. 5 2. 7	550874 783139
Scott	45 67	$\frac{29}{30}$	29. 03.	021 801	$171 \\ 210 \\ 241$	$34 \\ 02 \\ 57$	$     18. \\     25. \\     29.   $	590	$351 \\ 30 \\ 62$	33 06 00	$3 38 \\ 3 06 \\ 0 24$	. 6 . 8 . 6	Vance Mountain Howland, 1917 Elbow Rip		268. 3 401. 8 056. 1	B B L	3. 9 4. 1 3. 7	$\begin{array}{c} 917418 \\ 127163 \\ 782193 \end{array}$
Canoose	45 67	$22 \\ 25$	46. 07.	985 962	$     \begin{array}{r}       111 \\       159 \\       308     \end{array} $	$48 \\ 40 \\ 15$	$41. \\ 39. \\ 31.$	$\frac{2}{8}$ 7	291 339 128	37 30 19	$\begin{array}{c} 7 & 10 \\ 6 & 29 \\ 9 & 24 \end{array}$	. 5	Tomah Mountain Vance Mountain Oak	22, 21, 9,	695. 4 962. 2 085. 1	4 3 1	4. 3 4. 3	$355937 \\ 341678 \\ 958330$
Keene	45 67	25 28	29. 41.	276 018	$     \begin{array}{r}       169 \\       312 \\       317     \end{array} $	$     \begin{array}{c}       04 \\       04 \\       12     \end{array}   $	34. 30. 53.	7 6 3	349 132 137	0:10	$   \begin{array}{cccc}     2 & 55 \\     0 & 55 \\     5 & 25 \\   \end{array} $	. 8 . 3 . 0	Vance Mountain Oak Canoose	15, 15, 15, 6,	868. 6 861. 6 824. 4	5	4. 4. 4. 5 3. 5	$200540 \\ 200346 \\ 834070$
Loon Bay	45	$24 \\ 27$	38. 00	. 089 . 770	$313 \\ 324$	$20 \\ 24$	48. 35.	7	133     144	2	$   \begin{array}{c}     6 & 02 \\     5 & 56   \end{array} $	2. 1 5. 2	Oak Canoose	13, 4,	187. 9 217. 3	9	4. 3. 6	$120176 \\ 625034$
Collins (U. S. C. & G. S.).	45 67	$15 \\ 14$	02 03	649 425	101 139	54 53	35. 07.	51 55	281 319	3.	$5 24 \\ 9 08$	L. 70 8. 09	Neal Oak	36, 11,	050. 9 388. 1	91 29	4. 4.	$5569162\\0564586$
Rye (U. S. C. & G. S.).	45 67	07 25	24 31	. 585 . 742	$     \begin{array}{r}       136 \\       198 \\       226     \end{array} $	$     \begin{array}{c}       41 \\       30 \\       40     \end{array} $	19. 49. 19. 19.	. 54 . 06 . 52	$     \begin{array}{c}       316 \\       18 \\       46     \end{array} $	5 3 3 3 5 4	$\begin{array}{c} 0 & 18 \\ 4 & 58 \\ 8 & 27 \end{array}$	8. 58 8. 50 7. 82	Neal Oak Collins	$ \begin{array}{c} 29, \\ 24, \\ 20, \\ \end{array} $	567. 9 097. 4 634. 0	95 49 03	4. 4. 4.	4708211 3819718 3145841
Middlemiss (U. S. C. & G. S.).	45 67	12 24	14 20	. 648 . 501	9 119 203 248	51 55 42 52	51. 13. 13. 10.	. 0. 5. 6. 3	189 299 28 68	) 5 ) 4 3 3 5	$\begin{array}{ccc} 1 & 0 \\ 3 & 2 \\ 5 & 3 \\ 9 & 2 \end{array}$	), 5 1, 5 2, 7 3, 3	Rye Neal Oak Collins	$     \begin{array}{c}       9, \\       25, \\       15, \\       14     \end{array} $	$\begin{array}{c} 088. \\ 191. \\ 174. \\ 426. \end{array}$	6 7 5 5	3. 4. 4. 4.	$958496 \\ 401257 \\ 181114 \\ 159160$
Scotch Ridge church steeple (U.S.C.&G.S.), 1887; 1918.	45 67	5 17 23	00 56	. 265 . 483		24 40 31 37	$     \begin{array}{c}       08 \\       54 \\       19 \\       41     \end{array} $		183 186 279 103	3 2 3 3 3 3 1 5 4	$   \begin{array}{c}     3 & 5 \\     9 & 4 \\     9 & 0 \\     4 & 4   \end{array} $	1. 0 3. 7 9. 4 2. 9	Middlemiss Rye Neal Collins		832. 892. 669. 429.	8 9 6 2	3. 4. 4. 4.	$\begin{array}{r} 946100 \\ 252681 \\ 355444 \\ 128049 \end{array}$
Little Ridge church tower (U. S. C. & G. S.), 1887; 1917.	48 67	5 12 7 24	2 39 4 10	). 754 5. 078	4 7 5 251	06 40	) 13 ) 22		18 7	7 0 1 4	06 1 7 3	07	Middlemiss Collins	14	781. , 073.	0 8	2. 4.	892673 148412
Clark, 1918	- 48	5 19	9 33 7 05	3. 236 5. 784	$   \begin{array}{c}       3 \\       4 \\       203 \\       267 \\       343   \end{array} $	$\begin{array}{c} 7 & 53 \\ 3 & 11 \\ 7 & 52 \\ 5 & 04 \end{array}$	3 29 49 2 46 4 50	). 8 ). 4 ). 9 ). 6	30' 2: 8' 16	$7 4 \\ 3 1 \\ 7 5 \\ 5 0$	$\begin{array}{c} 13 & 2 \\ 13 & 1 \\ 58 & 0 \\ 06 & 4 \end{array}$	$\begin{array}{c} 3.5\\ 3.4\\ 3.8\\ 8.1 \end{array}$	Tomah Mountain_ Canoose Oak Middlemiss		, 455. , 508. , 706. , 011.	$     \begin{array}{c}       7 \\       0 \\       2 \\       0     \end{array} $	4. 3. 3. 4.	$370248 \\ 813446 \\ 987051 \\ 146469$
Ross	- 4.	5 17	7 33	3. 824 9. 878	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 0 & 01 \\ 2 & 42 \\ 4 & 42 \end{array} $	$1 15 \\ 5 32 \\ 2 48$	5. 2 2. 3 8. 9	$     \begin{array}{c}       31 \\       7 \\       14     \end{array} $	9 5 2 5 4 4	$52 5 \\ 52 3 \\ 46 3$	8.7 8.6 5.7	Tomah Mountain Oak Middlemiss	- 23 - 13 - 12	, 598. , 669. , 066.	$     \begin{array}{c}       7 \\       5 \\       4     \end{array}   $	4. 4. 4.	$372888 \\ 135753 \\ 081577$

## APPENDIX IV

# SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN, MAJOR SCHEME-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
Pomeroy	$\circ$ ' '' 45 15 13.956 67 26 32.111	$ \begin{array}{c} \circ & \prime & \prime \\ 136 & 33 & 00. \\ 225 & 56 & 08. \\ 0 \end{array} $	$ \begin{smallmatrix} \circ & , & , \\ 316 & 30 & 47.5 \\ 45 & 57 & 58.6 \end{smallmatrix} $	Ross Scotch Ridge church steeple	5, 949. 5 4, 720. 3	3. 774484 3. 673968
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Oak Middlemiss	$\begin{array}{c} 12,260.\ 6\\ 6,235.\ 7\end{array}$	$\begin{array}{c} 4.\ 088513\\ 3.\ 794884 \end{array}$
Chamcook (U. S. C. & G. S.).	45 07 30.243 67 05 01.637	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Rye Collins Oak	26, 884. 67 18, 301. 52 29, 689. 77	$\begin{array}{r} 4.\ 4295047\\ 4.\ 2624872\\ 4.\ 4726069 \end{array}$
Cooper (U. S. C. & G. S.).	44 59 13.477 67 28 02.254	$\begin{bmatrix} 192 & 14 & 29. & 55 \\ 211 & 57 & 09. & 46 \\ 242 & 57 & 02. & 82 \end{bmatrix}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Rye Collins Chamcook	$\begin{array}{c} 15,514.11\\ 34,564.63\\ 33,878.88\end{array}$	$\begin{array}{r} 4.\ 1907270\\ 4.\ 5386319\\ 4.\ 5299291 \end{array}$
Maguerrewoc(U. S. C. & G. S.).	45 09 19.867 67 16 49.387	$\begin{array}{c} 38 & 14 & 40. \\ 72 & 43 & 59. 0 \\ 118 & 45 & 29. 9 \\ 122 & 22 & 01 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cooper Rye Middlemiss Little Ridge church	$\begin{array}{c} 23,813,18\\ 11,955,09\\ 11,230,6\\ 11,540,6\end{array}$	$\begin{array}{c} 4.\ 3768174\\ 4.\ 0775528\\ 4.\ 050404\\ 4.\ 062228 \end{array}$
		146 47 28.4	326 42 25.2	steeple.	16, 995. 4	4. 230332
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Collins Chamcook	$\begin{array}{c} 11,184.70\\ 15,829.61 \end{array}$	$\begin{array}{c} 4. \ 0486242 \\ 4. \ 1994703 \end{array}$
Mohannas (U. S. C. & G. S.).	45 09 16.365 67 21 25.766	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Rye Collins Maguerrewoc	$\begin{array}{c} 6,386.9\\ 14,404.2\\ 6,038.0\end{array}$	$\begin{array}{c} 3. \ 805289 \\ 4. \ 158489 \\ 3. \ 780895 \end{array}$
Baring school cupo- la (U. S. C. & G. S.).	45 08 04.479 67 18 58.155	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Rye Mohannas Collins Maguerrewoc	$\begin{array}{c} 8,688.9\\ 3,914.7\\ 14,423.6\\ 3,651.1\end{array}$	$\begin{array}{c} 3. \ 938966\\ 3. \ 592698\\ 4. \ 159073\\ 3. \ 562422 \end{array}$
Sinclair, 2	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Maguerrewoc Collins	4,736.03 7,537.46	$\begin{array}{c} 3. \ 6754146 \\ 3. \ 8772252 \end{array}$
Todd Mountain	45 10 15.751 67 18 48.796	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Collins Sinclair 2 Maguerrewoc	$\begin{array}{c} 10,826,94\\ 6,372,69\\ 3,126,90 \end{array}$	$\begin{array}{c} 4. & 0345057 \\ 3. & 8043226 \\ 3. & 4951140 \end{array}$
Anderson (U. S. C. & G. S.).	45 08 16.432 67 23 17.002	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Rye Middlemiss Maguerrewoc	3, 351. 3 7, 483. 5 8, 691. 5	$\begin{array}{c} 3. \ 525214 \\ 3. \ 874103 \\ 3. \ 939097 \end{array}$
Murchie	45 09 10.099 67 22 09.155	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Anderson Rye Mohannas	$\begin{array}{c} 2,223.1\\ 5,495.8\\ 967.3\end{array}$	$\begin{array}{c} 3. \ 346953 \\ 3. \ 740031 \\ 2. \ 985575 \end{array}$
Prince Regents Re- doubt (U. S. C. & G. S.).	44 55 11. 418 67 00 39. 860	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cooper Chamcook	36, 768. 95 23, 516. 50	4. 5654812 4. 3713727
Arcus (U. S. C. & G. S.).	44 54 12.328 67 11 33.910	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cooper Chamcook Prince Regents Re- doubt.	$\begin{array}{c} 23,577.9\\ 26,086.2\\ 14,462.9\end{array}$	$\begin{array}{c} 4.\ 3725046\\ 4.\ 4164108\\ 4.\ 1602542 \end{array}$
Trescott Rock (U. S. C. & G. S.).	44 45 32.235 67 06 30.960	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cooper Arcus Chamcook Prince Regents Re- doubt.	$\begin{array}{c} 38,027.67\\ 17,379.2\\ 40,733.17\\ 19,470.82 \end{array}$	$\begin{array}{c} 4.\ 5800997\\ 4.\ 2400306\\ 4.\ 6099482\\ 4.\ 2893842 \end{array}$
Grand Manan (U. S. C. & G. S.).	44 44 53.516 66 49 53.224	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Trescott Rock Cooper Prince Regents Re- doubt	21, 978. 94 56, 831. 51 23, 781. 50	$\begin{array}{c} 4.\ 3420067\\ 4.\ 7545892\\ 4.\ 3762392 \end{array}$
		154 39 12.74	334 28 31.10	Chamcook	46, 376, 50	4. 6662980

Latitude Back Distance Azimuth Station and To station Logarithm azimuth (meters) longitude 0 / 11 0 / // 1 11 44 49 21.066 67 01 21.057 Porcupine (U. S. C. & G. S.). 9, 813. 416, 182. 5 10, 852. 7 43 59 33.2 223 55 54.9 Trescott Rock .... 3. 991821 4. 209046  $\begin{array}{c} 303 \ 41 \ 30. \ 0 \\ 4 \ 47 \ 02. \ 3 \end{array}$ Arcus\_ Prince Regents Re-4. 035539 doubt. 298 34 28.9 118 42 33.5 Grand Manan\_ 17, 229. 8 4. 236281 Quoddy (U. S. C. & G. S.). 44 48 51.927 66 57 48.478  $13, 035. 6 \\ 4, 756. 5$  $\begin{array}{c} 4. \ 115131 \\ 3. \ 677289 \\ 4. \ 314846 \end{array}$ Trescott Rock\_ Porcupine\_\_\_\_\_ 20, 646. 5 Arcus\_. Prince Regents Re-162 12 40.6 342 10 39.7 12, 303. 8 4. 090040 doubt. Grand Manan\_ 305 06 41.9 125 12 16.7 4. 106544 12.780.4 44 58 05.172 66 57 54.028 Hannah (U. S. C. Porcupine\_ 16, 804. 3 4. 225421 & G. S.). Prince Regents Re-6, 479. 7 3. 811557 doubt. 68 17 17.2 248 07 38.2 19, 361. 2 4. 286932 Arcus\_-151 49 46.1 331 44 43.5 Chamcook\_\_\_\_\_ 19, 795. 4 4. 296565 179 35 31.2 359 35 27.3 Quoddy\_\_\_\_\_ 17, 078. 6 4. 232452 44 55 30. 436 Hersev (U.S.C. & 67 28 29.4 Arcus\_\_\_\_\_ Prince Regents Re-6, 287, 2 3. 798455 247 25 22 6 G. S.). 67 07 09. 202 273 53 42. 3 93 58 17.3 8, 559. 2 3. 932435 doubt. Trott (U. S. C. & G. S.). 3.7426993.71947844 57 06. 182 5, 529. 7 Hersey\_\_\_\_\_ Prince Regents Re-67 03 36. 052 5, 241. 8 doubt. North Head (U. S. C. & G. S.). 45 01 24. 504 6, 284, 0 3. 798237 11 42 41.6 Hannah 66 56 55. 822 136 46 55.1 Chamcook\_\_\_\_\_ 15, 504. 9 4. 190470  $\begin{array}{c} 3. \ 923305 \\ 3. \ 919912 \end{array}$ Navy Island (U. S. C. & G. S.). Chamcook\_ 8, 381. 2 North Head\_\_\_\_\_ 8, 316. 0 45 05 26.626 Shortland (U.S.C. 235 10 48.4 55 13 46.4 Chamcook. 6, 687. 3 3. 825253  $\begin{array}{c} 294 & 47 & 39. \\ 294 & 49 & 13. \\ 7 \end{array}$  $\begin{array}{c} 114 \ 56 \ 21. \ 3 \\ 114 \ 53 \ 51. \ 5 \end{array}$ North Head\_\_\_\_\_ Navy Island\_\_\_\_\_ 17,774.49,458.4 & G. S.). 67 09 12.840 4.249795 3. 975819 Cumming (U.S.C. 194 01 46.3 Prince Regents Re-3, 247. 0 3. 511476 & G. S.). 274 48 21.9 doubt. Trott\_\_\_ 4,666.1 3. 668951  $\begin{array}{c} 4,\,076.\,5\\ 2,\,057.\,2 \end{array}$ Kendall 2 (U. S. C. 3. 610287 44 55 58. 286 Trott & G. S.). 67 00 56. 576 Cumming\_\_\_ 3. 313285 Prince Regents Re-doubt. 165 46 58.4 1, 492. 5 345 46 46.6 3.173916Treat 2 (U. S. C. & G. S.). Trott\_ Prince Regents Re-doubt. 9, 769. 3 3. 989864 325 48 28.1 3. 683186 340 19 50.3 4, 821, 5 445409.333451916.9665725.0491141027.4 Campobello (U. S. 225 17 51.6 Treat 2. 3, 730. 9 3. 571817 Prince Regents Re-294 08 09.9 C. & G. S.). 4, 683. 5 3. 670572 doubt. 145 29 39.7 325 27 47. 5 Cumming\_ 6, 149. 4 3. 788832 4, 792. 6 3.6805703.297063Cherry Island bell 44 55 07.790 22 29 18.9 202 28 20.0 Treat 2. Campobello\_\_\_\_\_ tower (U. S. C. & G. S.), 1910. 1, 981. 8 66 58 02. 398 335 34 37. 0 155 35 03.4 Friars Head 3 (U. S. C. & G. S.). 3. 161991 44 52 34. 747 101 45 52. 5 281 45 06.8 Treat 2. 1, 452. 1 66 58 21. 150 184 58 32. 3 4 58 45.5 Cherry Island bell 4, 742. 2 3. 675979 tower. Campobello\_\_\_ 3. 500884 22 52 05.1 3, 168. 7 202 51 25.5 Treat 2\_\_\_\_\_ Cherry Island bell 3. 322251 2, 100, 2 Buckman (U. S. C. 1 11 03.9 44 53 52.353 2, 936. 5 3. 467823 66 59 23. 941 217 31 21. 2 & G. S.). tower. 2, 660. 72, 763. 6Campobello\_ 78 38 59.2 3. 424994 258 37 35.3 330 05 09.8 150 05 54.1 Friars Head 3\_\_\_\_\_ 3. 441483

### SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN, MAJOR SCHEME-Continued

# APPENDIX IV

SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN, MAJOR SCHEME-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Logarithm
	0 / //	0 1 11	0 / //			
Mullholland Point Light (U. S. C. & G.S.), 1910; 1919.	44 51 47.569 66 58 48.673	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Treat 2 Buckman Friars Head 3	$\begin{array}{c} 1,933.\ 6\\ 3,929.\ 0\\ 1,576.\ 7\end{array}$	$\begin{array}{c} 3. \ 286367 \\ 3. \ 594277 \\ 3. \ 197746 \end{array}$
Lubec church spire (U. S. C. & G. S.).	44 51 38.470 66 59 17.418	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Porcupine Prince Regents Re- doubt.	5, 036. 3 6, 817. 9	$\begin{array}{c} 3. \ 702108 \\ 3. \ 833652 \end{array}$
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Treat 2 Quoddy	$\begin{array}{c} 2,\ 041.\ 7\\ 5,\ 499.\ 6\end{array}$	$\begin{array}{c} 3. \ 309982 \\ 3. \ 740332 \end{array}$
Indian Point (U. S. C. & G. S.)	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Quoddy Porcupine	2, 345. 4 5, 609. 3	$\begin{array}{c} 3. \ 370225\\ 3. \ 748906 \end{array}$
Wolf (U. S. C. & G. S.).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Quoddy Hannah Chamcook	22, 621. 3 18, 496. 8 34, 552. 5	$\begin{array}{c} 4.\ 354518\\ 4.\ 267096\\ 4.\ 538480\end{array}$
Southwest Wolf Is- land Lighthouse (Geodetic Sur- vey of Canada).	44 56 13.349 66 44 03.361	65 29	245 29	Wolf	44. 5	1. 64801

the second s						
Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Traverse Station 1	° / // 45 56 32.53 67 46 54.73	° ' '' 180 06 04	° ' '' 0 06 04	Initial Monument (Monument 1).	138. 2	2. 140647
Traverse Station 2	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	161 38 42	341 38 32	Traverse Station 1	933. 1	2. 969905
Ref. Mon. 2	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	161 38 42	341 38 42	Traverse Station 2	27. 9	1. 445433
Traverse Station 3	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	93 18 38	273 18 26	Traverse Station 2	376. 8	2. 576140
Traverse Station 4	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	152 31 18	332 31 16	Traverse Station 3	104, 3	2. 018108
Traverse Station 5	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	171 34 43	351 34 42	Traverse Station 4	148. 8	2. 172657
Traverse Station 6	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	106 16 25	286 16 10	Traverse Station 5	459. 2	2. 661975
Ref. Mon. 3	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	175 19 46	355 19 45	Traverse Station 6	318. 8	2. 503517
Traverse Station 8	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	96 25 27	276 25 15	Ref. Mon. 3	355. 1	2. 550305
Traverse Station 9	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	135 03 36	315 03 29	Traverse Station 8	313. 0	2. 495490
Traverse Station 10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	188 40 42	8 40 43	Traverse Station 9	196. 6	2. 293491
Traverse Station 11	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	133 23 19	313 23 02	Traverse Station 10	715.0	2. 854279
Traverse Station 12	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	180 34 22	0 34 22	Traverse Station 11	419.7	2. 622909
Ref. Mon. 4	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0 34 22	180 34 22	Traverse Station 12	47.7	1. 678245
Ref. Mon. 5	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	180 34 22	0 34 22	Ref. Mon. 4	29.7	1. 472800
Traverse Station 13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	225 43 20	45 43 33	Traverse Station 12	533. 7	2. 727333
Traverse Station 14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	229 34 14	49 34 19	Traverse Station 13	198. 9	2. 298709
Traverse Station 14–A_	45 54 40.08 67 45 38.02	262 11 21	82 11 24	Traverse Station 14	80. 9	1. 908053
Traverse Station 15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	262 10 21	82 10 30	Traverse Station 14–A.	262. 0	2. 418308
Traverse Station 16	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	250 30 38	70 30 44	Traverse Station 15	188. 4	2. 275086
Ref. Mon. 6	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	139 38 39	319 38 38	Traverse Station 16	26. 5	1. 422639
Ref. Mon. 7	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	139 38 39	319 38 38	Ref. Mon. 6	29. 8	1. 473998
					17	5

# GEOGRAPHIC POSITIONS OF TRIANGULATION AND TRAVERSE STATIONS, SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Traverse Station 17	° / // 45 54 19.00 67 46 03.30	° ′ ′′ 191 01 20	° ' '' 11 01 24	Traverse Station 16	562. 8	2. 750337
Traverse Station 17–A.	45 54 08.77 67 46 07.03	194 15 19	14 15 21	Traverse Station 17	325. 8	2. 512963
Traverse Station 18	$\begin{array}{r} 45 & 53 & 53. \ 28 \\ 67 & 46 & 12. \ 66 \end{array}$	194 15 20	14 15 24	Traverse Station 17–A_	493. 3	2. 693153
Traverse Station 18–F_	45 54 01.97 67 46 09.50	194 15 22	14 15 24	Traverse Station 17–A_	216. 5	2. 335458
Traverse Station 19	45 53 53.23 67 46 24.66	269 36 31	89 36 39	Traverse Station 18	258.6	2. 412590
Traverse Station 19–B_	45 53 49.99 67 46 27.07	207 26 44	27 26 46	Traverse Station 19	112. 7	2. 05201
Ref. Mon. 8	45 53 48.41 67 46 37.78	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$212 55 05 \\ 62 16 36$	Poplar Mountain Traverse Station 19	423.4 319.6	$\begin{array}{c} 2. \ 626790 \\ 2. \ 504606 \end{array}$
Ref. Mon. 9	45 53 47.87 67 46 39.47	245 23 53	65 23 54	Ref. Mon. 8	40. 2	1. 60369 <b>6</b>
Avernus	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Ref. Mon. 8 Poplar Mountain	511.0 274.5	$\begin{array}{c} 2.\ 708391\\ 2.\ 438516 \end{array}$
Avernus tablet	45 53 41. 13 67 47 01. 17	253 16 50	73 16 51	Avernus	41. 4	1. 616979
Acheron	45 53 45.60 67 47 05.67	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Poplar Mountain Avernus	$458.2 \\ 185.9$	$\begin{array}{c} 2. \ 661051 \\ 2. \ 269279 \end{array}$
Acheron tablet	45 53 44.73 67 47 07.30	232 32 49	52 32 50	Acheron	44. 4	1. 647285
Egypt	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	238 30 32	58 30 38	Acheron	195. 8	2. 291813
Dam	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	244 48 50	$64 \ 48 \ 54$	Egypt	119.8	2.078457
Dam tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	213 04 32	33 04 33	Dam	49.8	1. 697055
Water	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	228 40 18	48 40 23	Dam	204.4	2. 310481
Chub	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	177 03 28	357 <mark>0</mark> 3 28	Water	152. 7	2. 183839
Chub tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	167 27 16	<b>347 27 16</b>	Chub	25. 8	1. 411451
Togue	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$231 \ 14 \ 56$	$51 \ 14 \ 59$	Chub	109. 4	2. 039017
Sucker	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	247 52 07	67 52 12	Togue	147. 4	2. 168562
Sucker tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	135 46 51	315 46 50	Sucker	11. 6	1. 065580
Pickerel	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	213 51 06	33 51 08	Sucker	119. 3	2. 076640
Pickerel tablet	45 53 23.60 67 47 39.07	213 21 46	33 21 46	Pickerel	18. 8	1. 273649
Perch	45 53 20.98 67 47 41.50	212 57 39	$32\ 57\ 41$	Pickerel	114. 9	2. 060396

SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Perch tablet	$\circ$ , , , , , , , , , , , , , , , , , , ,	° ′ ′′ 217 07 58	° ' '' 37 07 58	Perch	19. 7	1. 294466
Ref. Mon. 10	45 53 20.32 67 47 41 36	107 05 07	287 05 07	Perch tablet	15.6	1. 193116
Ref. Mon. 11	$\begin{array}{c} 45 \\ 53 \\ 67 \\ 47 \\ 42. \\ 08 \end{array}$	285 46 59	105 46 59	Perch tablet	0. 8	9. 8956-10
Trout	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	208 00 15	28 00 17	Perch	153. 9	2. 187270
Trout tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	261 38 03	81 38 03	Trout	12. 4	1. 094646
Bend	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	304 23 48	$124 \ 23 \ 51$	Trout	95. 3	1. 979275
Camp Collier	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	235 35 46	55 35 48	Bend	78.6	1. 895423
Camp Collier mark	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	73 38 54	253 38 53	Camp Collier	19.9	1. 299725
Twist	45 53 12.89 67 47 53.00	194 30 53	14 30 54	Camp Collier	127. 5	2. 105578
Twist tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	223 09 16	43 09 16	Twist	8.6	0. 934498
Curve	45 53 08.69 67 47 55.38	201 38 47	21 38 49	Twist	139. 3	2. 143951
Curve tablet (T.P. 469)	45 53 09.44 67 47 54.99	20 09 15	200 09 15	Curve	24. 6	1. 390935
Hornet 2	45 53 06.06 67 47 57.79	212 34 17	32 34 19	Curve	96. 2	1. 983306
Hornet 2 tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	52 54 58	232 54 58	Hornet 2	19. 0	1. 279781
Spring	45 53 03.93 67 47 58.00	183 47 30	3 47 30	Hornet 2	66. 2	1. 820746
Spring tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$251 \ 43 \ 26$	71 43 27	Spring	26. 7	1. 426430
Road	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	268 52 02	88 52 05	Spring	83. 9	1.923854
Turn	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$197 \ 22 \ 05$	$17 \ 22 \ 05$	Road	64. 0	1. 805981
Ley	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	228 29 29	48 29 32	Turn	93. 6	1. 971313
Stafford	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	308 15 38	128 15 42	Ley	168. 3	2. 225956
Bess	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	216 12 54	36 12 57	Stafford	171. 0	2. 233004
Dan	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	130 30 28	310 30 26	Bess	86. 7	1. 937876
Ref. Mon. 12	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	212 02 17	32 02 20	Dan	149. 2	2. 173751
Ref. Mon. 13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	86 15 18	266 15 17	Ref. Mon. 12	37. 2	1. 570981

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SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Joe	° ' '' 45 52 46.94 67 48 14.85	$\circ$ ' '' 162 51 21	° ' '' 342 51 19	Ref. Mon. 12	191. 5	2. 282262
Tom	$\begin{array}{c} 45 \\ 52 \\ 67 \\ 48 \\ 15 \\ 75 \end{array}$	191 54 04	11 54 05	Joe	93, 0	1. 968418
Phil	$\begin{array}{c} 45 \ 52 \ 40. \ 58 \\ 67 \ 48 \ 18. \ 35 \end{array}$	208 01 13	28 01 15	Tom	119. 5	2. 077273
Pete	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	153 08 04	333 08 01	Phil	164. 2	2. 215295
Alder	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	214 27 37	34 27 41	Pete	197.4	2. 295391
Drybush	45 52 21.80 67 48 18.53	172 51 19	352 51 18	Alder	272.6	2. 435467
Drybush tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	348 05 32	$168 \ 05 \ 32$	Drybush	36. 9	1. 566555
Leaf	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	190 20 30	$10\ 20\ 32$	Drybush	344. 8	2. 537580
Green	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$175 \ 15 \ 26$	$355\ 15\ 25$	Leaf	267.5	2. 427379
Poplar 2	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	89 14 48	$269\ 14\ 42$	Green	169.9	2. 230278
Edge	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$52 \ 41 \ 27$	$232 \ 41 \ 26$	Poplar 2	31. 5	1. 498991
Ref. Mon. 14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	182 50 59	2 50 59	Edge	22. 7	1. 356160
Ref. Mon. 15	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	13 31 18	193 31 17	Ref. Mon. 14	109.6	2. 039860
Rockmaple	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	150 35 29	330 35 28	Poplar 2	72. 1	1. 857747
Rockmaple tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$62 \ 31 \ 28$	$242 \ 31 \ 27$	Rockmaple	24.4	1. 387731
Hades	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	167 18 20	347 18 19	Rockmaple	139. 2	2. 143765
Inferno	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	170 29 30	350 29 29	Hades	112. 0	2. 049364
Pest	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	80 12 44	260 12 38	Inferno	166. 5	2. 221520
Hardwood	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	139 40 24	319 40 22	Pest	98.6	1. 993842
Hardwood tablet	45 51 50.70 67 47 58.26	260 38 57	80 38 57	Hardwood	4.8	0. 683947
Moose	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	163 27 11	343 27 09	Hardwood	167. 3	2. 223549
Moose tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	248 29 11	68 29 11	Moose	16.4	1. 214473
Willows	45 51 27.02 67 47 33.63	140 01 53	320 01 37	Moose	745.4	2. 872405
Ness	45 51 21.62 67 47 38.87	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 333 & 38 & 30 \\ 34 & 06 & 39 \end{array}$	Moose Willows	823. 9 201. 7	$\begin{array}{c} 2. \ 915874 \\ 2. \ 304655 \end{array}$

# SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Ness tablet	$\circ$ ' '' 45 51 21.46 67 47 39.55	° ' '' 251 30 07	° ' '' 71 30 07	Ness	15. 5	1. 189659
Collier	45 51 10.52 67 47 24.24	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ness Moose	465.8 1, 277.7	$\begin{array}{c} 2. \ 668211 \\ 3. \ 106415 \end{array}$
Mid	45 51 09.78 67 47 29.15	257 44 32	77 44 36	Collier	108.4	2. 034840
Ref. Mon. 16	45 51 08.38 67 47 27.98	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Mid Ness Willows Collier	$50. 0 \\ 471. 4 \\ 588. 4 \\ 104. 5$	$\begin{array}{c} 1.\ 698837\\ 2.\ 673411\\ 2.\ 769698\\ 2.\ 019070 \end{array}$
Ref. Mon. 17	45 51 10.33 67 47 24.39	208 19 06	28 19 06	Collier	6, 9	0. 838849
Birch tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	246 30 32	66 30 32	Ref. Mon. 16	15.6	1. 191730
North Stump	45 51 07.47 67 47 24.54	110 37 19	290 37 16	Ref. Mon. 16	79.4	1. 89957
Raspberry	45 50 55.50 67 47 11.79	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Ref. Mon. 16 Ness	529. 3 995. 7	$\begin{array}{c} 2. \ 723661 \\ 2. \ 998145 \end{array}$
Cropley	45 50 50.83 67 47 01.87	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Raspberry Ref. Mon. 16 North Stump	$\begin{array}{c} 258. \ 1 \\ 781. \ 6 \\ 709. \ 4 \end{array}$	$\begin{array}{c} 2. \ 411773 \\ 2. \ 892983 \\ 2. \ 85088 \end{array}$
Landing	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Raspberry Cropley	$\begin{array}{c} 443.\ 2\\ 185.\ 3\end{array}$	$\begin{array}{c} 2. \ 646560 \\ 2. \ 237932 \end{array}$
Landing tablet	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	302 52 05	122 52 05	Landing	14.6	1. 165689
Cedar	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Cropley Landing	389. 8 208. 5	$\begin{array}{c} 2. \ 590846 \\ 2. \ 319060 \end{array}$
Extra	$\begin{array}{r} 45 & 50 & 48.85 \\ 67 & 46 & 58.13 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Landing Cedar	84. 2 290. 5	$\begin{array}{c} 1. \ 925174 \\ 2. \ 463091 \end{array}$
Ref. Mon. 18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cedar Landing	$348.9 \\ 550.2$	$\begin{array}{c} 2. \ 542675 \\ 2. \ 740521 \end{array}$
Narrows tablet	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	304 57 03	$124\ 57\ 03$	Ref. Mon. 18	8.6	0. 9355 07
Ref. Mon. 19	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	29 09 43	209 09 42	Ref. Mon. 18	56. 1	1. 748626
Fawn	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	142 08 13	322 07 52	Ref. Mon. 18	1, 022. 7	3. 009758
Calf	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Fawn Ref. Mon. 18	194.4 986.8	$\begin{array}{c} 2. \ 288804 \\ 2. \ 994241 \end{array}$
Deer	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Fawn Calf	$295.4 \\ 461.7$	$\begin{array}{c} 2. \ 470380 \\ 2. \ 664355 \end{array}$
Deer mark	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	203 07 32	23 07 32	Deer	15.8	1. 199892
Doe	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Deer Fawn Calf	$268. \ 6 \\ 381. \ 9 \\ 445. \ 2$	$\begin{array}{c} 2. \ 429030 \\ 2. \ 581948 \\ 2. \ 648507 \end{array}$
Doe mark	45 50 00.38 67 45 53.57	145 05 38	325 05 38	Doe	14. 3	1. 156095

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Wall	° ' '' 45 49 42.80 67 45 56.20	$\circ$ ' '' 157 07 13 185 01 00	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 337 & 07 & 06 \\ 5 & 01 & 02 \end{smallmatrix} $	Deer Doe	557.6 556.5	$\begin{array}{c} 2. \ 746308 \\ 2. \ 745493 \end{array}$
Ref. Mon. 20	45 49 47.58 67 45 42.75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Wall Deer Green Mountain	$\begin{array}{r} 325.\ 7\\ 625.\ 7\\ 473.\ 4\\ 5,\ 070.\ 9\end{array}$	$\begin{array}{c} 2. \ 512850\\ 2. \ 796335\\ 2. \ 675203\\ 3. \ 705088 \end{array}$
Buck	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Wall Ref. Mon. 20	535. 2 478. 7	$\begin{array}{c} 2. \ 72854 \\ 2. \ 68006 \end{array}$
Ref. Mon. 21	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Wall Ref. Mon. 20 McInelly	$116. 1 \\ 403. 3 \\ 5, 034. 1$	$\begin{array}{c} 2. & 064770 \\ 2. & 605682 \\ 3. & 701923 \end{array}$
Gull Rock 2	45 49 30.07 67 45 47.65	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 21 Wall Ref. Mon. 20 McInelly Green Mountain	$\begin{array}{r} 342. \ 8 \\ 434. \ 3 \\ 550. \ 9 \\ 4, \ 913. \ 2 \\ 4, \ 534. \ 9 \end{array}$	$\begin{array}{c} 2. \ 535093\\ 2. \ 637812\\ 2. \ 741048\\ 3. \ 691360\\ 3. \ 656566\end{array}$
Picnie	45 48 56 23 67 45 01 73	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Green Mountain Gull Rock 2 Ref. Mon. 21 Ref. Mon. 20	$\begin{array}{c} 3,564.4\\ 1,440.2\\ 1,780.5\\ 1,815.8 \end{array}$	$\begin{array}{c} 3. \ 551984 \\ 3. \ 158428 \\ 3. \ 250551 \\ 3. \ 259065 \end{array}$
Boulders	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 21 Gull Rock 2 Ref. Mon. 20 Picnic	798. 9467. 7990. 21, 047. 4	$\begin{array}{c} 2. & 902494 \\ 2. & 669962 \\ 2. & 995738 \\ 3. & 020108 \end{array}$
Watson	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Gull Rock 2	$547.6 \\ 227.1$	$\begin{array}{c} 2. \ 738476 \\ 2. \ 356234 \end{array}$
Ref. Mon. 23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{smallmatrix}&1&57&34\\&268&31&32\end{smallmatrix}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Watson Boulders	87.5 204.4	$\begin{array}{c} 1. \ 942096 \\ 2. \ 310464 \end{array}$
Ref. Mon. 22	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	154 52 09	334 52 09	Boulders	5. 3	0. 725438
Wet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Watson Ref. Mon. 23 Boulders	$96. \ 2 \\ 172. \ 2 \\ 222. \ 8$	$\begin{array}{c} 1. \ 983302 \\ 2. \ 236053 \\ 2. \ 348010 \end{array}$
Piedra	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Watson Wet	$119. \ 1 \\ 128. \ 4$	$\begin{array}{c} 2. \ 075782 \\ 2. \ 108733 \end{array}$
Bivouac	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 64 & 19 & 33 \\ 127 & 49 & 51 \end{array}$	Watson Piedra	$\begin{array}{c} 132. \ 6 \\ 68. \ 2 \end{array}$	$\begin{array}{c} 2. \ 122707 \\ 1. \ 834037 \end{array}$
Ref Mon. 24	45 49 06.96 67 46 07.76	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 64 & 20 & 48 \\ 76 & 06 & 50 \\ 76 & 59 & 20 \end{array}$	Watson Piedra Wet	$\begin{array}{c} 395. \ 5\\ 299. \ 6\\ 428. \ 0 \end{array}$	$\begin{array}{c} 2. \ 597175 \\ 2. \ 476599 \\ 2. \ 631415 \end{array}$
Ref. Mon. 25	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	345 56 00	165 56 01	Ref. Mon. 24	63. 8	1. 804857
Difficile	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	286 52 55	106 53 05	Ref. Mon. 24	312. 8	2. 495322
Logs	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 279 & 00 & 30 \\ 286 & 54 & 16 \\ 286 & 58 & 08 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 25 Ref. Mon. 24 Difficile	$\begin{array}{c} 398.\ 2\\ 427.\ 3\\ 114.\ 4\end{array}$	$\begin{array}{c} 2. \ 600115\\ 2. \ 630708\\ 2. \ 058559 \end{array}$
Low	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	253 18 53	73 18 59	Logs	194. 5	2. 288830
Packard	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	334 36 57	154 37 55	Green Mountain	4, 077. 0	3. 610338

# SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Ref. Mon. 26	<pre></pre>	$\circ$ , , , , , , , , , , , , , , , , , , ,	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 238 & 45 & 42 \\ 98 & 56 & 00 \\ \end{smallmatrix} $	Packard	552. 1 195. 4	2. 741999 2. 290979
Ref. Mon. 27	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 26	90. $1$ 195. $6$	$\begin{array}{c} 1. \ 954898 \\ 2. \ 291297 \end{array}$
Fence	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Packard Ref. Mon. 26	$   \begin{array}{r}     288. 9 \\     360. 5   \end{array} $	$\begin{array}{c} 2. \ 460796 \\ 2. \ 556962 \end{array}$
Thoroughfare	45 49 01.26 67 46 53.78	118 52 22	298 52 19	Packard	91. 9	1. 963402
Fox	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	97 12 13	277 12 11	Thoroughfare	64.1	1. 806858
Ref. Mon. 28	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{c} 98 & 17 & 31 \\ 226 & 15 & 19 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Packard Ref. Mon. 26	$151.7 \\ 445.7$	$\begin{array}{c} 2. \ 180859 \\ 2. \ 649025 \end{array}$
Ref. Mon. 29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Packard Ref. Mon. 26 Ref. Mon. 28	92. 9 499. 5 63. 7	$\begin{array}{c} 1.\ 967959\\ 2.\ 698516\\ 1.\ 804248 \end{array}$
Bubar 2	45 48 54.91 67 48 17.28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Packard Green Mountain	$\begin{array}{c} 1,739.\ 0\\ 4,888.\ 4 \end{array}$	$\begin{array}{c} 3. \ 240289 \\ 3. \ 689171 \end{array}$
Bubar 2 tablet	$\begin{array}{r} 45 \ 48 \ 54. \ 03 \\ 67 \ 48 \ 17. \ 62 \end{array}$	195 05 56	15 05 56	Bubar 2	28. 1	1. 448010
Ref. Mon. 31	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Packard Fence	$\begin{array}{c} 222. \ 1 \\ 303. \ 1 \end{array}$	$\begin{array}{c} 2.346628\\ 2.481650 \end{array}$
Ref. Mon. 33	45 48 02.43 67 47 58.25	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bubar 2 Packard Ref. Mon. 31	$\begin{array}{c} 1,671.5\\ 2,276.4\\ 2,137.4\end{array}$	$\begin{array}{c} 3.\ 223119\\ 3.\ 357242\\ 3.\ 329894 \end{array}$
Ref. Mon. 30	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 33 Ref. Mon. 31	$2, 204. 9 \\132. 3$	3.343385 2.121562
Ref. Mon. 32	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Bubar 2 tablet Ref. Mon. 33	978. 2 837. 8	$\begin{array}{c} 2. & 990437 \\ 2. & 923134 \end{array}$
North Point	45 48 14.24 67 47 36.98	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bubar 2 Packard Green Mountain	$\begin{array}{c} 1,527.\ 8\\ 1,722.\ 0\\ 3,397.\ 8\end{array}$	$\begin{array}{c} 3. \ 184074 \\ 3. \ 236023 \\ 3. \ 531193 \end{array}$
Caribou	45 47 54.81 67 48 32.02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Packard Ref. Mon. 33 Green Mountain	$\begin{array}{c} 2,925.3\\766.4\\4,108.1\end{array}$	$\begin{array}{c} 3.\ 466176\\ 2.\ 884452\\ 3.\ 613642 \end{array}$
Medselene	45 47 24.40 67 48 34.24	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Caribou Bubar 2 Green Mountain	$\begin{array}{r} 940. \ 0 \\ 2, \ 818. \ 2 \\ 3, \ 891. \ 6 \end{array}$	$\begin{array}{c} 2. & 973138 \\ 3. & 449976 \\ 3. & 590127 \end{array}$
Medselene tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	167 46 13	347 46 13	Medselene	14. 7	1. 16850
Ref. Mon. 34	45 47 42.00 67 48 20.77	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Medselene Caribou Bubar 2	$\begin{array}{r} 616.\ 3\\ 464.\ 3\\ 2,\ 252.\ 4\end{array}$	$\begin{array}{c} 2.\ 789775\\ 2.\ 666824\\ 3.\ 352642 \end{array}$
Ref. Mon. 35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 199 \ 40 \ 06 \\ 228 \ 06 \ 15 \\ 244 \ 30 \ 02 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Caribou Ref. Mon. 33 Ref. Mon. 34	$\begin{smallmatrix}&654.&9\\1,&276.&0\\513.&6\end{smallmatrix}$	$\begin{array}{c} 2. \ 816171 \\ 3. \ 105839 \\ 2. \ 710620 \end{array}$
Ref. Mon. 38	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Medselene Caribou Green Mountain	2, 611.0 3, 544.3 4, 104.4	$\begin{array}{c} 3.\ 416799\\ 3.\ 549525\\ 3.\ 612927 \end{array}$

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Cedar Point 2	° ' '' 45 46 20.12 67 48 59.99	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 253 & 04 & 10 \\ 308 & 02 & 44 \\ \end{smallmatrix} $	° ' '' 73 06 36 128 03 10	Green Mountain Ref. Mon. 38	4, 592. 5 999. 5	3. 662046 2. 999769
York	45 47 20.34 67 48 13.98	$\begin{array}{r} 4 & 46 & 53 \\ 28 & 07 & 57 \\ 106 & 00 & 14 \\ 159 & 53 & 26 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 38 Cedar Point 2 Medselene Caribou	2, 483.9 2, 108.2 455.3 1, 133.4	$\begin{array}{c} 3. \ 395127 \\ 3. \ 323911 \\ 2. \ 658312 \\ 3. \ 054395 \end{array}$
Ref. Mon. 36	45 46 56.90 67 48 07.28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 38 Cedar Point 2	1, 786. 7 1, 608. 3	$\begin{array}{c} 3. \ 252041 \\ 3. \ 206361 \end{array}$
Ref. Mon. 37	45 46 44.34 67 48 32.44	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cedar Point 2 Ref. Mon. 36 Ref. Mon. 38	$955.6 \\ 667.9 \\ 1,377.1$	2. 980280 2. 824712 3. 138972
Piney Point	45 45 02.77 67 48 49.88	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cedar Point 2 York Ref. Mon. 38 Green Mountain	$\begin{array}{c} 2,\ 398.\ 0\\ 4,\ 317.\ 5\\ 1,\ 861.\ 1\\ 5,\ 595.\ 6\end{array}$	3. 379852 3. 635237 3. 269777 3. 747843
Ref. Mon. 44	45 43 25 94 67 48 13 02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Piney Point Cedar Point 2 Ref. Mon. 38 Green Mountain	3, 094. 0 5, 472. 6 4, 767. 0 7, 516. 6	3. 490516 3. 738193 3. 678249 3. 876020
Ref. Mon. 42	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 44 Piney Point	1, 638.9 1, 977.3	$\begin{array}{c} 3. \ 214548 \\ 3. \ 296063 \end{array}$
Ref. Mon. 43	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 90 & 51 & 49 \\ 140 & 37 & 17 \end{array}$	Ref. Mon. 42 Ref. Mon. 44	$\begin{array}{c} 1,841.0\\ 2,032.3 \end{array}$	$\begin{array}{c} 3. \ 265056 \\ 3. \ 307988 \end{array}$
Ref. Mon. 41	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 44 Ref. Mon. 42 Piney Point	3, 230. 8 1, 655. 6 2, 470. 5	$\begin{array}{c} 3. \ 509315\\ 3. \ 218944\\ 3. \ 392788 \end{array}$
Ref. Mon. 40	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 41 Ref. Mon. 44	2, 151. 2 3, 284. 5	$\begin{array}{c} 3. \ 332686 \\ 3. \ 516463 \end{array}$
Ref. Mon. 39	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrr}1 & 56 & 28 \\ 35 & 43 & 04 \\ 309 & 55 & 18 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 44 Ref. Mon. 40 Ref. Mon. 41	$\begin{array}{c} 4,049.3\\974.2\\1,990.7\end{array}$	$\begin{array}{c} 3. \ 607378 \\ 2. \ 988666 \\ 3. \ 299011 \end{array}$
Ref. Mon. 48	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 44 Green Mountain Pemberton Ridge	$\begin{array}{c} 3,\ 600.\ 8\\ 10,\ 613.\ 4\\ 3.\ 968.\ 6\end{array}$	$\begin{array}{c} 3. \ 556406 \\ 4. \ 025855 \\ 3. \ 598637 \end{array}$
Work	45 43 13.37 67 49 07.26	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Green Mountain Ref. Mon. 42 Ref. Mon. 44 Ref. Mon. 48	$\begin{array}{c} 8,435.7\\ 2,589.1\\ 1,235.4\\ 3,642.3\end{array}$	$\begin{array}{c} 3. \ 926122 \\ 3. \ 413144 \\ 3. \ 091820 \\ 3. \ 561375 \end{array}$
Ref. Mon. 45	45 42 08.30 67 48 57.66	$\begin{array}{cccccccc} 174 & 05 & 58 \\ 201 & 56 & 04 \\ 205 & 29 & 03 \\ 305 & 20 & 17 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Work Ref. Mon. 44 Green Mountain Ref. Mon. 48	$\begin{array}{c} 2,019.6\\ 2,584.1\\ 10,094.0\\ 1,979.3 \end{array}$	$\begin{array}{c} 3. \ 305265\\ 3. \ 412306\\ 4. \ 004064\\ 3. \ 296505 \end{array}$
Little River Point	45 42 41.27 67 49 54.42	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Work Ref. Mon. 44 Ref. Mon. 48 Ref. Mon. 45	$\begin{array}{c} 1,\ 422.\ 2\\ 2,\ 590.\ 6\\ 3,\ 571.\ 6\\ 1,\ 594.\ 9 \end{array}$	$\begin{array}{c} 3. \ 152958 \\ 3. \ 413398 \\ 3. \ 552865 \\ 3. \ 202724 \end{array}$
Ref. Mon. 46	45 41 11.69 67 49 15.66	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Little River Point Ref. Mon. 45 Pemberton Ridge Ref. Mon. 48	$\begin{array}{c} 2,890.0\\ 1,790.8\\ 6,034.5\\ 2,093.1 \end{array}$	$\begin{array}{c} 3. \ 460904 \\ 3. \ 253053 \\ 3. \ 780638 \\ 3. \ 320784 \end{array}$
Greenland Point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 46 Ref. Mon. 48 Pemberton Ridge	2, 647.9 2, 065.8 5, 122.9	3.422897 3.315010 3.709518

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Haley	° / ″ 45 41 45.86 67 46 45.78	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 22 & 19 & 34 \\ 69 & 57 & 12 \\ 71 & 59 & 39 \\ 103 & 39 & 51 \\ \end{smallmatrix} $	<pre></pre>	Greenland Point Ref. Mon. 48 Ref. Mon. 46 Ref. Mon. 45	$\begin{array}{c} 2,709,9\\ 1,318,6\\ 3,410,3\\ 2,935,9\end{array}$	3. 432959 3. 120116 3. 532795 3. 467740
Ref. Mon. 49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Greenland Point Ref. Mon. 46 Ref. Mon. 48	$\begin{array}{c} 2,415.7\\ 4,306.5\\ 2,443.4\end{array}$	$\begin{array}{c} 3. \ 383040 \\ 3. \ 634125 \\ 3. \ 387987 \end{array}$
Ref. Mon. 47	45 40 28.94 67 48 22.22	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 48 Ref. Mon. 49 Greenland Point	$\begin{array}{c} 2,101.3\\ 3,326.2\\ 1,066.1 \end{array}$	$\begin{array}{c} 3. \ 322493 \\ 3. \ 521949 \\ 3. \ 027817 \end{array}$
Ref. Mon. 50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Greenland Point Ref. Mon. 48 Ref. Mon. 49	$\begin{array}{c} 1,552.9\\ 3,096.3\\ 1,889.4 \end{array}$	$\begin{array}{c} 3. \ 191145 \\ 3. \ 490848 \\ 3. \ 276317 \end{array}$
Ref. Mon. 51	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 48 Ref. Mon. 49 Pemberton Ridge	$\begin{array}{c} 4,177.5\\ 2,403.0\\ 5,148.8\end{array}$	$\begin{array}{c} 3. \ 620913 \\ 3. \ 380750 \\ 3. \ 711708 \end{array}$
Tongue	45 39 41.86 67 45 04.38	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 51 Ref. Mon. 49	778. 6 2, 782. 4	$\begin{array}{c} 2. \ 891298 \\ 3. \ 444423 \end{array}$
Narrows	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Tongue_ Ref. Mon. 51 Greenland Point Pemberton Ridge	$\begin{array}{c} 913. \ 9\\ 1, \ 182. \ 3\\ 3, \ 418. \ 2\\ 4, \ 350. \ 6\end{array}$	2. 960889 3. 072736 3. 533793 3. 638549
Camp	45 39 59.08 67 44 15.96	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Narrows Forest City church spire	954. 0 686. 6	$\begin{array}{c} 2. \ 979570 \\ 2. \ 836726 \end{array}$
Ref. Mon. 52	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Tongue Ref. Mon. 51	$\begin{array}{c} 1,\ 009.\ 7\\ 1,\ 152.\ 5 \end{array}$	$\begin{array}{c} 3. \ 004178 \\ 3. \ 061624 \end{array}$
Ref. Mon. 53	45 40 09.46 67 44 53.03	291 45 24	111 45 51	Camp	864. 1	2. 936543
Ref. Mon. 54	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{c} 194 \ 33 \ 15 \\ 200 \ 59 \ 38 \\ 151 \ 12 \ 19 \end{array}$	Ref. Mon. 53 Narrows Camp	$799. \ 6 \\ 779. \ 1 \\ 1, 248. \ 7$	$\begin{array}{c} 2. & 902850 \\ 2. & 891617 \\ 3. & 096441 \end{array}$
Ref. Mon. 55	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 6 & 49 & 29 \\ 110 & 57 & 35 \\ 150 & 25 & 53 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Camp Narrows Ref. Mon. 54	$\begin{array}{c} 28. \ 4\\ 946. \ 7\\ 1, 225. \ 7\end{array}$	$\begin{array}{c} 1.\ 453769\\ 2.\ 976216\\ 3.\ 088368 \end{array}$
Field	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Camp Narrows Forest City church spire	$\begin{smallmatrix} & 472. \ 1 \\ & 1, \\ & 408. \ 8 \\ & 431. \ 7 \end{smallmatrix}$	$\begin{array}{c} 2. \ 673998\\ 3. \ 148834\\ 2. \ 635225 \end{array}$
Ref. Mon. 56	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Field Forest City church spire	320. 9 407. 0	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
Ref. Mon. 57	45 39 57.65 67 43 55.41	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 56 Camp Field	$290. \ 8 \\ 447. \ 0 \\ 30. \ 2$	$\begin{array}{c} 2. \ 463562 \\ 2. \ 650269 \\ 1. \ 479960 \end{array}$
Brabazon No. 2	45 39 50.70 67 43 46.90	98 00 31	278 00 17	Ref. Mon. 56	435.1	2. 638590
Brabazon No. 1	45 39 53.97 67 43 28.90	75 26 45	255 26 33	Brabazon No. 2	402.6	2. 604874
City	45 39 54.49 67 43 21.40	84 26 17	264 26 12	Brabazon No. 1	163. 2	2. 212662
Ref. Mon. 64	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	City Forest City church spire	523. 5 1, 264. 5	$\begin{array}{c} 2. \ 718886\\ 3. \ 101928 \end{array}$
Tassel	45 39 34.88 67 43 21.90	$\begin{array}{c} 113 \ 32 \ 14 \\ 158 \ 31 \ 22 \\ 207 \ 55 \ 02 \end{array}$	$\begin{array}{c} 293 \ 31 \ 52 \\ 338 \ 30 \ 11 \\ 27 \ 55 \ 17 \end{array}$	Forest City church spire Pemberton Ridge Ref. Mon. 64	720. 1 5, 871. 4 986. 0	2. 857368 3. 768739 2. 993856

# APPENDIX IV

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Forest City, New Bruns- wick, Baptist Church spire.	$\circ$ / // 45 39 53.63 67 43 44.53	° ′ ′′ 319 44 34	° / // 139 44 50	Tassel	758. 3	2. 879865
House	45 39 50.89 67 43 48.73	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Forest City church spire Ref. Mon. 56 Field	$\begin{array}{c} 221. \ 4\\ 395. \ 1\\ 252. \ 7\end{array}$	$\begin{array}{c} 2.\ 345103\\ 2.\ 596752\\ 2.\ 402600 \end{array}$
Ref. Mon. 58	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 56 Forest City Baptist Church spire.	$258. \ 0$ $251. \ 0$	$\begin{array}{c} 2. \ 411572 \\ 2. \ 399655 \end{array}$
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	House Forest City church spire	$\frac{142.\ 0}{206.\ 3}$	$\begin{array}{c} 2. \ 152224 \\ 2. \ 314402 \end{array}$
Bridge	45 39 47.55 67 43 44.21	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Forest City church spire Ref. Mon. 58 Forest City Baptist Church spire.	$\begin{array}{c} 205. \ 1 \\ 256. \ 8 \\ 187. \ 7 \end{array}$	2. 312064 2. 409514 2. 273415
Ref. Mon. 59	$\begin{array}{c} 45 & 39 & 47. \ 48 \\ 67 & 43 & 41. \ 14 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Forest City church spire Bridge	$263.8 \\ 66.6$	$\begin{array}{c} 2. \ 421298 \\ 1. \ 823628 \end{array}$
Ref. Mon. 60	45 39 45 83 67 43 39 11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bridge Ref. Mon. 59	$122. \ 6 \\ 67. \ 2$	$\begin{array}{c} 2. \ 088520 \\ 1. \ 827245 \end{array}$
Ref. Mon. 61	45 39 51.96 67 43 29.45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 60 Ref. Mon. 59 Forest City church spire Forest City Baptist	$\begin{array}{c} 282. \ 1 \\ 288. \ 3 \\ 551. \ 4 \\ 330. \ 5 \end{array}$	$\begin{array}{c} 2.\ 450388\\ 2.\ 459911\\ 2.\ 741447\\ 2.\ 519129 \end{array}$
		$342 \ 45 \ 36$	162 45 41	Tassel	552.0	2. 741951
Ref. Mon. 62	45 39 41.65 67 43 17.99	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Tassel Ref. Mon. 61 Ref. Mon. 64	$\begin{array}{c} 225.\ 3\\ 403.\ 6\\ 762.\ 2\end{array}$	$\begin{array}{c} 2.\ 352738\\ 2.\ 606004\\ 2.\ 882078 \end{array}$
Gould	45 40 08.30 67 43 27.92	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 64 City Tassel	$\begin{array}{c} 613.\ 5\\ 449.\ 4\\ 1,\ 040.\ 1\end{array}$	$\begin{array}{c} 2.\ 787786\\ 2.\ 652622\\ 3.\ 017070 \end{array}$
Ref. Mon. 63	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Gould Ref. Mon. 64	578.8 356.8	$\begin{array}{c} 2. \ 762543 \\ 2. \ 552401 \end{array}$
Dry	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccc} 193 & 20 & 02 \\ 230 & 30 & 30 \\ 144 & 33 & 58 \end{array}$	City Gould Ref. Mon. 64	$\begin{array}{c} 693.\ 5\\ 390.\ 2\\ 501.\ 8\end{array}$	$\begin{array}{c} 2. \ 841025\\ 2. \ 591273\\ 2. \ 700491 \end{array}$
Stag	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Dry Gould	$586.5 \\ 648.8$	$\begin{array}{c} 2.\ 768270\\ 2.\ 812117 \end{array}$
Ref. Mon. 65	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Stag Dry	$\begin{array}{c} 408.\ 3\\ 435.\ 6\end{array}$	$\begin{array}{c} 2. \ 610950 \\ 2. \ 639095 \end{array}$
South base	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Stag Dry Gould	$\begin{array}{c} 224. \ 3 \\ 660. \ 3 \\ 581. \ 3 \end{array}$	$\begin{array}{c} 2. \ 350907 \\ 2. \ 819722 \\ 2. \ 764369 \end{array}$
Ref. Mon. 66	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Stag South base	$269.8 \\ 343.4$	$\begin{array}{c} 2. \ 431112 \\ 2. \ 535813 \end{array}$
North base	45 40 32 53 67 43 51 41	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 66 Stag South base	$\begin{array}{c} 204. \ 0\\ 384. \ 6\\ 323. \ 65\end{array}$	$\begin{array}{c} 2.\ 309621\\ 2.\ 585040\\ 2.\ 510072 \end{array}$
Butter	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 6 & 07 & 21 \\ 330 & 27 & 58 \end{array}$	$\frac{186}{150} \; \frac{07}{28} \; \frac{19}{03}$	North base Ref. Mon. 66	348. 7 300. 8	$\begin{array}{c} 2. \ 542402 \\ 2. \ 478309 \end{array}$
Milk	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Butter Ref. Mon. 66 North base	$   \begin{array}{c}     192.5 \\     366.1 \\     294.3   \end{array} $	$\begin{array}{c} 2. \ 284403 \\ 2. \ 563636 \\ 2. \ 468817 \end{array}$

# SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Gib	° / // 45 40 55.49 67 43 55.28			MilkButter	450. 5 381. 8	2. 653661 2. 581850
Baldy	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Gib Butter Milk	$\begin{array}{c} 136.\ 2\\ 409.\ 9\\ 416.\ 5\end{array}$	$\begin{array}{c} 2. \ 134257\\ 2. \ 612668\\ 2. \ 619627 \end{array}$
Ref. Mon. 67	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Gib Butter	$157.9 \\ 360.5$	$\begin{array}{c} 2. \ 198419 \\ 2. \ 556882 \end{array}$
Narrow	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 6 & 50 & 19 \\ 340 & 19 & 08 \end{array}$	$\frac{186}{160} \begin{array}{c} 50 \\ 19 \\ 11 \end{array}$	Baldy Gib	$304.6 \\ 280.3$	$\begin{array}{c} 2. \ 483731 \\ 2. \ 447558 \end{array}$
Way	45 41 02.29 67 44 04.46	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Narrow Gib Baldy	$117. \ 4 \\ 289. \ 3 \\ 257. \ 9$	$\begin{array}{c} 2. \ 069574 \\ 2. \ 461347 \\ 2. \ 411465 \end{array}$
Ref. Mon. 68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 0 & 58 & 06 \\ 335 & 03 & 58 \\ 338 & 48 & 00 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 67 Gib Butter	$351.8 \\ 280.2 \\ 661.0$	$\begin{array}{c} 2. \ 546312 \\ 2. \ 447426 \\ 2. \ 820171 \end{array}$
Pemb	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Narrow Way	$127.9 \\ 222.7$	$\begin{array}{c} 2. \ 106741 \\ 2. \ 347670 \end{array}$
Ton	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pemb Narrow Way	$187. \ 6 \\ 221. \ 1 \\ 217. \ 0$	$\begin{array}{c} 2. \ 273273 \\ 2. \ 344652 \\ 2. \ 336393 \end{array}$
Oldgate	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pemb Ton	$\begin{array}{c} 422.\ 4\\ 463.\ 5\end{array}$	$\begin{array}{c} 2. \ 625748 \\ 2. \ 666011 \end{array}$
Green	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Oldgate Pemb Ton	$326.\ 1\ 361.\ 7\ 255.\ 4$	$\begin{array}{c} 2. \ 513310 \\ 2. \ 558355 \\ 2. \ 407190 \end{array}$
Ref. Mon. 69	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Oldgate Pemb	298. 0 523. 8	$\begin{array}{c} 2. \ 474274 \\ 2. \ 719191 \end{array}$
Ref. Mon. 70	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	107 02 01	287 01 59	Oldgate	46. 7	1. 669446
Ref. Mon. 71	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ton Green	449.0 357.3	$\begin{array}{c} 2. \ 652248 \\ 2. \ 552998 \end{array}$
Driver	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	79 49 43	259 49 36	Oldgate	215. 22	2. 332875
Rapids	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	214 48 20	$34 \ 48 \ 21$	Driver	58. 1	1. 763926
Salmon	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Rapids Driver	$149.8 \\ 140.35$	$\begin{array}{c} 2. \ 175561 \\ 2. \ 147200 \end{array}$
Shade	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Driver Salmon	127.0 39.4	$\begin{array}{c} 2. \ 103927 \\ 1. \ 595217 \end{array}$
Ref. Mon. 72	$45 \ 41 \ 20. \ 18 \\ 67 \ 43 \ 40. \ 32$	293 20 52	113 20 53	Salmon	12.7	1. 104819
Mouth	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	151 17 38	<b>331 17 33</b>	Salmon	335. <mark>3</mark> 0	2. 525435
Ref. Mon. 74	45 41 06.97 67 43 32.78	184 58 23	4 58 23	Mouth	109. 1	2. 037838
Ref. Mon. 73	45 41 07.98 67 43 32.41	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Ref. Mon. 74 Ref. Mon. 72 Salmon	$\begin{array}{c} 32.\ 2\\ 413.\ 7\\ 404.\ 4\end{array}$	$\begin{array}{c} 1. \ 507773 \\ 2. \ 616724 \\ 2. \ 606807 \end{array}$
Ref. Mon. 75	45 41 04.18 67 43 23.70	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 74 Mouth	$214.6 \\ 270.1$	$\begin{array}{c} 2. \ 331550 \\ 2. \ 431516 \end{array}$

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Sockalexis	° ' '' 45 41 01.58 67 43 29.29	° ' '' 155 36 40 166 30 59 236 30 35	$\begin{array}{c}\circ & \prime & \prime \prime \\ 335 & 36 & 37 \\ 346 & 30 & 57 \\ 56 & 30 & 39 \end{array}$	Ref. Mon. 74 Mouth Ref. Mon. 75	182. 6     282. 8     145. 2	$\begin{array}{c} 2.\ 261450\\ 2.\ 451438\\ 2.\ 162030 \end{array}$
Bob	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Sockalexis Ref. Mon. 75	$536.9 \\ 490.2$	$\begin{array}{c} 2. \ 729914 \\ 2. \ 690375 \end{array}$
Ref. Mon. 76	45 40 59.21 67 43 26.19	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 75 Bob	$   \begin{array}{r}     162.5 \\     443.0   \end{array} $	$\begin{array}{c} 2. \ 210874 \\ 2. \ 646355 \end{array}$
Nogo	45 40 42 23 67 43 13 37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Sockalexis Ref. Mon. 75 Bob	$\begin{array}{c} 689.\ 8\\ 713.\ 6\\ 348.\ 4\end{array}$	$\begin{array}{c} 2.\ 838745\\ 2.\ 853457\\ 2.\ 542053 \end{array}$
Halo	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 40 & 07 & 04 \\ 178 & 09 & 06 \end{array}$	Bob Nogo	$194.\ 1\\179.\ 0$	$\begin{array}{c} 2.\ 288016\\ 2.\ 252806 \end{array}$
Ref. Mon. 77	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	92 08 22	272 08 13	Bob	246. 1	2. 391179
Hy-u	45 40 46.87 67 42 54.61	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Nogo Halo Bob Ref. Mon. 77	$\begin{array}{r} 430.\ 5\\ 413.\ 3\\ 340.\ 7\\ 179.\ 6\end{array}$	$\begin{array}{c} 2.\ 633992\\ 2.\ 616277\\ 2.\ 532400\\ 2.\ 254316 \end{array}$
Ref. Mon. 78	45 40 46.07 67 42 48.73	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Hy-u Bob Ref. Mon. 77	$\begin{array}{c} 129.\ 5\\ 463.\ 5\\ 260.\ 8\end{array}$	$\begin{array}{c} 2.\ 112277\\ 2.\ 666048\\ 2.\ 416258\end{array}$
Naught	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 78 Ref. Mon. 77	843. 8 792. 8	$\begin{array}{c} 2. & 926220 \\ 2. & 899173 \end{array}$
Upper	45 40 45.39 67 42 30.46	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 78 Ref. Mon. 77 Naught	$396.0 \\ 604.9 \\ 753.4$	$\begin{array}{c} 2.\ 597744\\ 2.\ 781718\\ 2.\ 877008 \end{array}$
Duck	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 78 Upper	503, 8 440, 7	$\begin{array}{c} 2.\ 702237\\ 2.\ 644133 \end{array}$
Ref. Mon. 79	45 40 39.31 67 42 11.31	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Duck Ref. Mon. 78 Upper	$\begin{array}{c} 604.\ 2\ 836.\ 3\ 454.\ 9 \end{array}$	$\begin{array}{c} 2.\ 781145\\ 2.\ 922370\\ 2.\ 657951 \end{array}$
Ref. Mon. 80	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Duck Ref. Mon. 79	$417.5 \\ 734.5$	$\begin{array}{c} 2. \ 620680 \\ 2. \ 865988 \end{array}$
Ref. Mon. 81	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 80 Duck Ref. Mon. 79	$\begin{array}{c} 762.\ 2\\ 1,\ 129.\ 8\\ 1,\ 055.\ 0\end{array}$	$\begin{array}{c} 2. \ 882065\\ 3. \ 052995\\ 3. \ 023272 \end{array}$
Ref. Mon. 82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 80 Ref. Mon. 81	$1, 279. \\ 958. \\ 0$	$\begin{array}{c} 3.\ 106886\\ 2.\ 981352 \end{array}$
Loose	45 39 46.11 67 41 52.73	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 82 Ref. Mon. 80 Ref. Mon. 81	$\begin{array}{r} 648.\ 2\\ 1,\ 304.\ 8\\ 636.\ 2\end{array}$	$\begin{array}{c} 2. \ 811742 \\ 3. \ 115537 \\ 2. \ 803606 \end{array}$
Orphan	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 82	$\begin{array}{c} 656. \ 0 \\ 750. \ 1 \end{array}$	$\begin{array}{c} 2. \ 816932 \\ 2. \ 875138 \end{array}$
Ref. Mon. 83	45 39 33.42 67 41 43.74	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Orphan Ref. Mon. 82 Loose	499. 3 813. 5 437. 3	$\begin{array}{c} 2. \ 698367\\ 2. \ 910377\\ 2. \ 640759 \end{array}$
Jim	45 38 51.63 67 41 32.86	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Orphan Ref. Mon. 83	$\begin{array}{c} 1,126.\ 6\\ 1,311.\ 5\end{array}$	$\begin{array}{c} 3.\ 051761\\ 3.\ 117770 \end{array}$
None	45 39 02.83 67 41 19.64	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Jim Orphan Ref. Mon. 83	$\begin{array}{c c} 448. \ 9 \\ 1, \ 075. \ 8 \\ 1, \ 078. \ 9 \end{array}$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

# SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Ref. Mon. 84	° / // 45 39 19.92 67 41 28.80	$\begin{array}{c}\circ & \prime & \prime \prime \\ 5 & 44 & 38 \\ 339 & 23 & 29 \end{array}$	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 185 & 44 & 35 \\ 159 & 23 & 36 \\ \end{smallmatrix} $	Jim None	877. 8 563. 7	2. 943392 2. 751016
Ref. Mon. 85	45 38 55.33 67 41 36.52	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 84 None Jim	$777. \ 4 \\ 432. \ 8 \\ 139. \ 0$	$\begin{array}{c} 2. \ 890653\\ 2. \ 636257\\ 2. \ 143017 \end{array}$
Byron	45 38 32.81 67 41 17.09	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 329 \ 33 \ 33 \\ 356 \ 35 \ 27 \\ 128 \ 01 \ 16 \end{array}$	Jim None Table Rock	$\begin{array}{c} 674.\ 0\\ 928.\ 6\\ 1,\ 031.\ 1\end{array}$	$\begin{array}{c} 2. \ 828690 \\ 2. \ 967818 \\ 3. \ 013305 \end{array}$
Short	45 38 54 65 67 41 15 73	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Byron Jim None Table Rock	$\begin{array}{r} 675. \ 0\\ 382. \ 4\\ 266. \ 4\\ 1, \ 525. \ 6\end{array}$	$\begin{array}{c} 2. \ 829283\\ 2. \ 582571\\ 2. \ 425564\\ 3. \ 183429 \end{array}$
Shaw	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Byron Short Table Rock	$\begin{array}{c} 1,033.\ 8\\ 1,650.\ 9\\ 427.\ 0\end{array}$	$\begin{array}{c} 3. \ 014449 \\ 3. \ 217717 \\ 2. \ 630441 \end{array}$
Ref. Mon. 86	45 38 18.08 67 40 42.11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Shaw Table Rock	$531.0 \\ 188.3$	$\begin{array}{c} 2. \ 725115 \\ 2. \ 274846 \end{array}$
Ref. Mon. 87	45 38 18.25 67 41 10.36	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 86 Table Rock Shaw	$\begin{array}{c} 611. \ 9 \\ 692. \ 0 \\ 574. \ 8 \end{array}$	$\begin{array}{c} 2.\ 786710\\ 2.\ 840081\\ 2.\ 759538 \end{array}$
Creek	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Shaw Table Rock	907. 0 1, 172. 2	$\begin{array}{c} 2. & 957604 \\ 3. & 068999 \end{array}$
Crab	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Creek Shaw Table Rock	$\begin{array}{c} 892. \ 9 \\ 1, \ 106. \ 2 \\ 1, \ 017. \ 9 \end{array}$	$\begin{array}{c} 2. \ 950827\\ 3. \ 043831\\ 3. \ 007692 \end{array}$
Ref. Mon. 88	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Creek Crab	$\begin{array}{c} 1,451.7\\ 1,103.1 \end{array}$	$\begin{array}{c} 3. \ 161876 \\ 3. \ 042616 \end{array}$
Hinkley	45 37 35.83 67 39 39.64	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 88 Creek Crab	$\begin{array}{r} 622.\ 0\\ 1,\ 436.\ 4\\ 725.\ 7\end{array}$	$\begin{array}{c} 2.\ 793786\\ 3.\ 157288\\ 2.\ 860732 \end{array}$
Ref. Mon. 89	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	236 25 59	56 26 00	Hinkley	14.6	1. 165134
Lyons	45 36 59.92 67 39 17.71	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 88 Hinkley McAllister	$\begin{array}{c} 760.\ 7\\ 1,\ 206.\ 2\\ 735.\ 7\end{array}$	$\begin{array}{c} 2. \ 881241 \\ 3. \ 081426 \\ 2. \ 866722 \end{array}$
Spingolly	45 37 46.02 67 38 53.59	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	McAllister Lyons Ref. Mon. 88 Hinkley	$\begin{array}{r} 869.\ 4\\ 1,\ 516.\ 4\\ 1,\ 439.\ 3\\ 1,\ 046.\ 1\end{array}$	$\begin{array}{c} 2. \ 939203\\ 3. \ 180805\\ 3. \ 158165\\ 3. \ 019564 \end{array}$
Upper end Birch Island.	45 37 20.72 67 38 21.38	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lyons McAllister Spingolly	$1, 379. 2 \\742. 7 \\1, 047. 5$	$\begin{array}{c} 3. \ 139618 \\ 2. \ 870785 \\ 3. \ 020167 \end{array}$
Ref. Mon. 90	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lyons McAllister	$\begin{array}{c} 678. \ 0\\ 1, \ 065. \ 8\end{array}$	$\begin{array}{c} 2. \ 831254 \\ 3. \ 027676 \end{array}$
Ref. Mon. 91	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	66 42 47	246 42 46	McAllister	29.6	1. 471483
Ref. Mon. 92	45 37 34.69 67 38 13.69	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Upper end Birch Island. McAllister Spingolly	$\substack{462.\ 4\\042.\ 2\\932.\ 5}$	$\begin{array}{c} 2. & 665006 \\ 3. & 017967 \\ 2. & 969666 \end{array}$
Pike	45 36 18.66 67 38 12.98	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Lyons Spingolly	1, 894. 7 2, 837. 1	$\begin{array}{c} 3.\ 277531\\ 3.\ 452870 \end{array}$

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Patterson	•       /         45       36       51.       87         67       36       50.       79	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 60 & 04 & 38 \\ 94 & 28 & 33 \\ 122 & 09 & 32 \\ \end{smallmatrix} $	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 240 & 03 & 40 \\ 274 & 26 & 48 \\ 302 & 08 & 04 \\ \end{smallmatrix} $	Pike Lyons Spingolly	$2, 055. 1 \\3, 193. 0 \\3, 142. 0$	3. 312824 3. 504194 3. 497209
Lower end Birch Island.	45 36 59.18 67 37 49.66	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pike Lyons Patterson	$\begin{array}{c} 1,349.1\\ 1,907.9\\ 1,295.3 \end{array}$	$\begin{array}{c} 3. \ 130044 \\ 3. \ 280559 \\ 3. \ 112358 \end{array}$
Ref. Mon. 93	$\begin{array}{c} 45 & 37 & 10. & 00 \\ 67 & 38 & 00. & 88 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pike Patterson	1, 606. 7 1, 618. 5	$\begin{array}{c} 3.\ 205922\\ 3.\ 209101 \end{array}$
Ref. Mon. 94	45 37 23.01 67 37 53.42	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pike Ref. Mon. 93 Patterson	$\begin{array}{c} 2,\ 031.\ 5\\ 433.\ 0\\ 1,\ 662.\ 9\end{array}$	$\begin{array}{c} 3.\ 307824\\ 2.\ 636524\\ 3.\ 220858 \end{array}$
Bright	45 36 08.30 67 37 04.99	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pike Patterson	1, 507. 8 1, 379. 9	$\begin{array}{c} 3.\ 178346\\ 3.\ 139858 \end{array}$
Norway	45 36 36.65 67 36 22.36	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bright Pike Patterson	$\begin{array}{c} 1,272.\ 6\\ 2,460.\ 7\\ 774.\ 9\end{array}$	$\begin{array}{c} 3.\ 104685\\ 3.\ 391056\\ 2.\ 889240 \end{array}$
Garfield	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bright Norway	1, 343. 7 792. 8	$\begin{array}{c} 3. \ 128295 \\ 2. \ 899179 \end{array}$
Dirty	45 36 34.97 67 35 51.37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Garfield Bright Norway	$\begin{array}{r} 683.\ 1\\ 1,\ 795.\ 3\\ 673.\ 5\end{array}$	$\begin{array}{c} 2. \ 834510 \\ 3. \ 254142 \\ 2. \ 828355 \end{array}$
Ref. Mon. 95	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Norway Dirty	$181. \ 8 \\ 669. \ 8$	$\begin{array}{c} 2. \ 259594 \\ 2. \ 825921 \end{array}$
Ref. Mon. 96	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 95 Norway Dirty	$\begin{array}{c} 1,164.5\\985.7\\1,373.4 \end{array}$	$\begin{array}{c} 3. \ 066148 \\ 2. \ 993760 \\ 3. \ 137802 \end{array}$
Robertson	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 91 & 00 & 11 \\ 144 & 39 & 36 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Garfield Dirty	$\begin{array}{c} 721.\ 2\\ 786.\ 9\end{array}$	$\begin{array}{c} 2. \ 858049 \\ 2. \ 895909 \end{array}$
Fog	45 36 35 49 67 35 07 30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Robertson Garfield Dirty	$\begin{array}{c} 826.\ 4\\ 1,\ 381.\ 1\\ 955.\ 2\end{array}$	$\begin{array}{c} 2. \ 917188\\ 3. \ 140211\\ 2. \ 980077 \end{array}$
Ref. Mon. 97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 40 & 46 & 51 \\ 88 & 25 & 16 \end{array}$	Fog Robertson		$\begin{array}{c} 2. \ 940279 \\ 1. \ 841134 \end{array}$
Ref. Mon. 98	45 36 40.68 67 35 14.20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Robertson Ref. Mon. 97 Fog	890. 1 921. 3 219. 1	$\begin{array}{c} 2. \ 949426 \\ 2. \ 964385 \\ 2. \ 340732 \end{array}$
Ref. Mon. 99	45 35 59.47 67 34 58.20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Robertson Ref. Mon. 98 Fog	$\begin{array}{c} 831.\ 8\\ 1,\ 318.\ 7\\ 1,\ 129.\ 5\end{array}$	$\begin{array}{c} 2. \ 920043 \\ 3. \ 120142 \\ 3. \ 052872 \end{array}$
Martin	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Robertson Fog	$\begin{array}{c} 1,277.9\\ 1,420.9 \end{array}$	$\begin{array}{c c} 3. & 106507 \\ 3. & 152552 \end{array}$
Aurora	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Martin Robertson Fog	$\begin{array}{c} 601. \ 5\\ 1, \ 241. \ 7\\ 1, \ 014. \ 0\end{array}$	$\begin{array}{c} 2.\ 779205\\ 3.\ 094015\\ 3.\ 006058 \end{array}$
Muncy	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Martin Aurora	$\begin{array}{c} 436. \ 3 \\ 869. \ 4 \end{array}$	$\begin{array}{c} 2. \ 639768 \\ 2. \ 939199 \end{array}$
Herb	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Muncy Martin Aurora	515.4 740.5 777.2	$\begin{array}{c} 2.\ 712146\\ 2.\ 869543\\ 2.\ 890545 \end{array}$
Cove	45 35 35 21 67 33 49 43	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Muncy Herb	786. 6 763. 9	$\begin{array}{c} 2. \ 895757 \\ 2. \ 883018 \end{array}$
### SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Sandy	° ' '' 45 35 53.85 67 33 51.93	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 69 & 41 & 10 \\ 111 & 05 & 02 \\ 354 & 36 & 31 \\ \end{smallmatrix} $	$\begin{array}{c}\circ & \prime & \prime \prime \\ 249 & 40 & 48 \\ 291 & 04 & 52 \\ 174 & 36 & 33 \end{array}$	Muney Herb Cove	702. 8 304. 3 578. 0	$\begin{array}{c} 2. \ 846808\\ 2. \ 483299\\ 2. \ 761923 \end{array}$
Mud	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 71 & 39 & 32 \\ 113 & 27 & 00 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cove Sandy	$759. \ 8 \\ 845. \ 2$	$\begin{array}{c} 2. \ 880689 \\ 2. \ 926975 \end{array}$
Snake	45 36 04.33 67 33 18.71	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cove Sandy Mud	$1, 118. 7 \\789. 4 \\662. 1$	$\begin{array}{c} 3. \ 048696 \\ 2. \ 897299 \\ 2. \ 820946 \end{array}$
Cleft	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Mud Snake	$\begin{array}{c} 680. \ 4 \\ 1, \ 029. \ 6 \end{array}$	$\begin{array}{c} 2. \ 832773 \\ 3. \ 012664 \end{array}$
Hardwood Island	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Mud Snake Cleft	$818.9 \\ 621.8 \\ 668.0$	$\begin{array}{c} 2. \ 913255\\ 2. \ 793616\\ 2. \ 824796 \end{array}$
Ref. Mon. 100	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Hardwood Island Mud	$\begin{array}{c} 1,539.9\\ 1,092.6 \end{array}$	$\begin{array}{c} 3. \ 187497 \\ 3. \ 038443 \end{array}$
Ref. Mon. 101	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	161 05 31	341 05 30	Mud	20. 0	1. 300762
Walker	45 35 04.86 67 31 21.56	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cleft Hardwood Island	2, 121.7 2, 612.5	$\begin{array}{c} 3. \ 326674 \\ 3. \ 417060 \end{array}$
Pine	45 35 57.14 67 31 21.23	$\begin{array}{cccc} 0 & 15 & 13 \\ 74 & 33 & 35 \\ 94 & 39 & 58 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Walker Cleft Hardwood Island	1, 613. 9 1, 881. 3 1, 934. 0	$\begin{array}{c} 3.\ 207865\\ 3.\ 274466\\ 3.\ 286462 \end{array}$
Ref. Mon. 102	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cleft Pine	$\begin{array}{c} 724.\ 5\\ 1,\ 592.\ 2\end{array}$	$\begin{array}{c} 2. \ 860045 \\ 3. \ 202000 \end{array}$
Ref. Mon. 102–A	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cleft Ref. Mon. 102	$\begin{array}{c} 763. \ 6 \\ 116. \ 0 \end{array}$	$\begin{array}{c} 2. \ 882872 \\ 2. \ 064611 \end{array}$
Ref. Mon. 103	45 35 05.91 67 31 23.55	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cleft Ref. Mon. 102 Pine	2,068.0 2,338.1 1,582.3	$\begin{array}{c} 3. \ 315556 \\ 3. \ 368861 \\ 3. \ 199292 \end{array}$
Ref. Mon. 104	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 103 Cleft Pine	$\begin{array}{c} 1,842.8\\ 2,957.4\\ 1,136.0 \end{array}$	$\begin{array}{c} 3.\ 265489\\ 3.\ 470916\\ 3.\ 055390 \end{array}$
Ref. Mon. 105	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 98 & 19 & 28 \\ 137 & 06 & 33 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Walker Pine	$\begin{array}{c} 1,762.4\\ 2,551.0 \end{array}$	$\begin{array}{c} 3.\ 246099\\ 3.\ 406710 \end{array}$
Musquash	$\begin{array}{c} 45 & 35 & 29. \ 43 \\ 67 & 29 & 54. \ 02 \end{array}$	$\begin{array}{c} 8 & 38 & 17 \\ 68 & 13 & 28 \\ 114 & 21 & 30 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 105 Walker Pine	$\begin{array}{c} 1,024.9\\ 2,043.6\\ 2,074.8 \end{array}$	$\begin{array}{c} 3. \ 010693 \\ 3. \ 310388 \\ 3. \ 316976 \end{array}$
Bay	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 78 & 20 & 38 \\ 162 & 19 & 21 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 105 Musquash	456.9 966.6	$\begin{array}{c} 2. \ 659852 \\ 2. \ 985256 \end{array}$
Breeze	45 35 16.37 67 29 34.97	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bay Ref. Mon. 105 Musquash	$531.\ 3$ $832.\ 8$ $577.\ 2$	$\begin{array}{c} 2. \ 725375\\ 2. \ 920556\\ 2. \ 761307 \end{array}$
White Owl	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Breeze Musquash	$\begin{array}{c} 428. \ 0 \\ 688. \ 2 \end{array}$	$\begin{array}{c} 2. \ 631412 \\ 2. \ 837742 \end{array}$
Heifer	45 35 34.46 67 29 32.48	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Breeze Musquash White Owl	561. 3 492. 1 315. 1	$\begin{array}{c} 2.\ 749220\\ 2.\ 692051\\ 2.\ 498383 \end{array}$
Ref. Mon. 106	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 105 White Owl Musquash	$1, 155. 4 \\742. 8 \\138. 3$	$\begin{array}{c} 3. \ 062732 \\ 2. \ 870851 \\ 2. \ 140851 \end{array}$

SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Ref. Mon. 107	$\circ$ , , , , , , , , , , , , , , , , , , ,	。 / // 339 41 33	° ' '' 159 41 34	Heifer	66. 1	1. 819974
Morrison	45 35 56.79 67 29 00.83	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	White Owl Heifer	$1,029.9 \\ 972.5$	3. 012797 2. 987887
Loon	45 35 58 96 67 29 27 88	$\begin{array}{c} 7 & 30 & 44 \\ 276 & 31 & 33 \\ 353 & 10 & 31 \end{array}$	$\begin{array}{r} 187 \ 30 \ 41 \\ 96 \ 31 \ 52 \\ 173 \ 10 \ 35 \end{array}$	Heifer Morrison White Owl	762. 9 590. 1 991. 3	2. 882470 2. 770928 2. 996193
Island	45 36 08.32 67 28 23.55	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Morrison Loon Indian Island	$\substack{882. \ 8\\1,\ 423.\ 7\\886.\ 5}$	$\begin{array}{c} 2. \ 945853\\ 3. \ 153427\\ 2. \ 947695 \end{array}$
Lindsay	45 36 25.18 67 28 45.53	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Morrison Loon Indian Island Island	$937. 0 \\1, 223. 6 \\1, 130. 7 \\705. 6$	$\begin{array}{c} 2. \ 971758\\ 3. \ 087655\\ 3. \ 053349\\ 2. \ 848576 \end{array}$
Ref. Mon. 108	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Heifer Morrison	$407.1 \\ 737.8$	$\begin{array}{c} 2. & 609693 \\ 2. & 867922 \end{array}$
Ref. Mon. 109	45 36 03.25 67 29 34.45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Morrison Ref. Mon. 108 Heifer	$\begin{array}{c} 755.\ 4\\ 990.\ 4\\ 898.\ 8\end{array}$	$\begin{array}{c} 2. \ 878178 \\ 2. \ 995802 \\ 2. \ 949270 \end{array}$
Ref. Mon. 110	45 36 09.96 67 29 45.83	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Morrison Ref. Mon. 109 Ref. Mon. 108	$\begin{array}{c} 1,056.6\\ 322.2\\ 1,293.1 \end{array}$	$\begin{array}{c} 3.\ 023930\\ 2.\ 508059\\ 3.\ 111639 \end{array}$
Ref. Mon. 111	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 40 & 26 & 02 \\ 103 & 41 & 22 \end{array}$	Lindsay Morrison	$1,041.4\\353.9$	$\begin{array}{c} 3. \ 017608 \\ 2. \ 548910 \end{array}$
Ref. Mon. 112	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccccc} 7 & 05 & 23 \\ 29 & 12 & 55 \\ 275 & 43 & 43 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Morrison Ref. Mon. 111 Lindsay	905. 4 933. 5 220. 9	$\begin{array}{c} 2. \ 956844 \\ 2. \ 970098 \\ 2. \ 344123 \end{array}$
Ref. Mon. 113	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lindsay Indian Island	$1,074.3 \\ 1,062.1$	$\begin{array}{c} 3. \ 031110 \\ 3. \ 026160 \end{array}$
Haley, 1911	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Island Lindsay Indian Island	$773. \ 4 \\ 1, \ 382. \ 9 \\ 691. \ 7$	2. 888391 3. 140803 2. 839944
Betula	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Haley, 1911 Indian Island	$\begin{array}{c} 629.\ 5\\ 1,\ 108.\ 2\end{array}$	$\begin{array}{c} 2. \ 799015 \\ 3. \ 044602 \end{array}$
Haley, 1917	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Indian Island		$\begin{array}{c} 2. \ 839952 \\ 2. \ 798851 \end{array}$
Ref. Mon. 114	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Haley, 1917 Betula	$\begin{array}{c} 888. \ 4 \\ 1, \ 003. \ 2 \end{array}$	$\begin{array}{c} 2. & 948586 \\ 3. & 001372 \end{array}$
Ref. Mon. 115	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	277 57 53	97 57 54	Betula	24. 8	1. 393879
Ref. Mon. 115–A	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	247 21 53	67 21 53	Ref. Mon. 115	5. 1	0. 703470
Ref. Mon. 116	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Betula Haley, 1917 Ref. Mon. 114	918. 5 1, 418. 2 1, 117. 0	$\begin{array}{c} 2. \ 963093 \\ 3. \ 151733 \\ 3. \ 048055 \end{array}$
Borden	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Betula Haley, 1911 Indian Island	$\begin{array}{c} 725.\ 0\\ 1,\ 114.\ 4\\ 1,\ 165.\ 0\end{array}$	$\begin{array}{c} 2.\ 860361\\ 3.\ 047031\\ 3.\ 066338 \end{array}$
Campus	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Betula Borden	460. 1 999. 9	$\begin{array}{c} 2. \ 662828 \\ 2. \ 999947 \end{array}$

## SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Flat Top		$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 53 & 58 & 19 \\ 99 & 10 & 42 \\ 162 & 04 & 46 \\ \end{smallmatrix} $	$\begin{array}{c}\circ & \prime & \prime \prime \\ 233 & 58 & 06 \\ 279 & 10 & 21 \\ 342 & 04 & 38 \end{array}$	Campus Betula Borden	$486. \ 6 \\ 646. \ 8 \\ 735. \ 2$	2. 687204 2. 810802 2. 866415
Ref. Mon. 117	45 35 44.15 67 26 47.81	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Campus Flat Top	$466.7 \\ 412.5$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
O'Malley	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 117 Campus Flat Top	$\begin{array}{c} 272. \ 9 \\ 719. \ 6 \\ 476. \ 2 \end{array}$	$\begin{array}{c} 2. \ 435951 \\ 2. \ 857076 \\ 2. \ 677794 \end{array}$
Ref. Mon. 118	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	98 12 17	278 12 17	O'Malley	16. 5	1. 218559
Soft	45 35 27.20 67 26 33.07	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 117 O'Malley	613.1 584.5	$\begin{array}{c} 2. \ 787508 \\ 2. \ 766794 \end{array}$
Tent	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Soft Ref. Mon. 117 O'Malley	$557. \ 4 \\ 1, \ 062. \ 8 \\ 901. \ 3$	$\begin{array}{c} 2. \ 746161 \\ 3. \ 026464 \\ 2. \ 954863 \end{array}$
Gravel	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Soft Tent	$812.2 \\ 550.4$	$\begin{array}{c} 2. & 909685 \\ 2. & 740663 \end{array}$
Upper base	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Gravel Soft Tent	$387. \ 3$ 1, 000. 7 519. 3	2. 588028 3. 000285 2. 715448
Ref. Mon. 120	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Gravel Upper base	$443.9 \\ 429.0$	$\begin{array}{c} 2. \ 647279 \\ 2. \ 632482 \end{array}$
Casey	45 35 04.39 67 25 47.31	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 120 Gravel Upper base	$269. 2 \\ 491. 4 \\ 240. 4$	2. 430027 2. 691475 2. 380918
Lower base	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 120 Gravel Upper base	$\begin{array}{c} 252.\ 4\\ 472.\ 7\\ 237.\ 02 \end{array}$	$\begin{array}{c} 2. \ 402012 \\ 2. \ 674604 \\ 2. \ 374776 \end{array}$
Ref. Mon. 119	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 120 Casey	$429.4 \\ 239.5$	$\begin{array}{c} 2. \ 632866 \\ 2. \ 379308 \end{array}$
Ref. Mon. 119–A	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 7 & 37 & 02 \\ 66 & 08 & 32 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 120 Ref. Mon. 119	$445.6 \\ 32.8$	$\begin{array}{c} 2. \ 648948 \\ 1. \ 515450 \end{array}$
McGrath	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 120 Casey	$518.0 \\ 647.0$	$\begin{array}{c} 2. \ 714351 \\ 2. \ 810920 \end{array}$
Lacey	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 67 & 27 & 38 \\ 127 & 53 & 33 \\ 152 & 29 & 40 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	McGrath Ref. Mon. 120 Casey	$\begin{array}{c} 129.\ 5\\ 569.\ 5\\ 645.\ 2\end{array}$	$\begin{array}{c} 2. \ 112225\\ 2. \ 755519\\ 2. \ 809724 \end{array}$
Bulk	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 120 Casey	$504.5 \\ 622.0$	$\begin{array}{c} 2. \ 702822 \\ 2. \ 793767 \end{array}$
Ref. Mon. 122	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lacey Bulk Ref. Mon. 120	31.7 138.0 585.1	1. 500613 2. 139927 2. 767231
Sept	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bulk Ref. Mon. 122	$212.5 \\ 112.3$	$\begin{array}{c} 2. & 327366 \\ 2. & 050258 \end{array}$
Ref. Mon. 121	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	McGrath Bulk Ref. Mon. 122 Sept	$\begin{array}{r} 37.8 \\ 70.4 \\ 181.5 \\ 222.7 \end{array}$	1. 577728 1. 847439 2. 258879 2. 347719
Horse	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$345 \ 32 \ 14 \\ 50 \ 59 \ 57$	BulkSept	$     189.0 \\     203.4   $	$\begin{array}{c} 2. \ 276448 \\ 2. \ 308342 \end{array}$

SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Vanceboro	° / // 45 34 26.94 67 25 31.42	$^{\circ}$ / // 28 55 45 164 40 51	$\begin{array}{c} \circ & \prime & \prime \prime \\ 208 & 55 & 29 \\ 344 & 40 & 48 \\ 40 & 48 \end{array}$	Vanceboro schoolhouse flagstaff. Horse	1, 035. 7 396. 3	<ol> <li>3. 015221</li> <li>2. 598048</li> </ol>
Ref. Mon. 123	$\begin{array}{c} 45 & 34 & 26. \ 78 \\ 67 & 25 & 32. \ 32 \end{array}$	185     58     12       256     09     43	5 58 14 76 09 44	Vanceboro	513. 0 20. 1	<ol> <li>2. 710141</li> <li>1. 303628</li> </ol>
Brown	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	49 14 24 133 46 11	229 13 59 313 46 02	Vanceboro schoolhouse flagstaff. Vanceboro	1,005.7 361.1	<ol> <li>3. 002474</li> <li>2. 557623</li> </ol>
Cemetery	$45 34 02.94 \\ 67 25 24 08$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	344 44 11 198 35 35 255 31 06	Sept St. Croix Vanceboro schoolhouse	787. 8 114. 1 661 6	2. 896427 2. 057334 2. 820606
	01 25 24.30	193 51 14	13 51 18	flagstaff. Brown	506. 0	2. 704125
Hutchins' house chim- ney.	45 34 17.46 67 25 36.91	$\begin{array}{c} 31 & 53 & 18 \\ 202 & 08 & 41 \\ 263 & 33 & 05 \\ 330 & 00 & 24 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Vanceboro senoolnouse flagstaff. Vanceboro Brown Cemetery	$\begin{array}{c} 722.8 \\ 316.0 \\ 382.3 \\ 517.6 \end{array}$	2. 859029 2. 499723 2. 582423 2. 714025
Ref. Mon. 124	45 34 25 84 67 25 25 97	42 31 30 106 08 00	$222 \ 31 \ 22$ $286 \ 07 \ 56$	Hutchins' house chim- ney. Vanceboro	350.9 122.8	<ol> <li>2. 545127</li> <li>2. 089369</li> </ol>
Ref. Mon. 125 ecc	$45 \ 34 \ 12. \ 24 \ 67 \ 25 \ 44. \ 23$	173       13       42         224       34       03	353 13 40 44 34 08	Sept Hutchins' house chim- nev.	548. 2 226. 3	<ol> <li>2. 738943</li> <li>2. 354625</li> </ol>
Ref. Mon. 125	$45 \ 34 \ 11. \ 86 \ 67 \ 25 \ 44. \ 15$	249 14 40 172 00 29	6914583520029	Brown Ref. Mon. 125 ecc	576. 1 11. 8	<ol> <li>2. 760473</li> <li>1. 072250</li> </ol>
Ref. Mon. 126	45 34 07. 44 67 25 38. 64	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Ref. Mon. 125 Ref. Mon. 125 ecc Hutchins' house chim-	$181. \ 4 \\ 191. \ 3 \\ 311. \ 5$	$\begin{array}{c} 2. \ 258543 \\ 2. \ 281815 \\ 2. \ 493441 \end{array}$
	15 00 50 00	229 50 53	49 51 07	Brown	546. 1	2. 737301
Hartley	45 33 53.09 67 25 34.50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	287     43     21       40     56     27	flagstaff. St. Croix	455. 8 259. 5	<ol> <li>2. 658796</li> <li>2. 414149</li> </ol>
East Abutment	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	122 05 59	302 05 49	Vanceboro schoolhouse flagstaff.	367. 6	2. 565338
West Abutment	45 33 50. 57	$\begin{array}{c} 243 & 16 & 33 \\ 243 & 35 & 24 \end{array}$	63 35 25	East Abutment	48. 20	<ol> <li>1. 683047</li> </ol>
Vanceboro bench mark_	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	239 45 54	59 45 55	East Abutment	48. 5	1. 685921
Ref. Mon. 127 ecc	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	East Abutment Vanceboro schoolhouse flagstaff.	$\begin{array}{c} 112. \ 4\\ 327. \ 6\end{array}$	$\begin{array}{c} 2. \ 050898\\ 2. \ 515354 \end{array}$
Ref. Mon. 127	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	94 45 13	274 45 13	Ref. Mon. 127 ecc	5. 7	0. 753966
Ref. Mon. 128	$\begin{array}{r} 45 \ 33 \ 49. \ 47 \\ 67 \ 25 \ 34. \ 27 \end{array}$	119 42 30	299 42 15	Vanceboro schoolhouse flagstaff.	505.5	2. 703749
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Hartley St. Croix	$     \begin{array}{r}       111.9 \\       349.3     \end{array} $	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

SOURCE OF THE ST. CROIX RIVER TO VANCEBORO, ME., MINOR SCHEMES-Continued

Station	Lati lor	tude	e and ude	Azi	imu	$^{\mathrm{th}}$	E azi	Back mu	th	To station	Distance (meters)	Loga- rithm
Ref. Mon. 129	。 45 67	, 33 5 25 4	,, 5. 42 8. 78	。 274 283 304	, 45 02 27	// 07 30 48	$^{\circ}_{\begin{array}{c}94\\103\\124\end{array}}$	, 45 02 27	'' 13 40 54	Ref. Mon. 127 ecc Hartley East Abutment	$     193. 1 \\     317. 9 \\     226. 7 $	$\begin{array}{c} 2. \ 285842 \\ 2. \ 502340 \\ 2. \ 355493 \end{array}$
Ref. Mon. 130	45 3 67 2	$33 \ 425 \ 4$	7. 19 0. 88	137 217 243	$20 \\ 12 \\ 49$	03 56 11	317 37 63	19 13 49	53 00 16	Vanceboro schoolhouse flagstaff. Hartley Ref. Mon. 128	436.5 228.8 159.6	<ol> <li>2. 639977</li> <li>2. 359398</li> <li>2. 203167</li> </ol>

47378°—34——14

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Abutment	° ' '' 45 10 02.41 67 24 18.89	• 1 11	0 / //			
East Abutment	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	141 54 38	321 54 36	Abutment	78.2	1. 893378
Ref. Mon. 193	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	50 15 08	230 15 08	East Abutment	3. 8	0. 58301
Ref. Mon. 194	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	230 55 06	50 55 06	Abutment	0. 7	9. 8514–10
Telline	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Abutment East Abutment	$452.5 \\ 464.3$	$\begin{array}{c} 2. \ 655616 \\ 2. \ 666813 \end{array}$
Suburb	45 09 43.40 67 24 39.15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Telline Abutment East Abutment Murchie Anderson	$\begin{array}{r} 339.\ 2\\735.\ 1\\718.\ 9\\3,\ 433.\ 8\\3,\ 229.\ 3\end{array}$	$\begin{array}{c} 2. \ 530438\\ 2. \ 866335\\ 2. \ 856699\\ 3. \ 535779\\ 3. \ 509107 \end{array}$
Woodland	45 09 31.80 67 24 11.47	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Suburb Telline Murchie Anderson	$\begin{array}{r} 702. \ 7\\ 874. \ 0\\ 2, \ 754. \ 5\\ 2, \ 613. \ 3\end{array}$	$\begin{array}{c} 2.\ 846745\\ 2.\ 941488\\ 3.\ 440045\\ 3.\ 417189 \end{array}$
Cement	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrr} 14 & 04 & 46 \\ 100 & 27 & 07 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Woodland Suburb	$242.9 \\ 674.9$	$\begin{array}{c} 2. \ 385535\\ 2. \ 829220 \end{array}$
Woodland Pulp Mill, new chimney, 1909.	45 09 29.76 67 24 15.29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Suburb Telline Abutment Murchie Anderson	$\begin{array}{c} 670. \ 0\\ 878. \ 7\\ 1, \ 011. \ 0\\ 2, \ 821. \ 2\\ 2, \ 597. \ 3\end{array}$	$\begin{array}{c} 2. \ 826055\\ 2. \ 943833\\ 3. \ 004733\\ 3. \ 450441\\ 3. \ 414530 \end{array}$
Upper base	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 18 & 03 & 08 \\ 189 & 02 & 25 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Woodland Cement	$136.\ 2\ 107.\ 5$	$\begin{array}{c} 2. & 134301 \\ 2. & 031263 \end{array}$
Spoilbank	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Woodland Upper base	$364.6 \\ 418.5$	$\begin{array}{c} 2. \ 561805 \\ 2. \ 621708 \end{array}$
Lower base	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spoilbank Upper base	$193. \ 9 \\ 450. \ 2$	$\begin{array}{c} 2. \ 287524 \\ 2. \ 653398 \end{array}$
Spoilbank tablet	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 79 & 11 & 03 \\ 219 & 52 & 04 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spoilbank Lower base	$36.5 \\ 164.3$	$\begin{array}{c} 1.\ 561790\\ 2.\ 215609 \end{array}$
Woodland, Me., finial on water tank, 1908, 1924.	45 09 26.81 67 24 19.28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	East Abutment Cement Woodland Spoilbank Murchie Anderson	$\begin{array}{c} 1,039.0\\ 452.2\\ 229.7\\ 481.7\\ 2,888.7\\ 2,563.5 \end{array}$	$\begin{array}{c} 3. \ 016626\\ 2. \ 655339\\ 2. \ 361116\\ 2. \ 682785\\ 3. \ 460707\\ 3. \ 408827 \end{array}$
Ref. Mon. 195	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	126 41 12	306 41 12	Cement	3. 2	0. 49896
Turning point 1006	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	208 35 15	28 35 17	Ref. Mon. 195	146. 9	2. 16708
Ref. Mon. 196	45 09 34.76 67 24 28.80	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	East Abutment Cement Ref. Mon. 195 Woodland, finial on water tank.	$\begin{array}{c} 835.\ 1\\ 460.\ 7\\ 462.\ 5\\ 321.\ 7\end{array}$	$\begin{array}{c} 2. \ 92172 \\ 2. \ 66338 \\ 2. \ 66510 \\ 2. \ 50746 \end{array}$
Crossing	45 09 20.87 67 23 37.67	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spoilbank Lower base	452. 6 400. 0	$\begin{array}{c} 2. \ 655695 \\ 2. \ 602103 \end{array}$

# GEOGRAPHIC POSITIONS OF TRIANGULATION AND TRAVERSE STATIONS, WOODLAND, ME., TO THE ATLANTIC OCEAN, MINOR SCHEMES

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Wapsaconhagan	° / // 45 09 15.13 67 23 37.26	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 111 & 27 & 25 \\ 126 & 22 & 36 \\ 146 & 55 & 54 \\ 177 & 07 & 40 \\ \end{smallmatrix} $	<ul> <li>, ', ''</li> <li>291 26 55</li> <li>306 22 22</li> <li>326 55 44</li> <li>357 07 39</li> </ul>	Woodland, finial on water tank. Spoilbank Lower base Crossing	986. 0 543. 4 543. 2 177. 3	2. 993900 2. 735144 2. 734979 2. 248734
Nearby	45 09 16.86 67 23 41.62	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Spoilbank Crossing Wapsaconhagan	$\begin{array}{c} 435.\ 4\\ 150.\ 9\\ 109.\ 1\end{array}$	$\begin{array}{c} 2. \ 638877\\ 2. \ 178582\\ 2. \ 037779 \end{array}$
Pond	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 85 & 16 & 34 \\ 107 & 46 & 14 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Wapsaconhagan Crossing	$\begin{array}{c} 433.\ 7\\ 463.\ 2\end{array}$	$\begin{array}{c} 2. \ 637185 \\ 2. \ 665765 \end{array}$
Gauge	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Wapsaconhagan Crossing Pond	$\begin{array}{c} 491.\ 5\\ 577.\ 6\\ 186.\ 8\end{array}$	$\begin{array}{c} 2. \ 691545 \\ 2. \ 761596 \\ 2. \ 271353 \end{array}$
Curve	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Gauge Pond	$508.0 \\ 576.5$	$\begin{array}{c} 2. \ 705834 \\ 2. \ 760816 \end{array}$
Lovering	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Gauge Pond Curve	$\begin{array}{c} 364.\ 2\\ 495.\ 9\\ 224.\ 7\end{array}$	$\begin{array}{c} 2. \ 561367 \\ 2. \ 695395 \\ 2. \ 351634 \end{array}$
Irving	45 08 59.79 67 22 47.43	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lovering Curve	$\begin{array}{c} 337.\ 7\\ 339.\ 0 \end{array}$	$\begin{array}{c} 2. \ 528551 \\ 2. \ 530224 \end{array}$
Ref. Mon. 198	45 08 51.52 67 22 48.76	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lovering Curve Irving	504.8 581.3 256.9	$\begin{array}{c} 2.\ 703097\\ 2.\ 764370\\ 2.\ 409692 \end{array}$
Casey's barn, finial	45 09 16.29 67 22 41.61	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 198 Anderson Lovering Gauge Woodland Murchie	$\begin{array}{c} 780.\ 3\\ 2,\ 003.\ 1\\ 529.\ 3\\ 768.\ 8\\ 2,\ 020.\ 5\\ 734.\ 2\end{array}$	$\begin{array}{c} 2. \ 892235\\ 3. \ 301707\\ 2. \ 723737\\ 2. \ 885839\\ 3. \ 305458\\ 2. \ 865798 \end{array}$
Ref. Mon. 197 ecc	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 198 Lovering	$316.\ 3\ 437.\ 5$	$\begin{array}{c} 2. \ 500065 \\ 2. \ 641026 \end{array}$
Ref. Mon. 197	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 197 ecc Ref. Mon. 198	$17.4 \\ 333.6$	$\begin{array}{c} 1.\ 239500\\ 2.\ 523269 \end{array}$
Traverse Station 1–W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$140\ 54\ 54$	320 54 42	Ref. Mon. 197 ecc	570.6	2. 756355
Traverse Station 2–W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	147 50 10	327 50 06	Traverse Station 1–W	236. 2	2. 373320
Traverse Station 3–W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	133 52 36	313 52 31	Traverse Station 2–W	206. 2	2. 314244
Traverse Station 4–W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	223 12 22	43 12 23	Traverse Station 3-W	65.6	1. 816771
Secrip	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	158 11 33	338 11 30	Traverse Station 4–W	263. 0	2. 419950
Bailey	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	146 09 06	326 09 03	Secrip	168. 7	2. 227081
Y	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Secrip Bailey	$300.5 \\ 297.7$	$\begin{array}{c} 2. \ 477884 \\ 2. \ 473736 \end{array}$
Smith	45 08 14.61 67 22 17.37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Y Mohannas Bailey Maguerrewoc	$\begin{array}{c c}111.&6\\2,&215.&0\\&317.&3\\7,&443.&3\end{array}$	$\begin{array}{c} 2. \ 047607 \\ 3. \ 345366 \\ 2. \ 501400 \\ 3. \ 871763 \end{array}$

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Base	° ' '' 45 08 14.89 67 22 10.53	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 86 & 35 & 59 \\ 206 & 58 & 34 \\ \end{smallmatrix} $	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 266 & 35 & 54 \\ 26 & 58 & 37 \end{smallmatrix} $	Smith Bailey	149.73 214.0	2. 175312 2. 330501
Midrip	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bailey Secrip	$   \begin{array}{c}     113. \\     261. \\     3   \end{array} $	$\begin{array}{c} 2. & 054065 \\ 2. & 417207 \end{array}$
Ref. Mon. 199	45 08 22.32 67 21 58.89	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Midrip Bailey Secrip	$\begin{array}{c} 75. \ 9 \\ 161. \ 8 \\ 271. \ 0 \end{array}$	1. 880397 2. 209085 2. 432897
Head ecc	45 08 27.33 67 22 07.10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Secrip Ref. Mon. 199 Midrip	89. 3 236. 9 253. 0	$\begin{array}{c} 1. \ 950787 \\ 2. \ 374478 \\ 2. \ 403099 \end{array}$
Head	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	352 49 36	172 49 36	Head ecc	9. 3	0. 969043
Ref. Mon. 200	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bailey Ref. Mon. 199	$\begin{array}{c} 0.4\\ 162.1 \end{array}$	$\begin{array}{c} 9. \ 6149{-}10 \\ 2. \ 209845 \end{array}$
B-W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Midrip Ref. Mon. 199	$175.9\\166.9$	$\begin{array}{c} 2. \ 245231 \\ 2. \ 222517 \end{array}$
C-W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 199 B-W	287.7 171.3	$\begin{array}{c} 2. \ 459001 \\ 2. \ 233750 \end{array}$
D-W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	C-W	$110.0 \\ 253.1$	$\begin{array}{c} 2. \ 041399 \\ 2. \ 403243 \end{array}$
Lounder	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	D W B-W	$171.8 \\ 222.5$	$\begin{array}{c} 2. \ 235100 \\ 2. \ 347280 \end{array}$
E-W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccccccccc} 115 & 02 & 41 \\ 148 & 53 & 14 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	D-W Lounder	$308.2 \\ 264.3$	$\begin{array}{c} 2. \ 488796 \\ 2. \ 422171 \end{array}$
F-W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 42 & 30 & 30 \\ 96 & 34 & 13 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	E-W D-W	$120.6 \\ 363.1$	$\begin{array}{c} 2. \ 081414 \\ 2. \ 560006 \end{array}$
G-W	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	E-W F-W	180. 8 129. 7	$\begin{array}{c} 2. \ 257252 \\ 2. \ 112998 \end{array}$
Clark	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	F-W	$251. \ 3 \\ 169. \ 1$	$\begin{array}{c} 2. \ 400134 \\ 2. \ 228170 \end{array}$
Ephraim	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Clark G–W	$236.6 \\ 295.1$	$\begin{array}{c} 2. & 373972 \\ 2. & 469980 \end{array}$
Ringbolt	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Clark G–W Ephraim	$\begin{array}{c} 460. \ 3 \\ 583. \ 9 \\ 311. \ 5 \end{array}$	$\begin{array}{c} 2. \ 663062 \\ 2. \ 766309 \\ 2. \ 493503 \end{array}$
Hall	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ringbolt Ephraim	670. 8 841. 1	$\begin{array}{c} 2. & 826616 \\ 2. & 924825 \end{array}$
Malloy	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ringbolt Ephraim Hall	$355.4 \\ 607.1 \\ 352.1$	$\begin{array}{c} 2. \ 550729 \\ 2. \ 783277 \\ 2. \ 546624 \end{array}$
Lawler	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Malloy Hall	266.0 194.6	$\begin{array}{c} 2. \ 424922 \\ 2. \ 289194 \end{array}$
Ref. Mon. 201	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Hall Lawler	279. 3 337. 3	$\begin{array}{c} 2. \ 446078 \\ 2. \ 528075 \end{array}$
Ref. Mon. 202	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccc} 7 & 57 & 53 \\ 112 & 14 & 14 \\ 156 & 57 & 06 \end{array}$	Ref. Mon. 201 Hall Lawler	$\begin{array}{c} 83.\ 3\\ 246.\ 8\\ 263.\ 2\end{array}$	$\begin{array}{c} 1. \ 920729 \\ 2. \ 392415 \\ 2. \ 420280 \end{array}$
Stillman	45       07       38. 42         67       20       46. 74	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Lawler Malloy Hall	259.3 469.5 178.1	$\begin{array}{c} 2. \ 413776 \\ 2. \ 695903 \\ 2. \ 250713 \end{array}$

						and the second
Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Rockfield	° / // 45 07 24.80 67 20 48.97	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 151 & 53 & 25 \\ 171 & 12 & 56 \\ 186 & 36 & 45 \\ \end{smallmatrix} $	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 331 & 53 & 18 \\ 351 & 12 & 53 \\ 6 & 36 & 47 \\ \end{smallmatrix} $	Lawler Hall Stillman	$\begin{array}{c} 443.\ 3\\ 546.\ 2\\ 423.\ 2\end{array}$	$\begin{array}{c} 2. \ 646723 \\ 2. \ 737376 \\ 2. \ 626564 \end{array}$
Waters	45 07 32.84 67 20 29.97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Rockfield Lawler Stillman	$\begin{array}{c} 483.\ 8\\ 640.\ 2\\ 404.\ 9\end{array}$	$\begin{array}{c} 2. \ 684636\\ 2. \ 806346\\ 2. \ 607380 \end{array}$
Interval	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Rockfield Stillman Waters	$375.\ 2\ 451.\ 7\ 161.\ 3$	$\begin{array}{c} 2. \ 574306 \\ 2. \ 654890 \\ 2. \ 207507 \end{array}$
Haywood	45 07 32.17 67 20 23.75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Interval Waters	$229.8 \\ 137.5$	$\begin{array}{c} 2. \ 361259 \\ 2. \ 138150 \end{array}$
Will	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Interval Waters Haywood	$221.\ 2\\87.\ 3\\66.\ 2$	$\begin{array}{c} 2. & 344856 \\ 1. & 940848 \\ 1. & 820935 \end{array}$
Ref. Mon. 204	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Will Haywood	$71.\ 1 \\ 9.\ 0$	$\begin{array}{c} 1. \ 851757 \\ 0. \ 955748 \end{array}$
Ref. Mon. 203	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Will Ref. Mon. 204	$     11.6 \\     81.8 $	$\begin{array}{c} 1. \ 065965 \\ 1. \ 912560 \end{array}$
Cove	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 36 & 02 & 31 \\ 44 & 10 & 46 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Haywood Will	$466.1 \\ 467.0$	$\begin{array}{c} 2. \ 668486 \\ 2. \ 669300 \end{array}$
Frostfield	45 07 40.81 67 20 12.39	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Haywood Will Cove	364.6 374.6 113.0	$\begin{array}{c} 2. \ 561818 \\ 2. \ 573590 \\ 2. \ 053042 \end{array}$
Abbott	45 07 52.07 67 19 58.09	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Frostfield	$467.5 \\ 372.3$	$\begin{array}{c} 2. \ 669737 \\ 2. \ 570933 \end{array}$
Doten	45 07 42.64 67 19 45.20	$\begin{array}{r} 84 \ 33 \ 47 \\ 95 \ 22 \ 27 \\ 135 \ 57 \ 20 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Frostfield Cove Abbott	596.7 570.7 405.0	$\begin{array}{c} 2.\ 775776\\ 2.\ 756399\\ 2.\ 607489 \end{array}$
Heater	45 07 55.08 67 19 27.99	$\begin{array}{r} 44 \ 25 \ 39 \\ 81 \ 59 \ 00 \\ 245 \ 59 \ 51 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Doten Abbott Baring school cupola_	$537.4 \\ 664.3 \\ 713.6$	$\begin{array}{c} 2.\ 730315\\ 2.\ 822336\\ 2.\ 853480 \end{array}$
Pratt	45 07 49.18 67 19 24.90	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Doten Abbott Heater Baring school cupola_	$\begin{array}{r} 487.\ 6\\730.\ 9\\194.\ 1\\751.\ 3\end{array}$	$\begin{array}{c} 2. \ 688031 \\ 2. \ 863831 \\ 2. \ 287998 \\ 2. \ 875801 \end{array}$
English	45 08 04.21 67 19 24.38	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pratt Heater Maguerrewoc Baring school cupola_	$\begin{array}{r} 464.\ 0\\ 292.\ 8\\ 4,\ 113.\ 5\\ 573.\ 1\end{array}$	$\begin{array}{c} 2. \ 666548 \\ 2. \ 466556 \\ 3. \ 614214 \\ 2. \ 758246 \end{array}$
Ref. Mon. 205	45 07 55.32 67 19 28.82	292 41 21	112 41 22	Heater	19.6	1. 29170
Ref. Mon. 206	45 07 50.28 67 19 26.15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 205 Heater Baring school cupola_ Pratt	$166. 1 \\ 153. 3 \\ 752. 5 \\ 43. 6$	$\begin{array}{c} 2. \ 22035\\ 2. \ 18568\\ 2. \ 87651\\ 1. \ 63967 \end{array}$
Poppelmill	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pratt Heater English Baring school cupola_	569.9 515.8 386.7 199.5	$\begin{array}{c} 2.\ 755780\\ 2.\ 712496\\ 2.\ 587352\\ 2.\ 299862 \end{array}$
Rock	45 07 26.99 67 19 33.07	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 9 & 23 & 25 \\ 33 & 24 & 20 \\ 45 & 45 & 44 \end{array}$	English Baring school cupola Maguerrewoc	$\begin{array}{c} 1,164.5\\ 1,386.2\\ 4,993.2 \end{array}$	$\begin{array}{c} 3. \ 066141 \\ 3. \ 141811 \\ 3. \ 698382 \end{array}$

### APPENDIX IV

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Ref. Mon. 207	$\circ$ ' '' 45 08 $^{\circ}$ 15.42 67 19 09.50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c}\circ & \prime & \prime \prime \\ 223 & 12 & 51 \\ 143 & 43 & 16 \\ 171 & 43 & 36 \end{array}$	English Baring school cupola Poppelmill	$\begin{array}{c} 474. \ 8 \\ 419. \ 0 \\ 402. \ 7 \end{array}$	2. 676525 2. 622181 2. 605033
Phinney	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	English Ref. Mon. 207 Baring school cupola_	$\begin{array}{c} 605.\ 2\\ 208.\ 6\\ 291.\ 6\end{array}$	$\begin{array}{c} 2.\ 781928\\ 2.\ 319276\\ 2.\ 464816 \end{array}$
South Bar	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 207 Phinney	$178. \ 0 \\ 97. \ 2$	$\begin{array}{c} 2. \ 250544 \\ 1. \ 987493 \end{array}$
Ref. Mon. 208	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 207 Phinney	$155.\ 3\ 81.\ 3$	$\begin{array}{c} 2. \ 19114 \\ 1. \ 91006 \end{array}$
Murphy	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Phinney Ref. Mon. 207	$\begin{array}{c} 408. \ 0 \\ 267. \ 4 \end{array}$	$\begin{array}{c} 2. \ 610649 \\ 2. \ 427195 \end{array}$
Chain Rock	45 08 25 29 67 19 09 31	$\begin{array}{ccccc} 0 & 48 & 15 \\ 56 & 18 & 19 \\ 330 & 46 & 46 \\ 355 & 38 & 10 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 207 Murphy Phinney Poppelmill	304.9 81.2 406.2 705.5	$\begin{array}{c} 2. \ 484139 \\ 1. \ 909322 \\ 2. \ 608758 \\ 2. \ 848471 \end{array}$
Towers	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Chain Rock Murphy	$\begin{array}{c} 133.\ 5\\ 123.\ 0\end{array}$	$\begin{array}{c} 2. \ 125490 \\ 2. \ 090084 \end{array}$
Ref. Mon. 209	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Towers Chain Rock	39.7 100.9	$\begin{array}{c} 1. \ 59885 \\ 2. \ 00395 \end{array}$
Ref. Mon. 210	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Chain Rock Ref. Mon. 209	$21.8 \\ 121.3$	$\begin{array}{c} 1.\ 33807\\ 2.\ 08401 \end{array}$
Sawdust Island	45 08 30.18 67 19 11.13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Murphy Towers Chain Rock	$197. 9 \\111. 0 \\156. 1$	$\begin{array}{c} 2.\ 296524\\ 2.\ 045466\\ 2.\ 193516 \end{array}$
Bartlett	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Sawdust Island Towers	$298.9 \\ 249.0$	$\begin{array}{c} 2. \ 475593 \\ 2. \ 396132 \end{array}$
Butler	45 08 45.85 67 19 27.35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Sawdust Island Towers Bartlett	$599.\ 4\\631.\ 1\\458.\ 6$	$\begin{array}{c} 2.\ 777692\\ 2.\ 800092\\ 2.\ 661430 \end{array}$
Canal	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bartlett Butler	$\begin{array}{c} 425.\ 2\ 630.\ 9 \end{array}$	$\begin{array}{c} 2. \ 628638 \\ 2. \ 799964 \end{array}$
Haw Point	45 08 44.25 67 18 55.68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Canal Towers Bartlett Butler	$\begin{array}{r} 418.\ 8\\ 660.\ 9\\ 753.\ 9\\ 693.\ 6\end{array}$	$\begin{array}{c} 2. \ 621967 \\ 2. \ 820147 \\ 2. \ 877290 \\ 2. \ 841103 \end{array}$
Russell	45 08 34.71 67 18 39.89	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Canal Butler Haw Point	$561. \ 3 \\ 1, \ 092. \ 2 \\ 453. \ 5$	$\begin{array}{c} 2.\ 749169\\ 3.\ 038301\\ 2.\ 656527 \end{array}$
Rideout	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Russell Haw Point	$\begin{array}{c} 676. \ 9 \\ 1, \ 104. \ 1 \end{array}$	$\begin{array}{c} 2. \ 830546 \\ 3. \ 042992 \end{array}$
Squirrel Point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Russell Haw Point Rideout	$\begin{array}{c} 462.\ 7\\ 731.\ 2\\ 509.\ 8\end{array}$	$\begin{array}{c} 2. \ 665268 \\ 2. \ 864015 \\ 2. \ 707360 \end{array}$
Ref. Mon. 211	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Russell Rideout	$339.5 \\ 666.0$	$\begin{array}{c} 2.\ 53078\\ 2.\ 82348 \end{array}$
Ref. Mon. 212	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	304 27 30	124 27 30	Russell	0. 2	9. 3284-10
Birch Hill	45 08 48.99 67 18 01.50	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Rideout Squirrel Point	$ \begin{array}{c} 645.7\\ 489.8 \end{array} $	$\begin{array}{c} 2. \ 809997 \\ 2. \ 689981 \end{array}$

### WOODLAND, ME., TO THE ATLANTIC OCEAN, MINOR SCHEMES-Continued

	F	the second second			1	······································
Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Stonyfield	° / // 45 08 32.85 67 17 31.28	$ \begin{smallmatrix} \circ & \cdot & \cdot & \cdot \\ 81 & 54 & 27 \\ 104 & 42 & 58 \\ 105 & 43 & 14 \\ 127 & 02 & 17 \\ 151 & 57 & 00 \\ 212 & 14 & 03 \\ \end{smallmatrix} $	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 261 & 54 & 00 \\ 284 & 40 & 12 \\ 285 & 42 & 38 \\ 307 & 01 & 56 \\ 331 & 56 & 05 \\ 32 & 14 & 33 \\ \end{smallmatrix} $	Rideout Mohannas Squirrel Point Birch Hill Todd Mountain Maguerrewoc	$\begin{array}{c} 854.\ 4\\ 5,\ 295.\ 6\\ 1,\ 157.\ 0\\ 826.\ 9\\ 3,\ 599.\ 5\\ 1,\ 715.\ 8\end{array}$	$\begin{array}{c} 2. \ 931647\\ 3. \ 723917\\ 3. \ 063312\\ 2. \ 917432\\ 3. \ 556244\\ 3. \ 234471 \end{array}$
Balcolm	45 09 06.73 67 18 01.33	$\begin{array}{cccccc} 0 & 23 & 20 \\ 154 & 03 & 33 \\ 255 & 31 & 05 \\ 327 & 52 & 55 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Birch Hill Todd Mountain Maguerrewoc Stonyfield	$\begin{array}{c} 547.\ 6\\ 2,\ 369.\ 7\\ 1,\ 623.\ 0\\ 1,\ 234.\ 5\end{array}$	$\begin{array}{c} 2.\ 738485\\ 3.\ 374690\\ 3.\ 210309\\ 3.\ 091506 \end{array}$
Junction	45 08 56.89 67 17 37.23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Rideout Birch Hill Balcolm Maguerrewoc Stonyfield	$\begin{array}{c} 1,120.8\\ 583.6\\ 607.7\\ 1,263.0\\ 753.3\end{array}$	$\begin{array}{c} 3. \ 049542 \\ 2. \ 766138 \\ 2. \ 783690 \\ 3. \ 101412 \\ 2. \ 876977 \end{array}$
Campbell	45 09 20.01 67 17 36.08	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Junction Balcolm Todd Mountain Maguerrewoc Stonyfield	$\begin{array}{c} 714. \ 2 \\ 687. \ 2 \\ 2, \ 341. \ 6 \\ 1, \ 020. \ 0 \\ 1, \ 459. \ 5 \end{array}$	$\begin{array}{c} 2. \ 853791 \\ 2. \ 837108 \\ 3. \ 369508 \\ 3. \ 008587 \\ 3. \ 164210 \end{array}$
Pineo	45 09 24 05 67 17 51 17	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Todd Mountain Maguerrewoc Junction Stonyfield	$\begin{array}{c} 2,032.7\\ 1,355.7\\ 891.9\\ 1,639.0 \end{array}$	$\begin{array}{c} 3. \ 308063 \\ 3. \ 132153 \\ 2. \ 950316 \\ 3. \ 214567 \end{array}$
White	45 09 46.97 67 18 14.51	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Todd Mountain Maguerrewoc Balcolm	$\begin{array}{c} 1,161.9\\ 2,038.9\\ 1,275.2 \end{array}$	$\begin{array}{c} 3. \ 065179 \\ 3. \ 309390 \\ 3. \ 105587 \end{array}$
Kelley	45 09 49.95 67 17 57.16	$\begin{array}{cccc} 76 & 20 & 18 \\ 125 & 14 & 20 \\ 302 & 05 & 50 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	White Todd Mountain Maguerrewoc	$\begin{array}{c} 390. \ 0 \\ 1, \ 380. \ 5 \\ 1, \ 747. \ 5 \end{array}$	$\begin{array}{c} 2. \ 591082 \\ 3. \ 140045 \\ 3. \ 242425 \end{array}$
Stubbs	45 10 08.69 67 17 49.37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Kelley White Todd Mountain	602. 9 866. 7 1, 315. 9	$\begin{array}{c} 2.\ 780271\\ 2.\ 937863\\ 3.\ 119210 \end{array}$
Pumping Station	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Stubbs Todd Mountain	80. 8 1, 317. 5	$\begin{array}{c} 1. \ 907519 \\ 3. \ 119745 \end{array}$
Ref. Mon. 215	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	56 46 16	236 46 14	Pumping Station	54.4	1. 735279
Church	45 10 13.30 67 17 54.60	$\begin{array}{rrrrr} 4 & 26 & 04 \\ 28 & 08 & 49 \\ 93 & 39 & 56 \\ 296 & 13 & 48 \\ 321 & 14 & 51 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Kelley White Todd Mountain Pumping Station Stubbs	$\begin{array}{r} 722. \ 9\\ 921. \ 8\\ 1, \ 185. \ 9\\ 141. \ 3\\ 182. \ 5\end{array}$	$\begin{array}{c} 2. \ 859080\\ 2. \ 964671\\ 3. \ 074036\\ 2. \ 150191\\ 2. \ 261184 \end{array}$
Harrison	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 57 & 30 & 17 \\ 83 & 15 & 07 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pumping Station Todd Mountain	670. 8 1, 889. 1	$\begin{array}{c} 2. \ 826613 \\ 3. \ 276251 \end{array}$
Harrison ecc	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	326 08 04	146 08 04	Harrison	4.6	0. 65982
Ref. Mon. 216	45 10 15.73 67 17 47.17	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pumping Station Harrison	$\begin{array}{c} 142. \ 1 \\ 575. \ 2 \end{array}$	$\begin{array}{c} 2. \ 152614 \\ 2. \ 759808 \end{array}$
Ref. Mon. 217	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pumping Station Harrison	$\begin{array}{c} 283.\ 1\\ 387.\ 8\end{array}$	$\begin{array}{c} 2.\ 452008\\ 2.\ 588648 \end{array}$
Gristmill	45 10 23.30 67 17 34.98	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 217 Harrison	223.5 264.3	$\begin{array}{c} 2. \ 349366 \\ 2. \ 422160 \end{array}$
Ref. Mon. 219	45 10 31.44 67 17 30.94	$\begin{array}{c} 19 \ 20 \ 50 \\ 326 \ 07 \ 58 \\ 326 \ 07 \ 58 \end{array}$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gristmill Harrison Harrison ecc	$\begin{array}{c} 266. \ 2 \\ 315. \ 7 \\ 311. \ 1 \end{array}$	$\begin{array}{c} 2. \ 425231 \\ 2. \ 499243 \\ 2. \ 492943 \end{array}$

### APPENDIX IV

### Latitude and longitude Back Distance Loga-Station Azimuth To station azimuth (meters) rithm 0 / // 0 1 11 0 / // Ref. Mon. 218\_\_\_\_\_ 45 10 17.29 188 24 31 8 24 33 Ref. Mon. 219\_\_\_\_ 441.6 $\begin{array}{c} 2. & 645039 \\ 2. & 473464 \end{array}$ 67 17 33.90 233 07 20 53 07 28 Harrison ecc 297. 5 Milltown, Me., Baptist Church, finial. 45 10 16.70 67 17 24.64 Stonyfield\_ $\begin{array}{c} 3. \ 506395 \\ 2. \ 743040 \\ 2. \ 676947 \end{array}$ 3, 209. 2 Pumping Station\_\_\_\_ Ref. Mon. 219\_\_\_\_ 553.4 343 10 43 475.3 $\begin{array}{cccc} 6 & 04 & 07 \\ 8 & 48 & 20 \\ 25 & 25 & 10 \end{array}$ 2, 394. 21, 058. 9Milltown, New Bruns-186 03 59 Balcolm\_\_\_\_ 3. 379165 3.3791653.0248543.1005633.1184662.6745232.7686343.2995393.527820wick, Congregational Church spire. $\frac{188}{205} \frac{48}{24} \frac{15}{52}$ Kelley\_\_\_\_\_ White\_\_\_\_\_ $\begin{array}{c} 1,\ 260.\ 6\\ 1,\ 313.\ 6\end{array}$ Todd Mountain\_\_\_\_ Ref. Mon. 219\_\_\_\_\_ 259 01 27 $60 \ 16$ 13 472. 6 Harrison\_\_\_\_\_ 587.0 Campbell\_ 1, 993. 1 -----Stonyfield\_\_\_\_\_ 3, 450. 1 3. 537830 Carl 45 09 42.45 67 18 08.58 White\_\_\_ 190.3 2. 27944 Milltown Congrega-tional Church 1, 342. 5 3. 12793 spire. Ref. Mon. 213\_\_\_\_\_ 201 06 04 Milltown Congrega-tional Church $21 \ 06 \ 22$ 1, 477. 3 3. 16948 spire. 230 12 14 50 12 18 Carl\_\_\_ 156.8 2. 19530 Ref. Mon. 214----- $154.7 \\ 301.7$ $\begin{array}{c} 2. \ 18939 \\ 2. \ 47959 \end{array}$ Ref. Mon. 213\_\_\_\_ White\_\_\_\_\_ 163 39 23 Carl\_\_\_\_ 119.3 2. 07646 Hitchings\_\_\_\_\_ $\begin{array}{ccccccccc} 19 & 04 & 37 \\ 116 & 10 & 45 \\ 137 & 45 & 42 \end{array}$ 199 04 33 Maguerrewoc\_ 401.4 2. 603611 3, 051. 82, 155. 6Todd Mountain\_\_\_\_ 3. 484555 Milltown Congrega-tional C h u r c h 3. 333575 spire. 232 40 09 52 42 03 Sinclair 2 \_ 4, 396. 5 3. 643101 Todd Mountain\_\_\_\_\_ Ref. Mon. 219\_\_\_\_\_ Harrison\_\_\_\_\_ Barton\_\_\_\_\_ 65 28 32 45 10 36. 45 $\begin{array}{c} 3. \ 187209 \\ 2. \ 528220 \\ 2. \ 801083 \end{array}$ 1, 538. 9 67 17 44.68 297 15 22 337.5632.5457.7311 12 05 332 26 02 152 26 09 2. 660569 Gristmill\_\_\_\_ Fowler\_\_\_\_\_ $57 \ 38 \ 08 \\ 358 \ 02 \ 58$ $237 \ 37 \ 59 \\ 178 \ 02 \ 58$ $\begin{array}{c} 2. \ 533451 \\ 2. \ 528384 \end{array}$ Barton. 341. 5 Ref. Mon. 219\_\_\_\_ 337.6 Bvre 205 56 41 Barton\_\_\_\_\_ 471.8 2. 673763 161 13 38 Fowler\_\_\_\_\_ 255.0 2. 406506 Ref. Mon. 221\_\_\_\_\_ 25 42 47 $\begin{array}{c} 2. \ 530336 \\ 2. \ 376548 \end{array}$ Bvre\_. 339.1 238. 0 74 22 20 Fowler\_\_\_\_\_ Ref. Mon. 220\_\_\_\_\_ 166 17 27 45 10 34.58 $\begin{array}{c} 2. \ 258622 \\ 2. \ 692742 \end{array}$ Ref. Mon. 221\_\_\_\_\_ 181.4 67 17 39.99 192 11 49 Byre\_\_\_\_\_ 492.9 45 10 36.44 67 17 44.67 Barton 2 ..... $\begin{array}{c} 471. \ 8 \\ 132. \ 7 \\ 117. \ 2 \end{array}$ 2. 673774 Ref. Mon: 221\_\_\_\_\_ Ref. Mon. 220\_\_\_\_\_ 2.122935299 20 25 2.068908 Slough\_\_\_\_\_ 199 01 37 432.8 Fowler\_\_\_\_\_ 2. 636249 233 04 21 Byre\_\_\_\_\_ 279.1 2. 445814 Union\_\_\_\_\_ 45 10 56.78 16 44 11 196 44 09 Byre\_ 212.3 $\begin{array}{c} 2. \ 327020 \\ 2. \ 219765 \\ 2. \ 648600 \end{array}$ Slough\_\_\_\_\_ Fowler\_\_\_\_\_ 67 17 32.42 165.9445.2Ref. Mon. 224\_\_\_\_\_ 7 04 48 Slough\_\_\_\_\_ $\begin{array}{c} 2. \ 684356 \\ 2. \ 695774 \end{array}$ 483.5 26 30 55 Union\_\_\_\_\_ 496.3 Slope\_\_\_ Ref. Mon. 224\_\_\_\_\_ 90 32 29 $\begin{array}{c} 2. \ 413664 \\ 2. \ 717589 \\ 2. \ 651432 \end{array}$ 259.2 Slough\_\_\_\_\_Union\_\_\_\_\_ 521. 9 448.2

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Ref. Mon. 222	° ' '' 45 10 58.72 67 17 28.91	° ' '' 163 31 32 200 39 36	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 343 & 31 & 28 \\ 20 & 39 & 41 \end{smallmatrix} $	Slope Ref. Mon. 224	$403.\ 2\ 410.\ 6$	2. 605504 2. 613412
Ref. Mon. 223	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 224 Ref. Mon. 222	$322.5 \\ 235.8$	$\begin{array}{c} 2. \ 508589 \\ 2. \ 372612 \end{array}$
Ref. Mon. 225	45 11 15.72 67 17 21.78	$\begin{array}{rrrrr} 4 & 23 & 13 \\ 21 & 39 & 59 \\ 62 & 51 & 46 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 224 Union Slope	$141. \ 3 \\ 629. \ 4 \\ 303. \ 4$	$\begin{array}{c} 2,\ 150010\\ 2,\ 798955\\ 2,\ 482033 \end{array}$
Ref. Mon. 226	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 225 Slope	$301.\ 1\ 576.\ 9$	$\begin{array}{c} 2. \ 478680 \\ 2. \ 761107 \end{array}$
International Bridge	45 11 30 68 67 17 02 23	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 225 Todd Mountain Slope Ref. Mon. 226 Sinclair 2	$\begin{array}{r} 628. \ 9\\ 3, \ 281. \ 0\\ 919. \ 7\\ 346. \ 1\\ 4, \ 031. \ 4\end{array}$	$\begin{array}{c} 2. \ 798585\\ 3. \ 516001\\ 2. \ 963668\\ 2. \ 539146\\ 3. \ 605454 \end{array}$
Ref. Mon. 227	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ref. Mon. 226 International Bridge_	$345.5 \\ 0.6$	2. 538410 9. 8000-10
Calais Congregational Church spire.	45 11 13.94 67 16 36.49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Hitchings Todd Mountain Slope International Bridge_ Sinclair 2	$\begin{array}{c} 3,145.\ 6\\ 3,401.\ 8\\ 1,261.\ 6\\ 763.\ 5\\ 3,379.\ 0 \end{array}$	$\begin{array}{c} 3.\ 497710\\ 3.\ 531707\\ 3.\ 100919\\ 2.\ 882817\\ 3.\ 528788 \end{array}$
Barnard	45 11 25.75 67 16 39.94	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	International Bridge_ Calais Congrega- tional Church spire.	509. 8 372. 3	$\begin{array}{c} 2. \ 707438 \\ 2. \ 570919 \end{array}$
Hospital	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	54 11 20	234 10 56	Calais Congrega- tional Church spire.	909. 3	2. 958700
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Barnard International Bridge_	829.7 1, 299.3	$\begin{array}{c} 2. \ 918937 \\ 3. \ 113707 \end{array}$
Haley	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	68 22 16	248 21 45	Calais Congrega- tional Church spire.	999. 0	2. 999571
		$\begin{array}{r} 89 \ 47 \ 41 \\ 130 \ 34 \ 22 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Barnard Hospital	1,003.9 251.8	$\begin{array}{c} 3. \ 001712 \\ 2. \ 401074 \end{array}$
Box	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	93 21 34	273 21 12	Calais Congrega- tional Church spire.	687.0	2. 836946
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$5 09 01 \\ 30 43 57$	Hospital Haley	574.6 475.3	$\begin{array}{c} 2. \ 759378 \\ 2. \ 676928 \end{array}$
St. Stephen Catholic Church spire, 1909.	45 11 41.57 67 17 02.17	$\begin{array}{cccccc} 0 & 12 & 36 \\ 283 & 53 & 02 \\ 288 & 01 & 24 \\ 315 & 10 & 48 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	International Bridge_ Hospital Haley Barnard	$\begin{array}{c} 336.\ 1\\ 1,\ 337.\ 0\\ 1,\ 566.\ 1\\ 688.\ 5\end{array}$	$\begin{array}{c} 2.\ 526474\\ 3.\ 126142\\ 3.\ 194828\\ 2.\ 837927 \end{array}$
St. Stephen Methodist Church spire, 1909.	45 11 41.43 67 16 34.22	$\begin{array}{rrrrr} 14 & 28 & 00 \\ 298 & 38 & 56 \\ 324 & 24 & 09 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Barnard Haley Box	$\begin{array}{c} 499.\ 8\\ 1,\ 001.\ 7\\ 1,\ 093.\ 1\end{array}$	$\begin{array}{c} 2. \ 698834 \\ 3. \ 000742 \\ 3. \ 038648 \end{array}$
Ref. Mon. 228	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$210 \ 43 \ 49 \\ 30 \ 43 \ 57$	Box Haley	$475.\ 2 \\ 0.\ 1$	$\begin{array}{c} 2. \ 676844 \\ 8. \ 9611 - 10 \end{array}$
Ref. Mon. 229	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	111 51 36	291 51 34	Box	72.4	1. 859862
Crocker	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Box St. Stephen Meth-	$\begin{array}{c} 811.\ 2\\ 1,\ 649.\ 8\end{array}$	$\begin{array}{c} 2. \ 909140 \\ 3. \ 217430 \end{array}$
		119 36 35	299 36 17	Haley	648.1	2. 811670
Young	$\begin{array}{c} 45,10 \\ 67 \\ 15 \\ 37. \\ 60 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Box	$734. \ 6 \\ 1, \ 803. \ 1$	2. 866029 3. 256026
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Haley Crocker	905. 8 552. 3	$\begin{array}{c} 2. \ 957017 \\ 2. \ 742180 \end{array}$

### APPENDIX IV

### Distance Latitude and Back Loga-To station Station Azimuth longitude azimuth (meters) rithm 0 / 1/ 0 / // 0 / // Red House\_\_\_\_\_ 45 11 04.66 75 35 50 255 35 28 Young\_\_\_\_\_ 714.7 2. 854151 67 15 05.89 124 33 01 304 32 45 589.7 2. 770627 Crocker\_\_\_ $\begin{array}{c} 2. & 825863 \\ 2. & 933918 \end{array}$ 290 43 46 669.7 45 10 51.22 Tannery\_\_\_\_\_ Young\_ 67 15 08.91 330 44 30 858. 9 Crocker 2. 623353 189 02 12 9 02 14 Red House\_\_\_\_ 420.1 97 44 09 277 43 53 Tannery. 505 3 2 703536 Stroud 138 00 31 318 00 17 Red House\_\_\_\_\_ 649.7 2. 812721 $\begin{array}{c} 2. & 991281 \\ 2. & 688658 \end{array}$ 980.1 Big Trees\_\_\_\_\_ Crocker\_ Red House\_\_\_\_\_ 448 3 383. 5 2. 583807 Stroud\_\_\_\_\_ Big Trees tablet\_\_\_\_\_ Big Trees\_\_\_\_\_ 1. 1 0.042969383. 7 Stroud \_\_\_\_ 2. 584001 Ref. Mon. 231\_\_\_\_\_ 45 10 48.90 89 25 56 269 25 56 Big Trees tablet\_\_\_ 0.1 8. 9611-10 67 15 03.55 3 41 41 Big Trees\_\_\_\_\_ 0. 03879 1. 89 26 08 2. 583898 Stroud\_\_\_ 383.6 Ref. Mon. 230\_\_\_\_\_ 45 10 49.02 89 26 08 269 26 08 Stroud\_ 0.1 9. 0861-10 67 14 45. 98 89 26 08 269 25 56 Ref. Mon. 231\_\_\_\_\_ 383. 7 2. 584036 Red House \_\_\_\_ 751 2 Todd Point\_\_\_\_ 2. 875774 301. 4 2. 479198 Stroud\_\_\_\_\_ $\begin{array}{c} 2. \ 717027 \\ 2. \ 907057 \\ 2. \ 755018 \end{array}$ Long Point\_\_\_\_\_ Todd Point\_---521. 2 807. 3 568. 9 Big Trees\_\_\_\_\_ Stroud\_\_\_\_\_ 335 04 54 $\begin{array}{c} 2. \ 618229 \\ 2. \ 815942 \\ 2. \ 597664 \end{array}$ Mound\_\_\_\_\_ 171 46 30 351 46 28 Todd Point\_ 415.2 Stroud\_\_\_\_\_ Long Point\_\_\_\_\_ 654.5396.0 $\begin{array}{c} 2. \ 704298 \\ 2. \ 251043 \end{array}$ 89 42 56 269 42 40 Mound. 506. 2 Hybrown\_\_\_\_\_ 133 04 48 313 04 43 Long Point\_ 178.3 45 10 08.63 144 14 42 324 14 28 747.8 Mound. 2.873775 Meadow\_\_\_\_\_ Long Point\_\_\_\_\_ $\begin{array}{c} 2. & 865488 \\ 2. & 787658 \end{array}$ 67 14 32. 22 355 13 54 733. 6 6 28 53 Hybrown .... 613.3 Donald\_\_\_\_\_ 45 10 04.71 277 34 44 Meadow\_\_\_\_\_ 916.2 2.961972 67 13 50.63 311 02 11 Hybrown\_\_\_\_\_ 1, 112. 2 3. 046185 45 10 00. 72 491. 9 925. 5 2. 691894 Meadow Knights Point\_\_\_\_ Hybrown\_\_\_\_\_ 67 14 12.66 2. 966361 75 38 03 Donald\_\_\_\_\_ 496.6 2. 696039 45 09 55.57 67 13 35.01 Knights Point\_\_\_\_ Hills\_\_\_\_\_ 837.5 442.7 2 922991 2. 646153 Donald 45 09 44.00 67 14 04.63 $\begin{array}{c} 970. \ 1 \\ 545. \ 2 \\ 708. \ 9 \end{array}$ $\begin{array}{c} 2. & 986821 \\ 2. & 736582 \\ 2. & 850567 \end{array}$ Bog Brook church spire 321 36 41 Meadow. Knights Point\_\_\_\_\_ Donald\_\_\_\_\_ 61 05 27 739.1 2. 868720 Hills\_\_\_\_ 24 10 40 204 10 40 Hills\_\_\_\_\_ Ref. Mon. 232\_\_\_\_\_ 1.1 0. 041511 Narrows, 1909\_\_\_\_\_ 45 09 44.79 Knights Point\_\_\_\_\_ 948.6 2. 977060 $\begin{array}{c} 2. & 843831 \\ 2. & 522512 \end{array}$ Donald\_\_\_\_\_ 67 13 35. 52 698.0 333. 1 Hills\_\_\_ Pine Point\_\_\_\_\_ 45 10 04.05 45 00 31 225 00 12 Narrows, 1909\_\_\_\_ 841.1 2. 924843 67 13 08.29 65 50 22245 50 03 Hills\_\_\_\_\_ 639.6 2. 805917 45 10 04.47 15 12 11 195 12 11 Pine Point 13.2 Ref. Mon. 234----1. 120925 67 13 08.13

# WOODLAND, ME., TO THE ATLANTIC OCEAN, MINOR SCHEMES-Continued

			the second se			
Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Pirington	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 45 & 09 & 57. 87 \\ 67 & 12 & 58. 40 \\ \end{smallmatrix} $	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 63 & 32 & 04 \\ 84 & 56 & 15 \\ 131 & 27 & 49 \\ \end{smallmatrix} $	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 243 & 31 & 38 \\ 264 & 55 & 49 \\ 311 & 27 & 42 \\ \end{smallmatrix} $	Narrows, 1909 Hills Pine Point	905. 9 802. 8 288. 3	$\begin{array}{c} 2. & 957061 \\ 2. & 904610 \\ 2. & 459916 \end{array}$
Ref. Mon. 233	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Hills Ref. Mon. 232 Pirington Narrows	$\begin{array}{c} 306.\ 7\\ 307.\ 8\\ 989.\ 5\\ 126.\ 1\end{array}$	$\begin{array}{c} 2.\ 486729\\ 2.\ 488284\\ 2.\ 995429\\ 2.\ 100745 \end{array}$
Mark Point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pirington Pine Point	$\begin{array}{c} 618.\ 4\\ 687.\ 8\end{array}$	$\begin{array}{c} 2.\ 791263\\ 2.\ 837453 \end{array}$
Quarantine	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{r} 249 & 49 & 07 \\ 270 & 33 & 27 \\ 343 & 17 & 29 \end{array}$	Pirington Pine Point Mark Point	$533.\ 1\\716.\ 5\\282.\ 7$	$\begin{array}{c} 2. \ 726846 \\ 2. \ 855233 \\ 2. \ 451334 \end{array}$
Ref. Mon. 235	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	135 30 13	315 30 12	Quarantine	16.4	1. 214021
Ref. Mon. 236	45 10 12.60 67 12 39.20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Mark Point Quarantine	$\begin{array}{c} 0. \ 1 \\ 282. \ 8 \end{array}$	$\begin{array}{c} 8. \ 8820{-}10 \\ 2. \ 451524 \end{array}$
Ledge	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Quarantine Mark Point	$719. 9 \\ 569. 3$	$\begin{array}{c} 2. \ 857256 \\ 2. \ 755319 \end{array}$
Brown	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Quarantine Mark Point Ledge	$\begin{array}{c} 1,\ 197.\ 8\\ 1,\ 280.\ 1\\ 954.\ 9 \end{array}$	$\begin{array}{c} 3.\ 078387\\ 3.\ 107228\\ 2.\ 979967 \end{array}$
Hymurch	45 09 52.09 67 11 49.08	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Mark Point Ledge Brown	$\begin{array}{c} 1,264.6\\ 1,171.7\\ 522.0 \end{array}$	$\begin{array}{c} 3. \ 101940 \\ 3. \ 068818 \\ 2. \ 717639 \end{array}$
Spruce Point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Hymurch Brown	926. 2 705. 1	$\begin{array}{c} 2. \ 966698 \\ 2. \ 848260 \end{array}$
Miller	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Hymurch Brown Spruce Point	$\begin{array}{c} 633. \ 9\\ 808. \ 3\\ 590. \ 1\end{array}$	$\begin{array}{c} 2,\ 802045\\ 2,\ 907568\\ 2,\ 770917 \end{array}$
Ref. Mon. 238	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Miller Spruce Point	590. 0 0. 1	2. 770850 8. 9611-10
Ref. Mon. 237	45 09 45.73 67 11 21.49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Miller Spruce Point Ref. Mon. 238	$\begin{array}{c} 0.1\\ 590.2\\ 590.1\end{array}$	$\begin{array}{c} 9. \ 0861 - 10 \\ 2. \ 771007 \\ 2. \ 770944 \end{array}$
Bluff Head	$\begin{array}{c} 45 & 09 & 58 & 98 \\ 67 & 10 & 29 & 31 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Miller Spruce Point	$\begin{bmatrix} 1, 210. 7 \\ 885. 6 \end{bmatrix}$	$\begin{array}{c} 3. \ 083024 \\ 2. \ 947223 \end{array}$
De Monts	45 09 31.02 67 09 51.86	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Miller Spruce Point Bluff Head	2,009.5 1,959.8 1,189.4	$\begin{array}{c} 3. \ 303081 \\ 3. \ 292216 \\ 3. \ 075314 \end{array}$
Oak Point	45 10 05.38 67 09 47.23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	De Monts Bluff Head	$ \begin{array}{c c} 1,065.5\\940.0\end{array} $	$\begin{array}{c} 3. \ 027571 \\ 2. \ 973111 \end{array}$
Ref. Mon. 240	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$5 \ 26 \ 42 \\ 5 \ 26 \ 42$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Oak Point De Monts	$\begin{bmatrix} 0. \ 1 \\ 1, 065. \ 6 \end{bmatrix}$	9. 0281-10 3. 027614
Ref. Mon. 239	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 185 \ 26 \ 38 \\ 185 \ 26 \ 38 \\ 185 \ 26 \ 38 \end{array}$	$5 \begin{array}{c} 26 \\ 5 \\ 5 \end{array} \\ 6 \\ 42 \\ 5 \end{array} \\ 26 \begin{array}{c} 42 \\ 42 \end{array}$	De Monts Oak Point Ref. Mon. 240	$\begin{array}{c c} & 0.1 \\ 1,065.6 \\ 1,065.8 \end{array}$	$\begin{array}{c} 9.\ 0281{-}10\\ 3.\ 027614\\ 3.\ 027658\end{array}$
Wiley	$\begin{array}{c} - \\ 45 & 09 \\ 67 & 08 \\ 19. 58 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	284 14 10 295 52 29 309 23 27	De Monts Bluff Head Oak Point	$\begin{array}{c} 2,079.6\\ 3,149.6\\ 2,477.4 \end{array}$	$\begin{array}{c} 3.\ 317986\\ 3.\ 498259\\ 3.\ 394001 \end{array}$
Warwig	$\begin{array}{c} - \\ 45 & 10 & 23. & 06 \\ 67 & 08 & 41. & 96 \end{array}$	$\begin{array}{c} 69 & 03 & 15 \\ 347 & 00 & 21 \end{array}$	$\begin{array}{c} 249 & 02 & 29 \\ 167 & 00 & 37 \end{array}$	Oak Point Wiley	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c c} 3. & 183653 \\ 3. & 337245 \end{array}$

### APPENDIX IV

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Eaton	° ' '' 45 08 48 60 67 09 23 06	$ \begin{smallmatrix} \circ & \prime & \prime \\ 167 & 26 & 33 \\ 197 & 06 & 25 \\ 240 & 05 & 05 \\ \end{smallmatrix} $	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 347 & 26 & 16 \\ 17 & 06 & 54 \\ 60 & 05 & 50 \\ \end{smallmatrix} $	Oak Point Warwig Wiley	2, 428. 2 3, 051. 0 1, 599. 7	3. 385291 3. 484439 3. 204042
Sand Point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Eaton Wiley	$2, 041. 0 \\ 1, 624. 4$	3. 309833 3. 210685
Wilson	45 07 42.74 67 08 42.91	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Eaton Wiley Sand Point	$\begin{array}{c} 2,214,2\\ 2,876,2\\ 1,646,7\end{array}$	$\begin{array}{c} 3. \ 345213 \\ 3. \ 458815 \\ 3. \ 216614 \end{array}$
Dochet Island	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 87 \ 56 \ 14 \\ 186 \ 40 \ 23 \end{array}$	$267 55 45 \\ 6 40 28$	Wilson Sand Point	$877.\ 3\\1,\ 266.\ 7$	$\begin{array}{c} 2. & 943137 \\ 3. & 102663 \end{array}$
Lowe Point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Wilson Sand Point Dochet Island	$\begin{array}{c} 1,199.2\\ 2,487.0\\ 1,241.5\end{array}$	$\begin{array}{c} 3. \ 078883\\ 3. \ 395680\\ 3. \ 093943 \end{array}$
Ref. Mon. 243	45 07 32.54 67 07 03.23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lowe Point Wilson Dochet Island Sand Point	$\begin{array}{c} 1,934.\ 8\\ 2,201.\ 2\\ 1,347.\ 1\\ 1,976.\ 9\end{array}$	$\begin{array}{c} 3.\ 286634\\ 3.\ 342649\\ 3.\ 129410\\ 3.\ 295988 \end{array}$
Dochet Island Light- house, finial	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lowe Point Wilson Eaton	$\begin{array}{c} 1,252.6\\ 874.8\\ 2,649.2\end{array}$	$\begin{array}{c} 3. \ 097813 \\ 2. \ 941918 \\ 3. \ 423114 \end{array}$
Ref. Mon. 241	45 09 14.44 67 08 19.58	352 33 32 352 33 32	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Wiley Dochet Island Light- house, finial.	$\begin{array}{c} 0.1\\ 2,809.6\end{array}$	$\begin{array}{c} 9.\ 0281{-}10\\ 3.\ 448651 \end{array}$
Ref. Mon. 242	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	166         59         04           346         59         04	346 59 04 166 59 04	Dochet Island Light- house, finial. Dochet Island	13. 3 0. 1	1. 125331 9. 0861–10
Little Dochet	45 06 49.11 67 07 45.41	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Shortland Wilson_ Dochet Island Sand Point Ref. Mon. 243 Chamcook	$\begin{array}{c} 3,184.0\\ 2,078.7\\ 1,729.6\\ 2,954.6\\ 1,626.9\\ 3,798.1 \end{array}$	$\begin{array}{c} 3. \ 502974\\ 3. \ 317784\\ 3. \ 237938\\ 3. \ 470495\\ 3. \ 211373\\ 3. \ 579569 \end{array}$
Lambs Bluff	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Shortland Little Dochet Ref. Mon. 243 Chamcook	$\begin{array}{c} 2,952.\ 7\\ 1,974.\ 4\\ 3,082.\ 7\\ 4,012.\ 4 \end{array}$	$\begin{array}{c} 3.\ 470220\\ 3.\ 295434\\ 3.\ 488926\\ 3.\ 603402 \end{array}$
Apple Point	45 05 54.23 67 05 51.23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Shortland Lambs Bluff Little Dochet Ref. Mon. 243	$\begin{array}{c} 4,490,2\\ 1,568,1\\ 3,016,9\\ 3,418,6 \end{array}$	$\begin{array}{c} 3. \ 652264 \\ 3. \ 195386 \\ 3. \ 479564 \\ 3. \ 533851 \end{array}$
Ref. Mon. 244	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Little Dochet	$\begin{array}{c} 0.3\\ 3,017.3\end{array}$	$\begin{array}{c} 9. \ 5254{-}10 \\ 3. \ 479612 \end{array}$
Ref. Mon. 245	45 05 54 23 67 05 51 23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Apple Point Dochet Island Light- house, finial.	$\begin{matrix} 0. \ 1 \\ 4, \ 451. \ 2 \end{matrix}$	8. 8820–10 3. 648475
Pike	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lambs Bluff Apple Point	$\begin{array}{c} 1,234.0\\ 1,602.4 \end{array}$	$\begin{array}{c} 3. \ 091313 \\ 3. \ 204766 \end{array}$
Holey Rock	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pike Lambs Bluff Apple Point	1, 847. 5 2, 432. 4 1, 112. 9	$\begin{array}{c} 3. \ 266589 \\ 3. \ 386030 \\ 3. \ 046460 \end{array}$
Joes Point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pike Holey Rock	2, 500.1 1, 604.3	$\begin{array}{c} 3.\ 397950\\ 3.\ 205281 \end{array}$
Robbinston	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Pike Holey Rock Joes Point	$\begin{array}{c} 1,167.3\\ 2,044.9\\ 1,813.8 \end{array}$	$\begin{array}{c} 3. \ 067176 \\ 3. \ 310674 \\ 3. \ 258582 \end{array}$

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Ref. Mon. 246	° ' '' 45 04 20.17 67 06 23.26	$\circ$ , ,, 214 45 07 254 20 34	$\circ$ , ,, 34 45 53 74 21 32	Holey Rock Joes Point	2, 515. 2 1, 872. 6	$\begin{array}{c} 3. \ 400573 \\ 3. \ 272454 \end{array}$
Range Mark 1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 75 & 12 & 51 \\ 145 & 23 & 50 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Joes Point Dochet Island Light- house, finial.	$15. \ 6 \\ 7, 034. \ 7$	$\begin{array}{c} 1. \ 193820 \\ 3. \ 847245 \end{array}$
Range Mark 2	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccccc} 75 & 12 & 55 \\ 75 & 12 & 55 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 1 Joes Point	$114.\ 2\\129.\ 8$	$\begin{array}{c} 2. \ 057704 \\ 2. \ 113375 \end{array}$
Pleasant Point	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cumming Kendall 2	3, 686. 0 3, 731. 4	$\begin{array}{c} 3. \ 566554 \\ 3. \ 571873 \end{array}$
Clam reference mark	44 57 53.25 67 01 00.64	$\begin{array}{ccccccc} 74 & 14 & 02 \\ 326 & 02 & 48 \\ 358 & 33 & 47 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Pleasant Point Cumming Kendall 2	2, 325. 4 2, 224. 8 3, 550. 0	$\begin{array}{c} 3. \ 366489 \\ 3. \ 347291 \\ 3. \ 550223 \end{array}$
Range Mark 3	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 6 & 28 & 58 \\ 49 & 06 & 38 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Kendall 2 Clam reference mark_	$\begin{array}{c} 4,047.2\\721.8 \end{array}$	$\begin{array}{c} 3. \ 607158 \\ 2. \ 858431 \end{array}$
Range Mark 4	44 58 17.83 67 00 28.11	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Kendall 2 Range Mark 3 Pleasant Point Cumming	$\begin{array}{c} 4,352.7\\ 331.6\\ 3,261.9\\ 2,657.7\end{array}$	$\begin{array}{c} 3.\ 638758\\ 2.\ 520549\\ 3.\ 513472\\ 3.\ 424513 \end{array}$
Range Mark 5	44 56 12.87 67 01 10.58	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Pleasant Point Clam reference mark Range Mark 3 Range Mark 4	$\begin{array}{c} 3,188.1\\ 3,106.2\\ 3,651.8\\ 3,968.1 \end{array}$	$\begin{array}{c} 3. \ 503525\\ 3. \ 492223\\ 3. \ 562506\\ 3. \ 598587 \end{array}$
Range Mark 6	44 56 07.96 67 01 16.15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Pleasant Point Clam reference mark_ Range Mark 4 Cumming	3, 233. 7 3, 267. 9 4, 145. 0 2, 116. 2	$\begin{array}{c} 3. \ 509698 \\ 3. \ 514263 \\ 3. \ 617522 \\ 3. \ 325549 \end{array}$
Eastport reference mark.	44 54 48.75 66 59 36.61	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Kendall 2. Cumming Cherry Island bell tower.	$\begin{array}{c} 2,771.8\\ 3,896.1\\ 2,148.5\end{array}$	3. 442755 3. 590632 3. 332141
Dem Island reference	14 55 97 09	292 50 52	112 52 25	Campobello	3, 132. 3	3. 495858
mark.	44 55 57.02 66 59 12.54	$\begin{array}{c} 19 \ 50 \ 47 \\ 106 \ 03 \ 53 \\ 154 \ 28 \ 21 \\ 300 \ 23 \ 02 \end{array}$	$\begin{array}{c} 199 \ 50 \ 50 \\ 286 \ 02 \ 40 \\ 334 \ 27 \ 44 \\ 120 \ 23 \ 52 \end{array}$	Kendall 2 Cumming Cherry Island bell	1, 580, 7 2, 373, 9 2, 615, 2 1, 783, 5	3. 375462 3. 417501 3. 251278
		318 55 48	138 57 04	tower. Campobello	3, 589. 8	3. 555068
Range Mark 7	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Kendall 2 Clam reference mark_ Cumming	$\begin{array}{c} 1,839.\ 2\\ 5,152.\ 9\\ 3,164.\ 4 \end{array}$	$\begin{array}{c} 3.\ 264640\\ 3.\ 712052\\ 3.\ 500292 \end{array}$
Range Mark 8	44 54 33.43 66 59 43.02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Kendall 2 Clam reference mark Cumming Treat 2	$\begin{array}{c} 3,076.\;4\\ 6,398.\;8\\ 4,347.\;1\\ 3,388.\;5 \end{array}$	3. 488040 3. 806097 3. 638197 3. 530008
Range Mark 9	44 55 22.63 67 00 21.23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Kendall 2 Cumming Deer Island reference mark.	$1, 346. 1 \\2, 829. 3 \\1, 570. 4$	3. 129084 3. 451682 3. 196024
Range Mark 10	44 55 16 60	155 57 46	130 28 32 335 57 98	Kendall 2	497.0	2. 090354
The second se	67 00 30.40	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cumming Range Mark 9 Deer Island reference mark.	$3,045.8 \\ 274.1 \\ 1,820.1$	$\begin{array}{c} 3. \ 483699\\ 2. \ 437938\\ 3. \ 260103 \end{array}$

### APPENDIX IV

## WOODLAND, ME., TO THE ATLANTIC OCEAN, MINOR SCHEMES-Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Cherry Island tower, 1919.	$\circ$ / // 44 55 07.78 66 58 02.40		$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 184 & 58 & 36 \\ 202 & 28 & 29 \\ 155 & 34 & 49 \\ \end{smallmatrix} $	Friars Head 3 Treat 2 Campobello	4, 741. 8 4, 792. 2 1, 981. 4	3. 675940 3. 680535 3. 296971
Cherry Island bell, 1919.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Friars Head 3 Treat 2 Campobello	4, 741. 7 4, 792. 8 1, 980. 2	3. 675930 3. 680588 3. 296703
Range Mark 11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cherry Island tower_ Campobello	$\begin{array}{c} 1,707.7\\ 3,491.4 \end{array}$	$\begin{array}{c} 3.\ 232424\\ 3.\ 542994 \end{array}$
Kendall Head reference mark.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 11 Range Mark 7	2, 217. 3 1, 916. 0	$\begin{array}{c} 3. \ 345825 \\ 3. \ 282398 \end{array}$
Range Mark 12	44 54 09.69 66 57 24.49	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Campobello Range Mark 11 Cherry Island tower	$16. \ 6 \\ 3, \ 491. \ 3 \\ 1, \ 976. \ 4$	$\begin{array}{c} 1.\ 220723\\ 3.\ 542991\\ 3.\ 295877 \end{array}$
Range Mark 13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 11 Cherry Island tower_ Campobello	842. 4 1, 758. 8 3, 141. 3	$\begin{array}{c} 2. & 925535 \\ 3. & 245223 \\ 3. & 497104 \end{array}$
Range Mark 14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 11 Cherry Island tower_ Campobello Friars Head 3	$\begin{array}{c} 1,598.8\\ 1,533.8\\ 2,361.9\\ 4,035.2 \end{array}$	$\begin{array}{c} 3.\ 203786\\ 3.\ 185758\\ 3.\ 373254\\ 3.\ 605866 \end{array}$
Range Mark 15	44 54 12.99 66 57 30.53	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 14 Range Mark 13 Range Mark 11 Cherry Island tower	$\begin{array}{c} 2,\ 205.\ 5\\ 2,\ 978.\ 3\\ 3,\ 327.\ 1\\ 1,\ 830.\ 0 \end{array}$	$\begin{array}{c} 3.\ 343500\\ 3.\ 473964\\ 3.\ 522072\\ 3.\ 262460 \end{array}$
Range Mark 16	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	42 16 27	222 16 27	Campobello	3, 5	0. 541050
Range Mark 17	44 55 08.24 66 58 02.67	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Friars Head 3 Treat 2 Range Mark 14 Cherry Island tower_	$\begin{array}{c} 4,755.7\\ 4,803.3\\ 1,536.2\\ 15.7\end{array}$	$\begin{array}{c} 3.\ 677213\\ 3.\ 681541\\ 3.\ 186440\\ 1.\ 195352 \end{array}$
Cherry Island refer- ence mark.	$\begin{array}{c} 44 \ 55 \ 07. \ 51 \\ 66 \ 58 \ 02. \ 43 \end{array}$	167 05 08	347 05 08	Range Mark 17	23. 2	1. 366049
Range Mark 18*	44 55 26.65 66 57 58.53	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Cherry Island tower_ Range Mark 17 Range Mark 13 Campobello Range Mark 15	588. 7575. 31, 936. 22, 497. 12, 355. 4	$\begin{array}{c} 2.\ 769884\\ 2.\ 759869\\ 3.\ 286949\\ 3.\ 397441\\ 3.\ 372056 \end{array}$
Range Mark 19	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Campobello Friars Head 3	$2, 419. 3 \\ 2, 638. 9$	$\begin{array}{c} 3. \ 383683 \\ 3. \ 421429 \end{array}$
Range Mark 20	44 53 53.01 66 59 17.51	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Treat 2 Campobello Range Mark 19 Friars Head 3	$\begin{array}{c} 2,127.9\\ 2,518.3\\ 112.1\\ 2,714.0 \end{array}$	$\begin{array}{c} 3. \ 327954 \\ 3. \ 401105 \\ 2. \ 049595 \\ 3. \ 433605 \end{array}$
Range Mark 21	44 52 41.87 66 59 16.09	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Treat 2 Campobello Friars Head 3	$\begin{array}{c} 228.\ 8\\ 3,\ 636.\ 1\\ 1,\ 225.\ 7\end{array}$	2. 359432 3. 560639 3. 088386
Range Mark 22	44 52 42.74 66 59 25.75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Treat 2 Range Mark 21 Friars Head 3	$\begin{array}{r} 49.\ 2\\213.\ 7\\1,\ 439.\ 2\end{array}$	$\begin{array}{c} 1. \ 692270 \\ 2. \ 329876 \\ 3. \ 158113 \end{array}$
Chambers	44 51 59.92 66 58 49.97	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lubec church spire Treat 2 Mulholland Point Lighthouse.	$1, \frac{895.}{581.} \\ \frac{9}{382.} \\ 3$	$\begin{array}{c} 2. \ 951918 \\ 3. \ 199178 \\ 2. \ 582348 \end{array}$

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Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Pope	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 44 & 52 & 07. & 99 \\ 66 & 59 & 03. & 67 \\ \end{smallmatrix} $	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 18 & 19 & 32 \\ 156 & 28 & 40 \\ 228 & 29 & 26 \\ 309 & 38 & 56 \\ 332 & 25 & 16 \\ \end{smallmatrix} $	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lubec church spire Treat 2 Friars Head 3 Chambers Mulholland Point Lighthouse.	$\begin{array}{c} 959. \ 9\\ 1, \ 223. \ 5\\ 1, \ 246. \ 3\\ 390. \ 6\\ 711. \ 2\end{array}$	2. 982248 3. 087611 3. 095632 2. 591696 2. 851997
Sculpin	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Treat 2 Friars Head 3 Pope	$\begin{array}{c} 339. \ 0 \\ 1, \ 400. \ 7 \\ 912. \ 0 \end{array}$	$\begin{array}{c} 2. \ 530257\\ 3. \ 146349\\ 2. \ 959990 \end{array}$
Dudley	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Treat 2 Sculpin Pope	$\begin{array}{c} 755. \ 6\\ 439. \ 1\\ 752. \ 0\end{array}$	$\begin{array}{c} 2. \ 878269 \\ 2. \ 642524 \\ 2. \ 876203 \end{array}$
Range Mark 23	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lubec church spire Dudley Pope	$952. \ 5 \\ 743. \ 3 \\ 13. \ 0$	$\begin{array}{c} 2. & 978865 \\ 2. & 871162 \\ 1. & 113283 \end{array}$
Range Mark 24	44 52 06.63 66 59 04.79	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lubec church spire Dudley Sculpin Range Mark 23	$\begin{array}{c} 912.\ 4\\ 753.\ 8\\ 936.\ 5\\ 40.\ 1\end{array}$	$\begin{array}{c} 2. \ 960166 \\ 2. \ 877258 \\ 2. \ 971506 \\ 1. \ 603613 \end{array}$
Folly	44 52 04.40 66 59 04.70	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Treat 2 Chambers Mulholland Point Lighthouse.	$\begin{array}{c} 1,317.6\\ 351.8\\ 627.6\end{array}$	$\begin{array}{c} 3.\ 119791\\ 2.\ 546238\\ 2.\ 797682 \end{array}$
Charley	44 51 37.89 66 58 44.97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lubec church spire Folly Treat 2 Mulholland Point Lighthouse.	712. 5 925. 9 2, 239. 2 309. 5	2. 852808 2. 966551 3. 350095 2. 490666
Range Mark 25	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 170 & 49 & 54 \\ 196 & 35 & 32 \\ 18 & 39 & 33 \\ 103 & 52 & 56 \\ 148 & 29 & 43 \\ 191 & 97 & 24 \end{array}$	$\begin{array}{c} 350 & 49 & 50 \\ 16 & 35 & 48 \\ 198 & 39 & 33 \\ 283 & 52 & 45 \\ 328 & 29 & 17 \\ 201 & 27 & 24 \end{array}$	Chambers Head 3 Friars Head 3 Chambers Folly	$\begin{array}{c} 653. \ 0\\ 1, 831. \ 3\\ 57. \ 1\\ 351. \ 9\\ 1, 544. \ 7\\ 372 \ 0\end{array}$	$\begin{array}{c} 2. \ 55135\\ 3. \ 262751\\ 1. \ 756430\\ 2. \ 546391\\ 3. \ 188852\\ 2. \ 572798 \end{array}$
Range Mark 26	$\begin{array}{r} 44 \ 52 \ 01. \ 53 \\ 66 \ 58 \ 47. \ 87 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 25 Treat 2	28. 2 1, 563. 0	1. 450097 3. 193962
Range Mark 27	44 51 46.73 66 59 01.13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 351 \ 49 \ 07 \\ 31 \ 02 \ 38 \\ 127 \ 34 \ 30 \end{array}$	Folly Chambers Charley	551.1 475.0 447.5	$\begin{array}{c} 2. \ 741196 \\ 2. \ 676681 \\ 2. \ 650809 \end{array}$
Breakwater 2	44 51 46.67 66 59 01.01	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 27 Folly Chambers Charley	3.4 553.5 475.4 444.1	$\begin{array}{c} 0. \ 528471 \\ 2. \ 743087 \\ 2. \ 677018 \\ 2. \ 647519 \end{array}$
Lubec Traverse 3	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Chambers Mulholland Point Lighthouse.	$561.2 \\ 264.0$	$\begin{array}{c} 2.\ 749132\\ 2.\ 421640 \end{array}$
Range Mark 28	44 51 43.00 66 59 01.91	296 49 40 188 29 49 206 39 20	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Charley Range Mark 27 Chambers Luber Treesen 2	337. 2 116. 6 584. 3 71. 2	$\begin{array}{c} 2.527840 \\ 2.066550 \\ 2.766671 \\ 1.852780 \end{array}$
Head	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Treat 2 Friars Head 3	$\begin{array}{c} 1.3 \\ 1,985.1 \\ 2,608.9 \end{array}$	$\begin{array}{c} 3. \ 297788 \\ 3. \ 416457 \end{array}$
Range Mark 29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 3 & 38 & 17 \\ 204 & 46 & 54 \\ 308 & 33 & 46 \\ 330 & 31 & 12 \end{array}$	$183 \ 38 \ 13 \\ 24 \ 46 \ 56 \\ 128 \ 33 \ 47 \\ 150 \ 31 \ 54$	Treat 2 Range Mark 20 Head Friars Head 3	$1, 998. 7 \\137. 9 \\24. 1 \\2, 631. 1$	$\begin{array}{c} 3.\ 300743\\ 2.\ 139666\\ 1.\ 381151\\ 3.\ 420136 \end{array}$

### APPENDIX IV

			the second s			Contraction of the second s
Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Range Mark 30	° ' '' 44 53 53.17 66 59 21.03	$\begin{array}{c}\circ & \prime & \prime \prime \\ 273 \ 44 \ 29 \\ 331 \ 30 \ 04 \\ 351 \ 30 \ 10 \end{array}$	$ \begin{smallmatrix} \circ & \prime & \prime \prime \\ 93 & 44 & 31 \\ 151 & 30 & 46 \\ 171 & 30 & 10 \\ \end{smallmatrix} $	Range Mark 20 Friars Head 3 Range Mark 29	$77. \ 4 \\ 2, 754. \ 5 \\ 131. \ 7$	$\begin{array}{c} 1. \ 888996\\ 3. \ 440042\\ 2. \ 119685 \end{array}$
Range Mark 31	44 52 32.83 66 59 26.77	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Dudley Sculpin	$\begin{array}{c} 408.\ 4\\ 43.\ 5\end{array}$	$\begin{array}{c} 2. \ 611090 \\ 1. \ 638591 \end{array}$
Gull	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 31 Dudley	$\begin{array}{c} 471.\ 2\\ 621.\ 8\end{array}$	$\begin{array}{c} 2. \ 673170 \\ 2. \ 793623 \end{array}$
Range Mark 32	44 52 40.29 66 59 31.42	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Dudley Gull Range Mark 31	$ \begin{array}{c} 615. \\ 348. \\ 252. \\ 0 \end{array} $	$\begin{array}{c} 2.\ 788936\\ 2.\ 542293\\ 2.\ 401376 \end{array}$
Range Mark 33	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Charley Treat 2	$7.6 \\ 2,242.7$	0. 882297 3. 350777
Range Mark 34	44 51 37.53 66 58 37.20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lubec church spire Charley Range Mark 33	$\begin{array}{c} 883.\ 4\\ 170.\ 9\\ 163.\ 3\end{array}$	$\begin{array}{c} 2. & 946139 \\ 2. & 232837 \\ 2. & 213013 \end{array}$
Range Mark 35	44 51 37.18 66 58 31.00	$\begin{array}{r} 94 & 32 & 31 \\ 129 & 34 & 37 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 34 Mulholland Point Lighthouse.	136.6 503.3	2. 135444 2. 701829
Range Mark 36	44 51 41.83 66 58 30.96	$\begin{array}{ccccccc} 0 & 23 & 14 \\ 45 & 54 & 58 \\ 68 & 25 & 48 \\ 84 & 11 & 26 \\ 114 & 28 & 27 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 35 Range Mark 34 Charley Lubec church spire Mulholland Point Lighthouse.	$143. \ 6 \\ 190. \ 9 \\ 330. \ 9 \\ 1, \ 025. \ 3 \\ 427. \ 3$	$\begin{array}{c} 2. \ 157286\\ 2. \ 280844\\ 2. \ 519675\\ 3. \ 010847\\ 2. \ 630727 \end{array}$
Range Mark 37	44 50 55.42 66 58 10.09	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Lubec church spire Charley Range Mark 33 Treat 2	$\begin{array}{c} 1,987.8\\ 1,518.4\\ 1,514.2\\ 3,751.6 \end{array}$	3. 298380 3. 181392 3. 180173 3. 574212
Range Mark 38	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	119 38 08	299 38 04	Range Mark 37	119. 2	2. 076386
Round Rock	44 49 41.13 66 56 09.85	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Quoddy Indian Point Lubec church spire	2, 646. 2 1, 545. 7 5, 485. 1	$\begin{array}{c} 3. \ 422620 \\ 3. \ 189136 \\ 3. \ 739186 \end{array}$
Larrabee	44 49 10.84 66 57 38.86	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Lubec church spire Indian Point Round Rock	5, 045.1 1, 724.5 2, 167.4	$\begin{array}{c} 3. \ 702872 \\ 3. \ 236668 \\ 3. \ 335947 \end{array}$
Bello	44 49 50.44 66 55 54.18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Round Rock Larrabee Indian Point	448. 4 2, 604. 3 1, 773. 4	$\begin{array}{c} 2. \ 651659 \\ 3. \ 415694 \\ 3. \ 248806 \end{array}$
Pond	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Larrabee Indian Point Round Rock	$\begin{array}{c} 2,425.4\\756.9\\1,478.7\end{array}$	$\begin{array}{c} 3. \ 384776 \\ 2. \ 879014 \\ 3. \ 169875 \end{array}$
Mam	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Indian Point Larrabee	$\begin{array}{c} 2,951.9\\ 2,774.1 \end{array}$	$\begin{array}{c} 3.\ 470097\\ 3.\ 443126 \end{array}$
Duck	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Mam Larrabee	2, 450. 7 2, 571. 1	$\begin{array}{c} 3. \ 389282 \\ 3. \ 410111 \end{array}$
Lubec Channel L. H., finial	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Mam Duck Indian Point Larrabee	$\begin{array}{c} 1,\ 503.\ 0\\ 1,\ 110.\ 8\\ 2,\ 069.\ 0\\ 2,\ 815.\ 6\end{array}$	$\begin{array}{c} 3. \ 176968 \\ 3. \ 045619 \\ 3. \ 315762 \\ 3. \ 449573 \end{array}$

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# WOODLAND, ME., TO THE ATLANTIC OCEAN, MINOR SCHEMES-Continued

1						
Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance (meters)	Loga- rithm
Range Mark 39	• / // 44 50 44.11 66 58 13.08	° ' '' 48 20 04 55 13 01	$\circ$ / // 228 19 12 235 12 43	Mam Lubec Channel L. H.,	$2,170.3\\674.2$	3. 336510 2. 828820
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Innial. Lubec church spire Duck Indian Point Larrabee	$\begin{array}{c} 2,193.4\\ 638.4\\ 1,822.8\\ 2,975.7\end{array}$	$\begin{array}{c} 3. \ 341117\\ 2. \ 805063\\ 3. \ 260748\\ 3. \ 473595 \end{array}$
Range Mark 40	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 39 Indian Point	$\begin{array}{c} 43.\ 5\\ 1,\ 823.\ 1\end{array}$	$\begin{array}{c} 1.\ 638619\\ 3.\ 260808 \end{array}$
Range Mark 41	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	149 48 48	329 48 00	Lubec Channel L. H., finial. Indian Point	2, 960. 6	<ol> <li>3. 471376</li> <li>3. 239380</li> </ol>
		$\begin{array}{c} 192 & 58 & 12 \\ 238 & 41 & 32 \end{array}$	58 42 40	Bello	2, 476. 9	3. 393912
Range Mark 42	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	151 56 19	331 56 17	Range Mark 41	131. 5	2. 119025
Range Mark 43	44 49 53.68	223 03 06	43 03 41	Lubec Channel L. H.,	1, 604. 0	3. 205211
	00 39 28.10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Indian Point Larrabee	2, 989. 0 2, 741. 3	$\begin{array}{c} 3. \ 475531 \\ 3. \ 437956 \end{array}$
Life - saving station lookout tower, 1919.	44 48 54.70 66 57 50.24	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 43 Indian Point Bello	$\begin{array}{c} 2,818,2\\ 2,278,7\\ 3,076,1 \end{array}$	3. 449978 3. 357681 3. 488001
Range Mark 44	44 49 54.87	229 55 46	49 56 29	Lubec Channel L. H.,	1, 764. 0	3. 246510
	66 59 39.76	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 85 \ 16 \ 38 \\ 98 \ 10 \ 11 \\ 127 \ 40 \ 34 \end{array}$	Indian Point Range Mark 43 Life-saving station lookout tower.	3, 239. 6 257. 6 3, 039. 6	$\begin{array}{c} 3.\ 510486\\ 2.\ 410929\\ 3.\ 482818 \end{array}$
Range Mark 45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Larrabee Bello Indian Point	$2, 490. 4 \\ 2, 414. 3 \\ 915. 8$	$\begin{array}{c} 3. \ 396265\\ 3. \ 382784\\ 2. \ 961785 \end{array}$
Range Mark 46	44 50 53.03 66 58 01.04	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Range Mark 45 Indian Point Larrabee	$\begin{array}{c} 990.\ 7\\ 1,\ 859.\ 3\\ 3,\ 191.\ 8\end{array}$	$\begin{array}{c} 2. \ 995948 \\ 3. \ 269348 \\ 3. \ 504036 \end{array}$
Range Mark 47	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Bello Larrabee	$\begin{bmatrix} 6. & 2 \\ 2, & 608. & 2 \end{bmatrix}$	$\begin{array}{c} 0. \ 788875 \\ 3. \ 416344 \end{array}$
Range Mark 48	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	11 22 08	191 22 07	Range Mark 47	59. 7	1. 776098
Sail Rock	44 48 45.48 66 56 52.50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Indian Point Round Rock Bello	$\begin{array}{c} 2,450.\ 6\\ 1,957.\ 0\\ 2,379.\ 7\end{array}$	$\begin{array}{c} 3. \ 389266\\ 3. \ 291592\\ 3. \ 376531 \end{array}$
West Quoddy Head Lighthouse.	44 48 54 89 66 57 03 75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	Round Rock Bello Sail Rock	$\begin{array}{c} 1,854.7\\ 2,297.1\\ 381.6\end{array}$	$\begin{array}{c} 3.\ 268281\\ 3.\ 361179\\ 2.\ 581660 \end{array}$
East Campobello (Geo- detic Survey of Can- ada).	$\begin{array}{cccccccccccccccccccccccccccccccccccc$					
West Campobello (Geo detic Survey of Can- ada).	- 44 50 37.60 66 55 13.23	196 38 06	16 39 17	East Campobello	7, 727. 3	3. 888027

47378°—34——15

SOURCE OF THE ST. CROIX RIVER TO PASSAMAQUODDY BAY, REFERENCE MONUMENTS

**Reference Monument 2** (Maine, Aroostook County; J. E. McGrath, 1913; 1921).—On Monument Brook, three-fourths mile downstream from initial monument, 2 meters south of the brook at the first big bend from a southerly to an easterly course.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 3** (Maine, Aroostook County; A. J. Brabazon, 1912; 1921).—On Monument Brook about 1½ miles below initial monument and 5.2 meters south of the brook, at the third big bend of the brook from a southerly to an easterly course.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base. Four trees are blazed facing the monument: An ash 12 inches in diameter, 8.63 meters distant; a cedar 14 inches in diameter, 3.41 meters; a cedar 18 inches in diameter, 3.32 meters; and an ash 12 inches in diameter, 3.23 meters distant from the station.

**Reference Monument 4** (New Brunswick, York County; J. E. McGrath, 1913; 1921).—On the east bank of Monument Brook about 3 miles below initial monument, and about one-eighth mile below the most easterly bend of the brook between initial monument and the mouth of Glendenning Brook.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base. Reference monument 5 is nearly due south, and just across the brook on the United States side 29.70 meters distant.

**Reference Monument 5** (Maine, Aroostook County; J. E. McGrath, 1913; 1921).—This monument is south 0° 34' west 29.70 meters from reference monument 4 (see description of reference monument 4). Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 6** (Maine, Aroostook County; J. E. McGrath, 1913; 1921).—On Monument Brook about three-fourths mile above the mouth of Glendenning Brook. The station is south 40° east 26.46 meters distant from traverse station 16 at Glendenning landing, 7.3 meters from the stream, and on the west side of the road.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 7** (New Brunswick, York County; J. E. McGrath, 1913; 1921).—On Monument Brook, across the brook and south 40° east 29.78 meters from reference monument 6. (See description of reference monument 6.)

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 8** (Maine, Aroostook County; A. J. Brabazon, 1913; 1921).—On Monument Brook about one-fourth mile northeast of Poplar Mountain. Poplar Mountain is the first prominent hill near Monument Brook below its source at initial monument, and though but 80 feet high above the brook it appears prominent in a rather flat country. The station is about 1.5 meters east from the edge of the stream.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 9** (New Brunswick, York County; J. E. McGrath, 1913; 1921).—On Monument Brook 9.8 meters from the stream and just opposite reference monument 8.)

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 10** (New Brunswick, York County; H. C. O. Clarke, 1917; 1921).—On Monument Brook about 13⁄4 miles above the mouth of Greenleaf Brook, 9 meters back from the water's edge. Reference monument 11 is directly across the stream.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 11** (Maine, Aroostook County; H. C. O. Clarke, 1917; 1921).—On Monument Brook about 1<sup>3</sup>/<sub>4</sub> miles above the mouth of Greenleaf Brook, 1.5 meters from the edge of the water, on a rock that measures 2.3 meters by 1.7 meters by 0.9 meter. Perch tablet is set in the same rock 0.8 meter east of the monument.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the highest point of the rock.

**Reference Monument 12** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook about 1 mile above the mouth of Greenleaf Brook, about 7 meters west of the edge of the brook near the southeast corner of the ruins of an old log building of the Shaw Brothers tanbark camp.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 13** (New Brunswick, York County; H. C. O. Clarke, 1917; 1921).—On Monument Brook about 1 mile above the mouth of Greenleaf Brook. The station is on the opposite shore from reference monument 12 and 6.4 meters back from the shore line.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base. In 1921 the post was broken off and only the shank of the post was left in place to mark the station.

**Reference Monument 14** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, in the edge of the tree growth about 27 meters back from the stream at the first bend of the brook just below the mouth of Greenleaf Brook. The station is on a triangular block of gneiss whose sides measure 2.4 meters, 2.4 meters, and 1.7 meters and whose height is 0.4 meter.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole surrounded by a triangle cut in the rock.

**Reference Monument 15** (New Brunswick, York County; H. C. O. Clarke, 1917; 1921).—On Monument Brook, just below the mouth of Greenleaf Brook. The station is on the opposite shore from reference monument 14, about 30 meters back from the shore line in the edge of the trees.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 16** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook about 2 miles above North Lake. The station is on the bank of the brook, at the foot of the slope of the high land. At this point the highlands close in on either side of the brook, making a narrow valley for a half mile downstream. One of the old "Collier" lumber camps is on the Canadian shore opposite the station. Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 17** (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook about 2 miles above North Lake, about 49 meters from the brook at the edge of the swamp and the outer edge of the tree growth and opposite reference monument 16. The remains of one of the "Collier" lumber camps is just below the station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock whose visible cross section is 1.3 meters by 1.3 meters.

**Reference Monument 18** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook a little more than a mile above North Lake and abreast of the section of Monument Brook locally known as the "Narrows." Narrows tablet is north 55° west, 8.6 meters from the monument.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 19** (New Brunswick, York County; H. C. O. Clarke, 1917; 1921).—On Monument Brook about 1 mile above North Lake. The station is on the bank of the stream just opposite reference monument 18.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large bowlder whose exposed surface is about 1 meter square.

**Reference Monument 20** (New Brunswick, York County; J. E. McGrath, 1912; 1917).—On the bank of North Lake on the first point east of the mouth of Monument Brook, which is about 250 meters distant.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base. A cross surrounded by a triangle cut on the sloping face of a gneiss bowlder bears south 42° 30′ east, 6.9 meters from the mark.

**Reference Mounment 21** (Maine, Aroostook County; J. E. McGrath, 1912; 1917).—On the west shore of North Lake about 350 meters below the mouth of Monument Brook. The station is on a large granite bowlder whose dimensions are 3.2 meters by 5.2 meters, and 1.6 meters in height. This is the first large bowlder on the United States shore below Monument Brook.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 22** (New Brunswick, York County; J. E. McGrath, 1912; 1917).—On the end of a narrow tonguelike peninsula 200 meters east of The Thoroughfare, the outlet of North Lake. The station is on the top of a huge bowlder that is about 15 meters north and in front of John Watson's cottage which he calls "The Boulders." Triangulation station "Boulders" is on a flat-topped and smaller gray granite bowlder north 25° 08' west, 5.3 meters from the monument.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 23** (Maine, Aroostook County; J. E. McGrath, 1912; 1917).—On the west shore of North Lake about 50 meters north of The Thoroughfare, the outlet of the lake. The station is on the top of a large and prominent pyramidal bowlder about 1.7 meters high, situated 8 meters from the southeast corner of the MacAllister cottage known as "Lakeview Camp." The bowlder juts out from the shore where two large yellow birch trees grow.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the top of the bowlder.

**Reference Monument 24** (New Brunswick, York County; J. E. McGrath, 1912; 1917).—On the south shore of The Thoroughfare 400 meters below North Lake outlet, on the first great bowlder in the water below the big cove in the southern shore.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the top of the bowlder.

**Reference Monument 25** (Maine, Aroostook County; H. C. O. Clarke, 1917).—On the north shore of The Thoroughfare about 400 meters from North Lake. The station is on the second solid point on this shore below North Lake.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

Reference Mounment 26 (Maine, Aroostook County; H. C. O. Clarke, 1917).—In a cedar swamp on the north bank of The Thoroughfare about 650 meters above Grand Lake.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 27** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the south bank of The Thoroughfare about 650 meters above Grand Lake, about 5.2 meters back from the water at an old log landing.

Station mark: A standard 8-inch manganese-bronze reference post.

**Reference Monument 28** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the Canadian bank of The Thoroughfare about 200 meters above the entrance to Grand Lake. The station is on the north side of the road and on the North Lake side of the old Fox sawmill, 5.88 meters distant.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 29** (Maine, Aroostook County; H. C. O. Clarke, 1917).—On the United States bank of The Thoroughfare about 200 meters above the entrance to Grand Lake. The station is north of the road, 1.8 meters back of Watson's garage, and 8.5 meters from the shore line.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the top of a bowlder whose top surface measures 0.9 meter on the north side, 1.8 meters on the east side, 0.9 meter on the south side, and 1.2 meters on the west side.

**Reference Monument 30** (Maine, Aroostook County; H. C. O. Clarke, 1917).—In a poplar grove at the edge of the swamp about 80 meters north of Grand Lake, and about 120 meters from The Thoroughfare entrance. The station is about 60 meters south of the road leading west from The Thoroughfare bridge.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the top of a large bowlder.

**Reference Monument 31** (New Brunswick, York County; J. E. McGrath, 1912; 1917).—On the south or Canadian spit at the entrance of The Thoroughfare into Grand Lake.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the apex of a small bowlder.

**Reference Monument 32** (Maine, Aroostook County; H. C. O. Clarke, 1917).—On the north shore of Grand Lake, about 1.4 miles from The Thoroughfare entrance and 0.4 mile from MacAllister Cove. There is a prominent rounded point on the shore line about 200 meters south of the station. The station is on a large bowlder, triangular in shape, measuring about 1.5 meters on the sides, and 0.4 meter in height. It is in an old clearing about 15 meters from the water's edge.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the top of the bowlder.

**Reference Monument 33** (New Brunswick, York County; J. E. McGrath, 1911; 1917).—On the northern shore of the large Canadian peninsula in the northern part of Grand Lake, and about 600 meters southwest along the shore from North Point. The station is on a granite bowlder whose cross section is 5.4 meters by 5.3 meters, and height 2.5 meters.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder. A cross surrounded by a triangle is cut on the second bowlder above the station, and bears north  $47^{\circ}$  45' east, 8.2 meters distant.

**Reference Monument 34** (New Brunswick, York County; J. E. McGrath, 1911; 1917).—On Blueberry Point on the east shore of Grand Lake. The station is at the water's edge on a spindle-shaped granite bowlder 7 meters long, 4 meters wide, and 3 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the top of the bowlder. A cross surrounded by a triangle cut in the top of a tall pyramidal bowlder bears south  $6^{\circ}$  46' east, 8.1 meters distant.

**Reference Monument 35** (Maine, Aroostook County; H. C. O. Clarke, 1917).—On the northeastern shore of Half Moon Island in Grand Lake. The station is about 100 meters east of the most northern point of the

island, 10 meters back from the water's edge, in a gneiss bowlder about 3 meters long by 2 meters wide, and 1.2 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 36** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the eastern shore of Grand Lake directly east of Bear Island. The station is 3 meters back from the water's edge on a trapezoidal shaped bowlder with a concave top surface. The width of the top is about 2 meters, its longer side about 2.1 meters, its shorter side about 1.1 meters.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the top of the bowlder.

Reference Monument 37 (Maine, Aroostook County; H. C. O. Clarke, 1917).—On the eastern shore of Round Island in Grand Lake. The station is on the western slope of a peaked rock about 1.7 meters high. Station mark: A standard 8-inch manganese-bronze reference post set in a hole drilled in the rock.

**Reference Monument 38** (New Brunswick, York County; J. E. McGrath, 1911; 1917).—On the north end of Pine Island in Grand Lake. The station is on a rock 5.4 meters long by 5.0 meters wide, and 2.2 meters above low water. It is well out (some 70 or 80 meters) on the rocky spit at the head of the island, and is entirely surrounded by water.

Station mark: A standard 8-inch manganese-bronze reference post set in a hole drilled in the rock.

**Reference Monument 39** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the western of the two southern points of Pine Island in Grand Lake. The station is on a rock about 0.6 meter high with a top 1.8 meters square. The station is surrounded by low scrub willow brush and the ground nearby is overflowed at high water. A small bay makes into the shore just east of the station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 40** (Maine, Aroostook County; H. C. O. Clarke, 1917).—On the eastern shore of Burnt Island just north of the most eastern point of the island. The station is on a bowlder that is about 2 meters by 3 meters in cross section.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 41** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the eastern shore of Grand Lake, about 650 meters southeast of Balm of Gilead Point at the south entrance to Robinson Cove. The station is on the sloping face of the more southern of two large granite bowlders. This sloping face is almost square and nearly 3 meters across.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 42** (Maine, Aroostook County; H. C. O. Clarke, 1917).—On the southwest corner of the most southern of the "Five Islands" in Grand Lake. The station is on a large rock whose top is triangular in shape with the long point pointing toward the island. The sides of the triangular top are, respectively, 2.3 meters, 3.7 meters, and 4.8 meters in length.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 43** (Maine, Aroostook County; H. C. O. Clarke, 1917).—On the west shore of Work Cove of Grand Lake. The station is directly opposite Work Point, and about 3 meters from the water line, on a granite bowlder with a ridge-like top about 1.2 meters long.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

Reference Monument 44 (New Brunswick, York County; J. E. McGrath, 1911; 1917).—On the extreme end of Hayes Point in Grand Lake.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the top of a large bowlder.

**Reference Monument 45** (Maine, Aroostook County; J. E. McGrath, 1911; 1917).—On the summit of a large bowlder on the highest part of the bare rocky islet known as White Horse Reef in Grand Lake.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 46** (Maine, Aroostook County; J. E. McGrath, 1911; 1917).—On the west shore of Grand Lake, on a rounded point 1.1 miles southeast of Meetinghouse Point. The station is on a bowlder that is 3.9 meters by 2.6 meters in cross section and 1.8 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 47** (Maine, Washington County; H. C. O. Clarke, 1917).—On the west shore of Grand Lake 0.7 mile northwest of Greenland Point, and 1.3 miles southwest of Billy and Nan Islands. The station is on a bowlder 6.7 meters long parallel to the water, 3.4 meters wide on the south edge, 2.4 meters on the north edge, and about 3 meters above the water. The bowlder is ridge-shaped, and the point slopes gradually toward the lake.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 48** (New Brunswick, York County; J. E. McGrath, 1911; 1917).—On the extreme north end of Billy Island in Grand Lake. The station is on a large bowlder, whose extreme dimensions are 5.5 meters north and south, and 6.2 meters east and west, and which at the date of marking, September, 1911, was 1.8 meters above the water level.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 49** (New Brunswick, York County; J. E. McGrath, 1911; 1917).—On the east shore of Grand Lake, and about 1 mile southeast from Haley Point. The station is on a large flat-topped bowlder whose cross section is 2.0 meters by 2.4 meters, and whose height was 1.6 meters above the water in September, 1911. Another bowlder leans against the station bowlder.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder. A cross cut in the top of a higher bowlder is 3.6 meters up shore from the station mark.

**Reference Monument 50** (Maine, Washington County; H. C. O. Clarke, 1917).—On the west shore of Grand Lake, due west of the highest part of Manley Island, and about 0.9 mile east of Greenland Point. The station is on the top of a pyramidal bowlder, whose base is about 3.5 meters square and which at low water is about 3 meters above the water surface. At extreme high water it will be surrounded.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 51** (Maine, Washington County; J. E. McGrath, 1911; 1917).—On the west shore of Grand Lake, directly opposite the north end of Manley Island, on a small rounded point of the shore line 1.7 miles below Greenland Point. The station is on a bowlder whose extreme dimensions in cross section are 4.2 meters by 5.7 meters, and whose top is about 0.3 meter above high-water mark.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 52** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the west shore of the Canadian point just north of Manley Island and about 100 meters north of the end of the point. The station is on a large granite bowlder whose face toward the lake is 1.2 meters high. The bowlder is 3.7 meters long north and south, and 1.5 meters wide east and west and is surrounded by evergreen trees.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 53** (Maine, Washington County; N. W. Smith, 1918).—On the north end of Manley Island in Grand Lake. The station is on a large bowlder on the northern shore of the island and about 75 meters from the extreme northern point of the island.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 54** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the eastern shore of the bay that extends northward from the outlet of Grand Lake, and about 1 mile from the outlet. The station is on the largest granite bowlder on the shore in the vicinity. The bowlder is ridge shaped, about 2.7 meters long and 1.5 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 55** (Maine, Washington County; H. C. O. Clarke, 1917).—On the northeast shore of Foster Island in Grand Lake. The station is on a large triangular granite bowlder, the largest on the shore, and is about one-third of the way down the shore from the north end of the island.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

Reference Monument 56 (Maine, Washington County; A. J. Brabazon, 1912; 1917).—At the west end of the dam at the outlet of Grand Lake, near Forest City.

Station mark: A standard 8-inch manganese-bronze reference post.

**Reference Monument 57** (New Brunswick, York County; H. C. O. Clarke, 1917).—At Forest City, New Brunswick, 18 meters south of the road leading to Clark's sawmill, and in line with the dam to the westward across the outlet of Grand Lake.

Station mark: A stat dard 8-inch manganese-bronze reference post set in a drill hole in an outcropping granite bowlder.

**Reference Monument 58** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the Canadian shore of the stream connecting Grand and Mud Lakes, and midway between the dam at the outlet of Grand Lake and the highway bridge across the stream at Forest City. The station is on a large split rock locally known as Muskrat Rock. The top part is pinned to the lower part with two iron pins, each 1 inch in diameter and 25 inches long. The top of the rock is approximately 1.5 by 2.7 meters in cross section.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 59** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the north shore of the stream connecting Grand and Mud Lakes about midway between the two lakes, and in an elbow of a small peninsula 65 meters below the highway bridge at Forest City.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large outcropping ledge of rock.

**Reference Monument 60** (Maine, Washington County; H. C. O. Clarke, 1917).—On the south shore of the stream connecting Grand and Mud Lakes, about midway between the lakes, and about 120 meters below the highway bridge across the stream at Forest City. A canal separates the land on which the monument stands from the mainland.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in an outcropping pinnacle rock.

**Reference Monument 61** (New Brunswick, York County; H. C. O. Clarke, 1917).—In an open field on the north bank of the river connecting Grand and Mud Lakes. The station is on a bowler 20 meters from the water's edge and just opposite the large triangular island in this river.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

Reference Monument 62 (Maine, Washington County; H. C. O. Clarke, 1917).—On the south shore of the river connecting Grand and Mud Lakes and about 250 meters from Mud Lake. The station is just above high-water mark in second-growth timber on the big elbow bend of the stream.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 63** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the point that forms the Canadian side of the mouth of the river that connects Grand and Mud Lakes, as it enters Mud Lake. This point becomes an island in Mud Lake at high water.

Station mark: A standard 8-inch manganese-bronze reference post set in a triangular rock whose sides are 3.3, 3.3, and 2.1 meters in length, and whose height is 1.1 meters above the ground.

**Reference Monument 64** (Maine, Washington County; A. J. Brabazon, 1912; 1917.)—On the east shore of Mud Lake opposite the mouth of the river that connects Grand and Mud Lakes, and about 91 meters north of the "Joe Louie Carry" (portage) to Spednik Lake. The station is on an irregularly topped split rock, in the bush, about 9 meters from the shore. A tree grew in the split of the rock, the stump of which still remains.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross within a triangle is cut in a low rock 3.7 meters directly inland from the station; a second cross within a triangle is cut in a rock 3.4 meters to the south of the station; and a third cross within a triangle is cut in a large bowlder 15.8 meters northward and inland from the station.

**Reference Monument 65** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the west shore of Mud Lake on a prominent rounded point of the shore line 900 meters north of the mouth of the river connecting Grand and Mud Lakes. The station is on a ridge-shaped bowlder whose base is about 2.7 meters by 2.7 meters. The ridge of the bowlder is 2.7 meters long and 1.2 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 66** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the east shore of Mud Lake about 0.9 mile north of Forest City. The shore in the vicinity is very rocky, and the station is on a split rock that is 32.9 meters south of the line fence between the farms of Harvey Boone and George Boone produced across the lake.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross within a triangle is cut in a large low rock 8.4 meters lakewards from the station. A cross within a triangle is cut in a large, low, flat rock 8.4 meters north of the station. A cross within a triangle is cut in a large bowlder just inside the tree line 8.2 meters south of the station. The station is 0.4 meter west of the line joining the last two crosses.

**Reference Monument 67** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the west shore of Mud Lake 1¼ miles north of the mouth of the river joining Grand and Mud Lakes. The station is on the timber line at the edge of extreme high water on a bowlder 5 meters long and 1.5 meters high. Fifteen meters north of the station an area covered with bowlders extends 30 meters out into the lake.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 68** (Maine, Washington County; H. C. O. Clarke, 1917).—On a small island off the east shore of Mud Lake about 500 meters south of the dam at the outlet of Mud Lake and at the narrowest part of the lake. Triangulation station "Narrow" is on the mainland a short distance to the eastward from the station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock.

**Reference Monument 69** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the west shore of Mud Lake opposite and a little north of the dam at the outlet of Mud Lake. The station is on a bowlder whose top is about 2 meters by 2 meters and about 2 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 70** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of Mud Lake, at the north side of the spillway of the dam at the outlet of the lake. The station is on a bowlder 2.4 meters square with a rectangular face 2.6 meters high facing the dam.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 71** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the east shore of Mud Lake at the south end of the dam across the outlet of Mud Lake. The station is on a big rock 1.5 meters below the dam.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Three crosses within triangles are cut in rocks near the station, as follows: The first cross nearest the gate and below the dam is 5.6 meters distant; the second is below the dam 6.2 meters distant; and the third, below and close to the dam and farthest from the gate, is 3.7 meters distant from the station.

**Reference Monument 72** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the north bank of the river connecting Mud and Spednik Lakes, on the bend of the river about 300 meters below the dam at the outlet of Mud Lake. At the monument one can look downstream to dead water in the basin. The station is on top of a rock about 0.9 meter square, and is behind a large bowlder which is directly on the shore and protects the station from drift or logs in high water.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 73** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of the river connecting Mud and Spednik Lakes, near the mouth of the river. The station is on a bowlder 2 meters above the water, well out in the stream where the swift water and dead water come together. The bowlder is by far the most prominent feature in the vicinity.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 74** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the west side of the mouth of the river that flows from Mud Lake into Spednik Lake. The station is on a rock, 2.1 meters long, 1.5 meters wide, and 0.9 meter high, which is close to the shore and south of and nearly opposite reference monument 73. The foot of the river-drivers' path is on the opposite shore about 75 meters distant.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Three crosses within triangles are cut in rocks at the following distances, respectively, from the station: 4.0 meters, 4.3 meters, and 2.6 meters.

**Reference Monument 75** (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the north side of the bay of Spednik Lake into which the river from Mud Lake flows. The station is on the end of a long point that makes out from the mouth of the river. Behind this point to the north is a dirty cove or bay full of driftwood.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock 4 meters long, 2.4 meters wide, and 1.5 meters high. Two crosses within triangles are cut in the rock; one upstream and inland 1.3 meters, and the other downstream and inland 1.1 meters from the station.

**Reference Monument 76** (Maine, Washington County; H. C. O. Clarke, 1917).—On the west shore of the bay of Spednik Lake into which the river from Mud Lake flows. The station is a short distance below the mouth of the river on a rock 22 meters back from the shore and about 15 meters back from the timber line. The rock is ridge shaped, parallel to the lake, 1.8 meters long and 1.2 meters high, perpendicular on the back side and sloping toward the lake on the front side.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 77** (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the point at the north side of the entrance to the bay of Spednik Lake into which the river from Mud Lake flows. The station is on the highest rock on the islandlike part of the point. The rock is 4.9 meters long, 4.6 meters wide, and 1.8 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Three crosses within triangles are cut in adjacent rocks at the following distances, respectively, from the station: 8.2 meters, 4.5 meters, and 3.4 meters.

**Reference Monument 78** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the west shore of Spednik Lake, about 120 meters below the entrance to the bay into which the river from Mud Lake flows. The station is on a rock 6 meters long, 5.5 meters wide, and 3.7 meters high at its greatest height.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Three crosses within triangles are cut in the rock; the first is 0.93 meter downstream, the second is 2.59 meters upstream and inland, and the third is 1.86 meters upstream and lakeward from the station mark.

Reference Monument 79 (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the east side of the channel of Spednik Lake, at the south end of the small, low, rocky island just north of Cold Cove. Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock 3.7 meters long, 3.4 meters wide, and 2.7 meters high.

**Reference Monument 80** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the west shore of Spednik Lake opposite Cold Cove, 0.9 mile north of Forest City Landing. The station is a short distance back in the bush on a rock 2.1 meters long, 1.8 meters wide, and 0.6 meter high

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross within a triangle is cut in a rock 3.19 meters upstream from the station. A cross within a triangle is cut in a rock 4.36 meters lakeward from the station; and another like mark is cut in a rock 4.71 meters inland from the station.

**Reference Monument 81** (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the eastern shore of Spednik Lake, about 300 meters south of the point at the west side of the entrance to Cold Cove. The station is on the shore line on a sharp-topped rock 3 meters long, 2.7 meters wide, and 2.1 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross within a triangle is cut in a rock 8.41 meters downstream and inland from the station, and another like mark is cut in a rock 8.56 meters slightly upstream and inland from the station.

**Reference Monument 82** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the west shore of Spednik Lake, at the upper end of a little cove about 200 meters north of Forest City Landing. The station is on a rock 10.7 meters long, 7.6 meters wide, and 2.4 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Two crosses within triangles are cut in the rock; the first is 5.23 meters inland, and the second is 2.23 meters lakeward from the station. A cross within a triangle is cut in another rock 7.50 meters upstream from the station.

**Reference Monument 83** (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the east shore of Spednik Lake, opposite to and almost due east of Forest City Landing. The station is on a sharp-topped rock about 3 by 3 meters in cross section and 2.4 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross is cut in a rock 6.70 meters inland and downstream from the station. A cross within a triangle is cut in a rock 5.08 meters inland and upstream from the station.

**Reference Monument 84** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of Spednik Lake, 0.7 mile southeast of Forest City Landing and 0.4 mile north of Current Island. The station is on a bowlder surrounded by a growth of spruce near the water's edge. The face of the bowlder slopes toward the lake and is 2.1 meters long and 1.5 meters wide, projecting 0.3 meter from the ground.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 85** (Maine, Washington County; H. C. O. Clarke, 1917).—On the west shore of Spednik Lake, 0.9 mile down lake from Forest City Landing and directly opposite Current Island. The station is on the shore line about 30 meters lakeward from the timber line, and is on a bowlder about 5 meters square at the base, 5 meters long on top, and about 3 meters high. The bowlder is the most prominent one in the vicinity.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 86** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of Spednik Lake, 0.9 mile below Current Island, and 188 meters up the lake from the old Coast Survey station "Table Rock." The station is on a rough-surfaced granite bowlder, whose top is rectangular in shape 4.6 meters long, 2.4 meters wide, and about 2 meters above the water when marked.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 87** (Maine, Washington County; H. C. O. Clarke, 1917).—On the west shore of Spednik Lake, about three-fourths mile below Current Island. The station is about 0.6 meter above high-water mark on a dome-shaped bowlder about 1.8 by 2.4 meters in cross section, and is near the center of a large area which is bowlder-covered at low water. About 45 meters south of the station, at the edge of the timber, there is a conspicuous bowlder 5 meters high with a perpendicular face toward the lake.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 88** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the eastern shore of the point at the east side of the entrance to Spruce Mountain Cove, and about 200 meters downlake from the most northern tip of the point. A big rock out in the lake is in line with Hinkley Point from the station. The station is on a rock 4.6 meters long, 4 meters wide, and 2.4 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross within a triangle is cut in a rock 5.31 meters downstream and lakeward from the station; another like mark is cut in a rock 9.60 meters inland from the station.

**Reference Monument 89** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of Spednik Lake, on Hinkley Point south 56° west, 14 meters from "Hinkley" triangulation station. The station is well out on the point at high-water mark and on top of a pyramidal rock 0.3 meter high with the three sides of the base about 1 meter each.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 90** (Maine, Washington County; H. C. O. Clarke, 1917).—On the west shore of Spednik Lake, 1 mile below the entrance to Spruce Mountain Cove and directly opposite Birch Island. A

small island out in the lake is in line with McAllister Point almost due north from the station. The shore is rough and rocky and the timber comes down to the lake. The station is in the spruce timber on a triangular rock with sides about 3 meters in length and a height of 1.5 meters.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 91** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east side of the lower end of a small island in Spednik Lake, at the west side of the entrance to McAllister Cove, and 0.45 mile west of the upper end of Birch Island. The station is on a large bowlder 5.5 meters long, 2.7 meters wide, and a little more than a meter high. The bowlder may be covered with water at extreme high water, though it is the largest on the island. The station is north 66° 45' east, 29.6 meters from the United States Coast and Geodetic Survey station "McAllister."

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Beference Monument 92** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of Spednik Lake, in a little bay 0.3 mile north and a little east of the north end of Birch Island. Thirty meters in front of the station there is a sand bar.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a bowlder 3.4 meters long, 2.4 meters wide, and 0.9 meter above the water in October, 1917.

**Reference Monument 93** (Maine, Washington County; H. C. O. Clarke, 1917).—On Birch Island, in Spednik Lake. The original Birch Island has become two islands since the water has been raised in the lake by dams. The station is about 50 meters north of the lower end of the northern and larger of the two islands. The station is on a bowlder about 0.9 meter square and projecting about 0.3 meter above the ground and is surrounded by green timber.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 94** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of Spednik Lake, on the point on the uplake side of Birch Island Brook. In extreme high water the point is flooded and but few rocks show above the water, but there are many dead trees on the point to identify its position. The monument is near the middle of the point about 75 meters from the extreme tip, and on a large flat rock measuring 2.7 by 3.4 meters and projecting 0.3 meter above the ground.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 95** (New Brunswick, York County; H. C. O. Clarke, 1917).—On Norway Point on the east shore of Spednik Lake. Norway Point is flooded since the water in the lake has been raised by dams, but the dead timber on the point still identifies it. The station is on the upper part of the point, entirely surrounded by water, and is about 90 meters from the present mainland and about the same distance from the timber on the submerged Norway Point to the lakeward.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock 4 meters long, 3 meters wide, and 2.4 meters above the water in October, 1917.

**Reference Monument 96** (Maine, Washington County; H. C. O. Clarke, 1917).—On the point in Spednik Lake between Robertson Cove and Pike Cove Brook and directly opposite Norway Point. The point is low and is overflowed at high water. The station is at the high-water mark on the northern end of the point, on a dome-shaped rock 1.7 meters in diameter and projecting about 0.2 meter above the ground.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 97** (Maine, Washington County; H. C. O. Clarke, 1917).—On the west shore of Spednik Lake, near the "Five Islands." The station is on the most eastern point of the headland that lies east of Robertson Cove and is at the edge of the birch growth 17 meters back from the water's edge.

Station mark: A standard 8-inch manganese-bronze reference post set in a bowlder 3 by 3 meters in cross section and projecting 0.5 meter above the ground.

Reference Monument 98 (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of Spednik Lake. The station is on the west shore of the peninsula that forms the west side of Sandy Bay Cove and is almost due north of the largest of the "Five Islands." It is on the largest rock in the vicinity, which is a hogback rock, 4 meters long on the ridge or back, 2 meters high, and 3 by 4 meters in cross section at the base. Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Beference Monument 99** (Maine, Washington County; H. C. O. Clarke, 1917).—On the west shore of Spednik Lake, about 1 mile above the entrance to Muncy Cove, and about one-half mile southeast of the largest of the "Five Islands." The station is about 8 meters from the lake and about 9 meters in front of the timber line, on the highest bowlder in a field of bowlders. The bowlder is pyramidal in shape, 1.4 meters high. The three sides of its base measure 3.7, 2.1, and 2.4 meters, respectively.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Beference Monument 100** (New Brunswick, York County; H. C. O. Clarke, 1917).—On Sandy Point, opposite Hardwood Island, at the west side of the entrance to Sandy Bay Cove in Spednik Lake. The station

is near the middle of the point at the high-water mark about 250 meters from the extreme end of the point. The point is low, flat and marshy, and is being eroded. It is about 200 meters wide at the station and is covered with dead standing timber and "dryki."

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a flat bowlder about 3 meters in diameter and about 15 centimeters above the surface of the ground.

**Reference Monument 101** (Maine, Washington County; H. C. O. Clarke, 1917).—On the point between Muncy Cove and Mud Cove of Spednik Lake. The station is south 19° east, 20 meters from triangulation station "Mud" and is in front of a cottage on the point.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a granite bowlder 1.0 by 1.5 meters in cross section and projecting about 0.3 meter above the ground.

**Reference Monument 102** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the extreme southeast point of Hardwood Island in Spednik Lake. The station is on the highest rock in the vicinity and is entirely surrounded by water. The rock is ridge-shaped, 4.3 by 2.7 meters at the base, 3 meters long on the ridge. and about 1.5 meters above the water, in October, 1917.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. In 1921 this post was found to have been broken off flush with the surface of the rock; the shank remained in place. Reference monument 102-A was afterwards set north  $55^{\circ}$  54' west, 116.0 meters from the station.

**Reference Monument 102-A** (New Brunswick, York County; N. W. Smith, 1921).—On the southeast point of Hardwood Island in Spednik Lake, on the southern shore of the point, 100 meters west of the extreme point and north 55° 54′ west, 116.0 meters from reference monument 102, which it is intended to take the place of, should the exposed position of monument 102 result in its destruction. The station is on a huge bowlder back of the driftwood or "dryki" and is surrounded by high water.

Station mark: A bronze disk set in a drill hole in the bowlder.

**Reference Monument 103** (Maine, Washington County; H. C. O. Clarke, 1917).—On Birch Island, at the entrance to Walker Cove of Spednik Lake. The station is on the highest part of the island 9 meters in front of the green timber and about 30 meters distant from the water, in the direction of Sandy Bay. Triangulation station "Birch Point" is about 25 meters north of the station and triangulation station "Walker" is about 75 meters southeast of the station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a flat rectangular rock about 1.5 by 3.7 meters in size and 0.3 meter above the general level of the ground.

**Reference Monument 104** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the west shore of the large island that lies northwest of "The Narrows" and Sandy Bay in Spednik Lake. The station is about one-half mile southeast along the shore line from the "Mouth of Musquash." There are three large bowlders that are in line with Rocky Island, and the station is on the one farthest uplake. This bowlder is 6 meters in front of the timber, is dome shaped, measures about 3.7 by 4.0 meters at the base, and is 2 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 105** (Maine, Washington County; A. J. Brabazon, 1911; 1917).—On the south shore of Spednik Lake, about halfway between Sandy Bay and Dark Cove, where the shore begins to bend toward the latter. The station is on a huge rock, the largest in this vicinity.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Two crosses within triangles are cut in the rock; one is 0.84 meter upstream from the station mark, the other is 1.34 meters downstream from the station mark. A cross within a triangle is also cut on a rock 8.51 meters shoreward from the station.

**Reference Monument 106** (New Brunswick, York County; H. C. O. Clarke, 1917).—About one-third mile west of "The Narrows," in Spednik Lake and on the southern shore of a large island. The station is on a flat rock at the high-water mark north 12° west, 138.3 meters from triangulation station "Musquash." The rock is about 0.3 meter high, and triangular in shape with sides 3.7, 3.7, and 2.7 meters in length.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 107** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the point that forms the west side of "The Narrows" in Spednik Lake, north 20° 18′ west, 66.1 meters from triangulation station "Heifer." The station is at the edge of the green timber on a pyramidal bowlder 1.5 meters square and 0.6 meter high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 108** (Maine, Washington County; H. C. O. Clarke, 1917).—On the east shore of and at the lower end of "The Narrows" in Spednik Lake. About 30 meters north of the station a reef makes out for about 100 meters into the water. There are three rocks of about the same size on the shore, two of which are about 6 meters apart, while the third is about 45 meters to the south. The station is on the most

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northern of the three. Perpendicular to the shore line this rock measures 3.7 meters across, and parallel to the shore line 2.4 meters.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 109** (Maine, Washington County; H. C. O. Clarke, 1917).—On the westernmost of the three small islands on the United States side of the boundary at the mouth of "The Narrows" in Spednik Lake. The station is on the Green Bay end of the island on a large rock nearly level with the ground. Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

Reference Monument 110 (New Brunswick, York County; H. C. O. Clarke, 1917).—On a small island in the mouth of Green Bay. The station is on the channel end of the island, well above the high-water mark, on a triangular rock approximately 3 meters on each side and about 0.8 meter high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 111** (Maine, Washington County; H. C. O. Clarke, 1917).—On the easternmost of the three small islands on the United States side of the boundary north of "The Narrows" in Spednik Lake. Indian Channel is southeast of this island. The station is on the highest part of the island on a pyramidal rock with a base 1 by 1.5 meters and 0.6 meter high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 112** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the shore of a small bay on the west side of Lindsay Point and north 84° 16′ west, 220.9 meters from "Lindsay" triangulation station. This point is directly across the channel from Cold Water Tavern. The station is on a low spot on a pyramidal rock with a base 2.4 by 3 meters and 1.5 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 113** (Maine, Washington County; H. C. O. Clarke, 1917).—On the south shore of Spednik Lake, about two-fifths mile west of Haley Point, 30 meters west of Cold Water Tavern, 15 meters in from the timber line, and 38 meters from the water's edge.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 114** (New Brunswick, York County; H. C. O. Clarke, 1917).—On a small island in Spednik Lake, on the east side of Diggity Gap. There are three islands on the east side of the gap. The station is on the smallest and most western of the three. It is on the southern side of the island on a bowlder with a base about 3 by 3 meters and 1.5 meters above the water, in October, 1917.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 115** (Maine, Washington County; H. C. O. Clarke, 1917).—On the south shore of Spednik Lake on Birch Point, at the west side of the entrance to Mollie Cove. The station is on the timber line on the largest bowlder in the vicinity. The bowlder is pyramidal in shape and was 2.7 meters above the water on August 16, 1917. Its largest dimension is about 4 meters.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Triangulation station "Betula" is south  $82^{\circ}$  02' east, 24.8 meters from the station, and reference monument 115-A, which is a bronze disk set in a bowlder 0.6 meter higher than the station, is south  $67^{\circ}$  22' west, 5.1 meters from the station.

**Reference Monument 115-A** (Maine, Washington County; N. W. Smith, 1918).—On the south shore of Spednik Lake on Birch Point. (See description of reference monument 115, above.)

Station mark: A bronze disk set in a drill hole in the bowlder.

**Reference Monument 116** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of Spednik Lake, nearly 3 miles above Vanceboro, Me. The station is due north of O'Mally Island with a smaller island intervening, and is on a hogback rock 4 meters long and 2 meters wide, showing a vertical face 2 meters high toward the water.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 117** (Maine, Washington County; A. J. Brabazon, 1911; 1917).—On La Coute Point on the south shore of Spednik Lake, about 2 miles above Vanceboro, Me. The station is 5 meters inland from high-water mark, on a rock 4.4 meters long, 2.7 meters wide, and 1.4 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross within a triangle is cut in a rock 3.86 meters below the station; a like mark is cut in a rock 9.96 meters in the direction of Mollie Cove from the station; and a third mark is cut in a rock 12.19 meters from the station in such a direction that a line from this cross through the station passes between the other two crosses.

**Reference Monument 118** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the southern point of O'Mally Island and south 81° 48′ east, 16.5 meters from triangulation station "O'Mally." (See description.) The station is in the hardwood timber on a bowlder about 1 by 1 meter in cross section and one-third meter above the level of the ground.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 119** (New Brunswick, York County; H. C. O. Clarke, 1917).—On the east shore of Spednik Lake, 1.6 miles above Vanceboro, Me., and about 80 meters south of the point at the south side of the mouth of Casey Brook. The station is at the water's edge at the foot of a little knoll about 16 meters high, on a dome-shaped rock with a base 1.8 by 1.4 meters, and a height of about 1 meter.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Reference monument 119–A, which is a bronze disk set in a rock on the hillside 15 meters higher than the station, bears north  $66^{\circ}$  08' east, 32.8 meters from the station.

**Reference Monument 119-A** (New Brunswick, York County; N. W. Smith, 1918).—On the east shore of Spednik Lake, on the side of the knoll just south of the mouth of Casey Brook. This station is used as a reference mark for reference monument 119. (See description.)

Station mark: A bronze disk set in a drill hole in a rock.

**Reference Monument 120** (Maine, Washington County; A. J. Brabazon, 1911; 1917).--On Ice House Point on the west shore of Spednik Lake, 1¼ miles north of Vanceboro, Me. The station is above high-water mark near the upper end of the "Horseback," on a rock 3 meters long, 2 meters wide, and 1.7 meters high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross within a triangle is cut in a large rock 26.45 meters northward from the station, and another like cross is cut in a rock 5.63 meters inland from the station.

**Reference Monument 121** (Maine, Washington County; H. C. O. Clarke, 1917; 1924).—On the west shore of Spednik Lake, about 1 mile north of Vanceboro, Me. The station is on a rock near high-water mark on the shore of a little bight just south of the narrowest place in the lake along "The Horseback." The rock is 1.7 by 1.4 meters at the ground and is 0.6 meter high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Triangulation station "McGrath" bears north  $4^{\circ}$  13' east, 37.8 meters distant. A large pier in the lake bears north  $14^{\circ}$  east, 70 meters distant.

**Reference Monument 122** (New Brunswick, York County; H. C. O. Clarke, 1917; 1924).—On the east shore of Spednik Lake, 1 mile north of Vanceboro, Me., on the point opposite "The Horseback" at the narrowest part of the lake. The station is on the slope of a little ridge which rises about 2.5 meters higher than the station, on a rock 1.5 by 1.2 meters in cross section and 0.5 meter high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. Triangulation station "Lacey" bears south 65° 58' west, 31.7 meters from the station.

**Reference Monument 123** (Maine, Washington County; H. C. O. Clarke, 1917; 1924).—About threefourths mile north of Vanceboro on the highest part of "The Horseback," opposite Varny Island. The station is on the fence line that runs along "The Horseback."

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base. Triangulation station "Vanceboro" bears north 76° 10' east, 20.1 meters from the station.

**Reference Monument 124** (New Brunswick, York County; H. C. O. Clarke, 1917; 1924).—On Varny Island, in the lower end of Spednik Lake, about three-fourths mile north of Vanceboro, opposite the Vanceboro landing. The station is on the extreme top of the horseback formation of the island.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 125** (Maine, Washington County; H. C. O. Clarke, 1917; 1924).—At Vanceboro, Me., at the west end of the dam at the foot of Spednik Lake. The station is on the west side of Water Street and on the south line of the street that crosses Water Street and continues across the dam to St. Croix, New Brunswick.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 126** (New Brunswick, York County; H. C. O. Clarke, 1917; 1924).—At St. Croix, New Brunswick, at the east end of the dam at the foot of Spednik Lake. The station is 9 meters riverward from the road that crosses the river on the dam.

Station mark: A standard 8-inch manganese-bronze reference post set in a bowlder about 2 by 2 meters in cross section and 0.7 meter high.

**Reference Monument 127** (New Brunswick, York County; H. C. O. Clarke, 1917; 1924).—In the town of St. Croix, New Brunswick, on the east side of the St. Croix River, 100 meters north of the Canadian Pacific Railway track and about 50 meters west of the main street running north through the town of St. Croix. The station is on the property of James Rideout near the property line facing the St. Croix River, and is directly behind a large barn.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a bowlder 2 meters long and 1 meter wide at the base.

Reference Monument 128 (New Brunswick, York County; H. C. O. Clarke, 1917; 1924).—In St. Croix, New Brunswick, on the east side of the St. Croix River, about 100 meters south of the Canadian Pacific Railway track, on the east side of a road running south under an elevated railway crossing. The station is 30 centimeters inside the fence line, where the ground changes slope toward a low hay marsh to the south. Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 129** (Maine, Washington County; H. C. O. Clarke, 1917; 1924).—In Vanceboro, Me., about 200 meters north of the Canadian Pacific Railway and 15.8 meters east of Water Street, on the property of Ed Holbrook. The monument is 4.6 meters north of the property line between Getchel and Holbrook on a hogback rock 1.8 meters long and 0.9 meter wide.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

Reference Monument 130 (Maine, Washington County; H. C. O. Clarke, 1917; 1924).—In Vanceboro, Me., 104 meters south of the Canadian Pacific Railway, 30 meters west of the west shore of the St. Croix River, and 122 meters east of the sawmill. The station is on a small ridge that juts out toward the river. Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 131** (New Brunswick, York County; N. W. Smith, 1917).—On the east shore of the St. Croix River, about three-fourths mile below the Canadian Pacific Railway bridge at Vanceboro, Me., and about one-half mile upstream from the upper end of Wingdam Island. The station is opposite a prominent point making into the river from the west shore.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

Reference Monument 132 (Maine, Washington County; N. W. Smith, 1917).—On the west shore of the St. Croix River, three-fourths mile below the Canadian Pacific Railway bridge at Vanceboro, Me. The station is about 100 meters north of the head of a little bay which is west of a prominent point on the United States shore. It is about 325 meters northeast of the cemetery and 25 meters from the river. Station mark: A standard 8-inch manganese-bronze reference post.

**Reference Monument 133** (New Brunswick, York County; N. W. Smith, 1917).—On the eastern shore of the St. Croix River, 2 miles below Vanceboro, Me., directly opposite the extreme lower end of Wingdam Island, and opposite the middle of the lower reach of Elbow Rips. The station is 6 meters from the river bank on a rock about 1.5 meters in diameter and 0.9 meter high.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 134** (Maine, Washington County; N. W. Smith, 1917).—Two miles below Vanceboro, Me., on the extreme lower end of Wingdam Island in the St. Croix River. The station is 22 meters inshore from the rips and 13 meters from the shore of the west channel of the river, opposite Salmon Brook, on a rock 1.5 by 0.9 by 0.9 meter in size.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 135** (New Brunswick, York County; N. W. Smith, 1917).—On the east shore of the St. Croix River, about 46 meters above the head of Mile Rips, on a large outcropping bowlder which projects about a meter into the river. The station is surrounded by water at times.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 135-A** (New Brunswick, York County; J. E. McGrath, 1910; 1921).—On the east shore of the St. Croix River, near the lower end of Mile Rips, at the elbow of the stream opposite the Holbrook farm. The station is near the low-water mark of the stream, on a bowlder 1.4 meters long, 1 meter wide and 0.7 meter high. The point back of the station is wooded.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole in the bowlder.

**Reference Monument 136** (Maine, Washington County; N. W. Smith, 1917).—On the west shore of the St. Croix River, about 90 meters above the head of Mile Rips. The station is 20 meters downstream from a woven-wire fence and 3 meters from the river bank on a bowlder that projects 30 centimeters out of the ground.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 136-A** (Maine, Washington County; J. E. McGrath, 1910; 1921).—On the west bank of the St. Croix River, at the elbow of the stream near the lower end of Mile Rips. The station is at the landing place at the Holbrook farm, on an igneous rock about 1 meter in cross section and one-half meter high, that extends outside the shore line about 0.6 meter.

Station mark: A bronze disk set in a drill hole in the rock.

Reference Monument 137 (New Brunswick, York County; N. W. Smith, 1917).—On the large island in the St. Croix River one-fourth mile below Mile Rips. The station is about midway between the upper and lower ends of the island, 6.5 meters from the southwest or main channel shore, and 9 meters north of the largest birch tree on the island.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

Reference Monument 137-A (New Brunswick, Charlotte County; N. W. Smith, 1921) .- On the south shore of the elbow of the St. Croix River, about 210 meters west of English Cove, about 15 meters downstream from the point where the grass along English Cove stops at the wooded bank, and 1.3 meters back from the water line.

Station mark: A bronze disk set in a pointed rock.

Reference Monument 137-B (New Brunswick, Charlotte County; N. W. Smith, 1921).-On the south bank of the St. Croix River on the upstream side of the point that is opposite American Cove. Station mark: A bronze disk set in a drill hole in a huge bowlder.

Reference Monument 138 (Maine, Washington County; N. W. Smith, 1917) .-- On the west bank of the St. Croix River, opposite the large island that is one-fourth mile below Mile Rips. The station is on the property of Mr. Holbrook one-fourth mile below the abandoned farmhouse used as a river drivers' camp, and is 12 meters from the river bank.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock.

Reference Monument 139 (New Brunswick, Charlotte County; N. W. Smith, 1917) .-- On the south bank of the St. Croix River, near the middle of the first reach of Tunnel Rips. The station is 137 meters downstream from the Porter Meadows River Drivers' Camp on the opposite side of the river, and is 3.7 meters from the river bank.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a bowlder.

Reference Monument 140 (Maine, Washington County; N. W. Smith, 1917).-On the north bank of the St. Croix River, about 140 meters below Porter Meadows River Drivers' Camp, and opposite the middle of the first reach of Tunnel Rips. The station is about 2.4 meters from the river bank in a small grass plot. Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

Reference Monument 141 (New Brunswick, Charlotte County; J. E. McGrath, 1910; 1917).-On the south bank of the St. Croix River, 1.6 miles below American Cove at the narrow part of the river at the head of Halls Rips.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a huge bowlder that projects about 1.5 meters into the stream.

Reference Monument 142 (Maine, Washington County; J. E. McGrath, 1910; 1917).-On the north bank of the St. Croix River, 1.6 miles below American Cove at the narrow part of the river at the head of Halls Rips.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a huge bowlder nearly surrounded by water.

Reference Monument 143 (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the south bank of the St. Croix River, about 200 meters below the mouth of Halls Brook, at the elbow of the river opposite the point known as "The Cape." The river suddenly widens just below the station. The station is on a bowlder 1 meter from the river bank.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

Reference Monument 144 (Maine, Washington County; N. W. Smith, 1917) .-- On the north bank of the St. Croix River, about 200 meters below the mouth of Halls Brook. The station is three-fourths mile above Little Falls, near the tip of the peninsula known as "The Cape," and is on a rock which is separated from the shore by 1.5 meters of water. The station is covered by water during extreme floods.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

Reference Monument 145 (New Brunswick, Charlotte County; N. W. Smith, 1917) .- On the south bank of the St. Croix River, at the foot of Little Falls. The station is on a rocky ledge projecting into the river, is 1 meter from the bank of the river, and is nearer the downstream than the upstream side of the ledge.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge. A bronze disk set in a drill hole surrounded by a triangle cut in the rock bears south 15° 56' east, 8.51 meters distant from the station.

Reference Monument 146 (Maine, Washington County; N. W. Smith, 1917).-On the east bank of the St. Croix River, near the middle of Little Falls. The station is on the top of the rocky ledge about 3 meters inshore from the river bank.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge. A bronze disk bench mark set in the same ledge bears south 54° 54' west, 1.22 meters distant from the station.

**Reference Monument 147** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the south shore of the St. Croix River, opposite Duck Point, about 275 meters upstream from the upper reach of Cedar Island Rapids, about 1.7 miles below Little Falls. The Duck Point River Drivers' Camp is about 100 meters downstream from the station and on the opposite shore.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock on the shore line.

**Reference Monument 148** (Maine, Washington County; N. W. Smith, 1917).—On the north bank of the St. Croix River, on Duck Point, 1.7 miles below Little Falls, and about 300 meters above the upper reach of Cedar Island Rips. The station is 100 meters upstream from the Duck Point River Drivers' Camp, and 9 meters from the river bank.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock.

**Reference Monument 149** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the south bank of the St. Croix River, 2.8 miles below Little Falls and at the head of Tyler Rips. The station is on the top of a huge outcropping bowlder 3 meters above the water and 4 meters out from the river bank.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 150** (Maine, Washington County; N. W. Smith, 1917).—On the north bank of the St. Croix River, 2.8 miles below Little Falls, on the extreme point of Boot Point at the head of Tyler Rips. The station is on a huge bowlder separated from the shore at high water.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 151** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the south bank of the St. Croix River, about 4 miles below Little Falls, 60 meters above the mouth of Scott Brook, on the west side of a point made by a bend of the river.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large bowlder on the shore line.

**Reference Monument 152** (Maine, Washington County; N. W. Smith, 1917).—On the north bank of the St. Croix River, about 4 miles below Little Falls, and about 60 meters upstream from the mouth of Scott Brook.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large bowlder projecting 1.2 meters out into the river.

**Reference Monument 153** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east shore of the St. Croix River, just above the head of Rocky Rips. There is a small island in the river about 50 meters upstream from the station, and the Rocky Rips River Drivers' Camp is about 200 meters downstream on the opposite shore.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock on the bank.

**Reference Monument 154** (Maine, Washington County; N. W. Smith, 1917).—On the west bank of the St. Croix River, about 60 meters above the head of Rocky Rips, and about 200 meters upstream from the Rocky Rips River Drivers' Camp.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock on the bank of the river.

**Reference Monument 154–A** (Maine, Washington County; J. E. McGrath, 1911; 1917).—On the west bank of the St. Croix River, 12 meters north of the shore end of the wing dam in Rocky Rips. The station is 255 meters downstream from reference monument 154 and 50 meters below the Rocky Rips River Drivers' Camp.

Station mark: A bronze disk set in a drill hole in a large bowlder.

**Reference Monument 155** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east bank of the St. Croix River, about 550 meters below the mouth of Rolf Brook, near the middle of Split Rock Rips, and nearly opposite the shore end of a wing dam.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a bowlder on the river bank.

**Reference Monument 156** (Maine, Washington County; N. W. Smith, 1917; 1924).—On the west bank of the St. Croix River, about 550 meters below the mouth of Rolf Brook, about the middle of Split Rock Rips and 27 meters above the inshore end of the wing dam.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock on the shore line of the river.

Reference Monument 157 (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east side of the St. Croix River, about the middle of Meetinghouse Rips, about 45 meters above Meetinghouse Rock, and opposite the mouth of Little Simsquish Brook.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large outcropping bowlder out in the river.
**Reference Monument 158** (Maine, Washington County; N. W. Smith, 1917).—On the west side of the St. Croix River, near the middle of Meetinghouse Rips, about 50 meters upstream from Meetinghouse Rock, and at the mouth of Little Simsquish Brook.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock on the shore line.

**Reference Monument 159** (New Brunswick, Charlotte County; N. W. Smith, 1917; 1924).—On the east side of the St. Croix River, about 1 mile below Meetinghouse Rock, on the narrow place in the river between the upper and middle groups of Grassy Islands, a little below the old Elisha Keene farmhouse.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock 3 meters from the river bank.

**Reference Monument 160** (Maine, Washington County; N. W. Smith, 1917; 1924).—On the west bank of the St. Croix River, about 1 mile below Meetinghouse Rock, on the narrow place in the river between the upper and middle groups of Grassy Islands, and about 50 meters downstream from the old Elisha Keene farmhouse.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock on the river bank.

**Reference Monument 161** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east shore of the St. Croix River, about one-fourth mile below the lower end of Grassy Islands, at the head of Haycock Rips, and about 50 meters above the shore end of a wing dam. Haycock Brook flows into the river on the opposite shore a short distance downstream from the station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock on the shore line.

**Reference Monument 162** (Maine, Washington County; N. W. Smith, 1917).—On the west bank of the St. Croix River, one-fourth mile below the lower end of Grassy Islands, near the head of Haycock Rips. Haycock Brook flows into the river about 50 meters downstream from the station and a wing dam is built out from the opposite shore.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large rock on the shore line.

**Reference Monument 163** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east bank of the St. Croix River, about 340 meters above the lower end of Loon Bay, and 280 meters above the mouth of Trout Brook.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large rock on the shore line.

**Reference Monument 164** (Maine, Washington County; N. W. Smith, 1917).—On the west shore of the St. Croix River, on the prominent point that is about 300 meters above the lower end of Loon Bay.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock about 1 meter inside the shore line.

**Reference Monument 165** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east bank of the St. Croix River, about 700 meters upstream from the mouth of the Canoose River, at the head of Canoose Rips, and at the brink of Canoose Ledges.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge about 3 meters inshore from the shore line and about 1.5 meters above normal water level.

**Reference Monument 166** (Maine, Washington County; N. W. Smith, 1917).—On the west bank of the St. Croix River, about 700 meters above the mouth of Canoose River, and just above the Canoose Ledges and Rips.

Station mark: A standard 8-inch manganese-bronze reference post set in a rock about 3 meters from the shore line and about 1 meter above the normal water level.

**Reference Monument 167** (New Brunswick, Charlotte County; N. W. Smith, 1917.)—In the St. Croix River, on the lower end of the middle one of three islands at Dog Falls at the head of Dog Island Rips, and about 900 meters below the mouth of the Canoose River.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rocky ledge about 1 meter in from the shore line and about 1.8 meters above the water level.

**Reference Monument 168** (Maine, Washington County; N. W. Smith, 1917).—On the west side of the St. Croix River, about 900 meters below the mouth of the Canoose River, and at Dog Falls at the head of Dog Island Rips.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large bowlder about 10 meters from the shore line and about 7.5 meters above the water level.

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**Reference Monument 169** (New Brunswick, Charlotte County; N. W. Smith, 1917).— On the cast bank of the St. Croix River, 1¼ miles above Gleason Point, five-eighths mile above King Brook, on a pronounced bend of the river. The station is on the only prominent rock on the Canadian shore between Dog Falls and Gleason Point. The rock is known as Hi-Roc and is about 2.4 meters above high water.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross is cut in the rock 0.41 meter upstream from the station mark.

**Reference Monument 169–A** (New Brunswick, Charlotte County; N. W. Smith, 1921).—On the east bank of the St. Croix River, about three-fourths mile above Gleason Point, about 300 meters above the mouth of King Brook, and opposite the upper end of the largest island off Corkin Field.

Station mark: A bronze disk set in a drill hole in a pointed rock about 9 meters outside the shore line.

**Reference Monument 170** (Maine, Washington County; N. W. Smith, 1917).—On the west bank of the St. Croix River, in the bend of the river five-eighths mile above King Brook and opposite reference monument 169. The station is about 25 meters from the water and 3 meters above it.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock 1.5 meters square and 1.2 meters above ground. A crown of cement is placed on top of the rock around the post.

**Reference Monument 170-A** (Maine, Washington County; N. W. Smith, 1921).—On the west bank of the St. Croix River, about seven-eighths mile above Gleason Point on the point opposite the second grassy island off Corkin Field.

Station mark: A bronze disk set in a drill hole in a rock 3 meters outside the shore line.

**Reference Monument 171** (New Brunswick, Charlotte County; N. W. Smith, 1917; 1924).—On the east shore of the St. Croix River at Gleason Point, on the bank about 100 meters upriver from Doctor McNicholl's boat landing.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base 4.6 meter 3 from the shore line.

**Reference Monument 172** (Maine, Washington County; N. W. Smith, 1917; 1924).—On the west bank of the St. Croix River across from Gleason Point, opposite the McNicholl guides' camp, and just above the end of the road from Lambert Lake to Gleason Point.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base about 2 meters from the shore line and 2 meters above normal water level.

**Reference Monument 173** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east shore of the St. Croix River at Clark Point, at the end of the Pomeroy Ridge Road from St. Stephen to Clark Point, and about 9 meters upstream from the old dock.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock about 2 meters out into the river from the shore at normal water level and but a little above high-water mark.

**Reference Monument 174** (Maine, Washington County; N. W. Smith, 1917).—On the west side of the St. Croix River opposite Clark Point, about 90 meters upstream from the old dock on the opposite shore, and about 4.5 meters inshore. It is in a rock which is part of a rocky ledge running perpendicular to the river's course.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 175** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east bank of the St. Croix River, about 2 miles down the river from the Pomeroy Ridge Road at Clark Point, about threeeighths mile below Enoch Brook, near the head of Kindric Rips. The station is on the shore line on a small point at a narrow place in the river about 125 meters above a dam across the head of the west channel of the river, and about 100 meters below a small island near the United States shore.

Station mark: A standard 8-inch manganese-bronze reference post.

**Reference Monument 176** (Maine, Washington County; N. W. Smith, 1917).—On the west bank of the St. Croix River, about 2 miles below the Pomeroy Ridge Road at Clark Point, about three-eighths mile below the mouth of Enoch Brook, near the head of Kindric Rips. The station is about 75 meters downstream from a small island, about 110 meters above the entrance to the west channel of the river, and is opposite reference monument 175.

Station mark: A standard 8-inch manganese-bronze reference post.

**Reference Monument 177** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east side of the St. Croix River at the end of Little Ridge Road and at the brink of Spednik Falls, which are about 234 miles above Grand Falls Dam at the head of the backwater from that dam.

Station mark: A standard 8-inch manganese-bronze reference post set in the rock about 1 meter from the edge of and about 1.5 meters above the water. A bronze disk is set in the same rock south  $44^{\circ} 40'$  west, 0.26 meter from the station.

**Reference Monument 178** (Maine, Washington County; N. W. Smith, 1917).—In the St. Croix River on an island at the brink of Spednik Falls, which are about 2<sup>3</sup>/<sub>4</sub> miles above Grand Falls Dam at the head of the backwater from that dam.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rocky ledge forming the end of the island, and about 4.5 meters from the extreme end of the ledge. A bronze disk is set in the rock south 38° 09' west, 5.47 meters from the station.

**Reference Monument 179** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the east bank of the St. Croix River, about a mile below Spednik Falls and about three-fourths mile above the dam at Grand Falls. The station is on the point at the narrow place in the backwater of the Grand Falls Dam and is at the edge of the woods on a rock 4.5 meters from the bank of the river. Reference monument 180 is on the point that forms the opposite side of the narrows.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 180** (Maine, Washington County; N. W. Smith, 1917).—On the west side of the St. Croix River, about 1 mile below Spednik Falls and about three-fourths mile above the Grand Falls Dam, on the point that forms the west shore of the narrows in the backwater from the Grand Falls Dam.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock about 11 meters from the edge of and 3 meters above the water.

**Reference Monument 181** (New Brunswick, Charlotte County; N. W. Smith, 1918; 1924).—On the east side of the St. Croix River at Grand Falls. The station is in the top of the concrete dam in the northwest corner of the wing wall about 12 meters from the Canadian shore.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the concrete.

**Reference Monument 182** (Maine, Washington County; N. W. Smith, 1917).—On the west side of the St. Croix River at Grand Falls. The station is 37 meters upstream from the United States end of the dam and 16 meters back from the edge of the backwater from the dam.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock that projects about 0.3 meter out of the ground.

Reference Monument 183 (New Brunswick, Charlotte County; N. W. Smith, 1918).—In the St. Croix River at the lower pitch of Grand Falls on the west shore of the north end of an island. The station is about 60 meters east of and below the small dam across the boundary channel of the river and is on the highest point of a smooth-topped rock ledge that rises about 8 meters above the water level of the runway below the dam. Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

**Reference Monument 184** (Maine, Washington County; N. W. Smith, 1918).—On the east bank of the St. Croix River at the lower pitch of Grand Falls, about 23 meters below the small dam across the boundary channel and about 4.5 meters back from and 5.5 meters above the water line.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in an outcropping ledge of rock. "Gorge" triangulation mark (a bronze disk) is north 5° 43' east, 13.8 meters distant.

**Reference Monument 185** (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the east bank of the St. Croix River, about 23⁄4 miles below the Grand Falls Dam, about one-fourth mile below Pomeroy Landing, about one-fourth mile above the two small islands known as Garrity Islands and at the downstream side of a small clearing or landing.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base about 3 meters from the water.

**Reference Monument 186** (Maine, Washington County; N. W. Smith, 1918).—On the west shore of the St. Croix River, about 234 miles below the Grand Falls Dam, about one-fourth mile below Pomeroy Landing on the opposite shore, and about 23 meters upstream from a little jog or point in the river bank.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base about 6 meters from the shore line. "Maurel" triangulation station mark (a bronze disk set in the rock) is about 5 meters north of the station near the shore line.

**Reference Monument 187** (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the east bank of the St. Croix River, about 4½ miles above Woodland, Me., on the point at Gibbs Landing. There is a long narrow island about 100 meters upstream and a large oval-shaped island about 300 meters downstream from the station. The station is at a narrow place in the river, in a small clearing on an exposed ledge of rock about 2.4 meters above the water. An old pier in the river about one-half mile upstream can be seen from the station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

Reference Monument 188 (Maine, Washington County; N. W. Smith, 1918).—On the west bank of the St. Croix River, about 4½ miles above Woodland, Me., on the bend of the shore a little below Gibbs Landing and reference monument 187.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large white bowlder on the bank about 11 meters from the shore and about 1.2 meters above the water level.

Reference Monument 189 (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the east shore of the St. Croix River, about 3 miles above Woodland, Me., about three-eighths mile above Mosquito Island, where the backwater from the Woodland Dam broadens out into the mouth of Sprague Meadow Brook.

Station mark: A standard 8-inch manganese-bronze reference post set in a white flat-topped bowlder about 9 meters from the shore.

Reference Monument 190 (Maine, Washington County; N. W. Smith, 1918) .- On the west bank of the St. Croix River, about 3 miles above Woodland, Me., at the end of the point of high land where the Woodland Dam flowage broadens out into the mouth of Sprague Meadow Brook, and about one-half mile northwest of Mosquito Island.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large white bowlder about 6 meters from the shore line.

Reference Monument 191 (New Brunswick, Charlotte County; N. W. Smith, 1918) .- On the east shore of the St. Croix River, about 134 miles above the railroad bridge at Woodland, Me. The station is on the point at the upper end of a narrow place in the backwater from the Woodland Dam, and about five-eighths mile below Mosquito Island.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a slate ledge about 7.5 meters from the shore line and about 1.4 meters above the water.

Reference Monument 192 (Maine, Washington County; N. W. Smith, 1918) .- On the west bank of the St. Croix River, about 13/4 miles above the railroad bridge at Woodland, Me., on the point at the head of the narrow place in the backwater from the Woodland Dam, and about five-eighths mile below Mosquito Island.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a slate ledge 6 meters from the shore line and about 1.8 meters above the water.

Reference Monument 193 (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the east side of the St. Croix River at Woodland Junction, Me. The station is on the southeast abutment of the Maine Central Railroad bridge across the river, on the upstream side of the track, 1.68 meters from the nearest rail.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the concrete.

Reference Monument 194 (Maine, Washington County; N. W. Smith, 1918).-On the west side of the St. Croix River at Woodland Junction, Me. The station is on the top of the abutment wall of the Maine Central Railroad bridge across the St. Croix River, on the downstream side of the track, and about 1.6 meters from the nearest rail.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the concrete. Triangulation station "Abutment" (marked by a bronze disk) is on the same abutment, and bears south 50° 55' west, 0.71 meter from the station.

Reference Monument 195 (New Brunswick, Charlotte County; N. W. Smith, 1918; 1924) .- On the east side of the St. Croix River, across the river from Woodland, Me. The station is on the tower abutment at the Canadian end of the dam of the St. Croix Paper Co. (the Woodland Dam) and is about 1 meter from the southwest corner of the abutment, about level with the water above the dam.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the concrete.

Reference Monument 196 (Maine, Washington County; N. W. Smith, 1918).-On the west side of the St. Croix River at Woodland, Me., about 350 meters above the Woodland Dam belonging to the St. Croix Paper Co., on an island made by a canal cut through a point for the passage of pulp wood from the railroad dump to the paper mill. The station is near the north end and on the highest point of the island, 9 meters from the water and about 2.4 meters above it.

Station mark: A standard 8-inch manganese-bronze reference post.

Reference Monument 197 (New Brunswick, Charlotte County; N. W. Smith, 1918; 1924) .- On the east bank of the St. Croix River, about 1 mile below Woodland, Me., three-fourths mile below the mouth of Wapsaconhagan Brook, opposite Grass Island. The station is about 18 meters inland from the Maine Central Railroad, 30 meters from the river and about 6 meters above the water.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large bowlder.

Reference Monument 198 (Maine, Washington County; J. E. McGrath, 1912; 1918; 1924) .- On the west bank of the St. Croix River a little more than a mile below Woodland, Me., about three-fourths mile below the mouth of Wapsaconhagan Brook, opposite the lower end of Grass Island. The station is about 3 meters from the river on a large dark-colored bowlder whose largest exposed dimension is 1.3 meters.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 199** (New Brunswick, Charlotte County; N. W. Smith, 1917; 1918).—On the east bank of the St. Croix River, 2¼ miles below the Woodland Dam, at the narrow place in the river near the foot of Bailey Rips, and nearly midway between the two largest islands at the Rips (one at the head and the other below the foot of the Rips). The station is about 4.5 meters from the river on a rocky ledge about 1.5 meters above the water.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 200** (Maine, Washington County; N. W. Smith, 1918).—On the west bank of the St. Croix River above the lower pitch of Bailey Rips and 2½ miles below the Woodland Dam. The station is abreast of an indentation in the shore line about midway between the two large islands at the head and foot of the Rips. It is about 30 meters from the river at an elevation of about 6 meters above its surface.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large bowlder. The station mark for triangulation station "Bailey" is set in the same bowlder 41 centimeters distant.

**Reference Monument 201** (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the St. Croix River about 3½ miles below Woodland, on the downstream point of the lower Butler Island, and about 15 meters back from the water.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 202** (Maine, Washington County; N. W. Smith, 1918).—On the St. Croix River, about 3½ miles below Woodland, on the north side of the large grassy island just below and across the channel from the lower Butler Island. The station is across the channel opposite reference monument 201 and is in a large hayfield about 15 meters back from the water.

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 203** (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the north bank of the St. Croix River in the big bend of the river about 13% miles above Baring, on the downstream side of the bend just where the shore begins to run in a northeasterly direction downstream. The station is opposite the upper end of Haywood Island and is north 69° 30' west, 11.6 meters from triangulation station "Will."

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a bowlder that is 9 meters from the water and whose top is nearly level with the ground.

**Reference Monument 204** (Maine, Washington County; N. W. Smith, 1918).—On the St. Croix River, about 13% miles above Baring, on Haywood Island, south 9° 57′ west, 9.03 meters from "Haywood" triangulation station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

**Reference Monument 205** (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the north bank of the St. Croix River, about one-half mile above Baring, on the point at the narrow part of the river opposite Pratt Point. The station is at the edge of the pine timber about 23 meters from the river.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a large bowlder. Triangulation station "Heater" is south 67° 19' east, 19.58 meters distant from the station.

**Reference Monument 206** (Maine, Washington County; N. W. Smith, 1918).—On the south side of the St. Croix River on Pratt Point, about one-half mile above Baring. The station is about 30 meters back from the river on a rocky ledge and is north 38° 54′ west, 43.6 meters from triangulation station "Pratt."

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge of rock.

**Reference Monument 207** (New Brunswick, Charlotte County; A. J. Brabazon, 1910; N. W. Smith, 1918).—On the west bank of the St. Croix River in the town of Upper Mills, New Brunswick. The station is 57 meters north of the outer upper corner of the abutment of the international highway bridge, 16.6 meters south of the end of the dam and about 12 or 15 meters from the river's edge on a little rocky point.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a ledge of rock. The letters "C. R. M." are cut in the ledge, and two ring bolts are set in it at distances of 1.26 and 0.35 meters from the station mark. Three crosses are cut in rock; one is 5.35 meters upstream, the second is 6.32 meters inland, and the third is 4.57 meters downstream and inland from the station.

Reference Monument 208 (Maine, Washington County; N. W. Smith, 1918).—On the east bank of the St. Croix River in the town of Baring. The station is about 25 meters north of the international highway bridge and between the railroad track and the river, about 18 meters from the railroad and 15 meters from the river. Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in outcropping rock.

**Reference Monument 209** (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the west bank of the St. Croix River, one-fourth mile below the international highway bridge at Baring, 5.5 meters from the water's edge, and south 29° 24' east, 39.7 meters from triangulation station "Towers," where the river broadens out into a wide bay.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock ledge.

**Reference Monument 210** (Maine, Washington County; N. W. Smith, 1918).—On the east bank of the St. Croix River, one-fourth mile north of the international highway bridge at Baring. The station is on the upstream side of the first rock point below the dam and is about 22 meters east of "Chain Rock" triangulation station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock ledge.

Reference Monument 211 (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the north bank of the St. Croix River, about three-fourths mile below Baring, opposite from and one-fourth mile northeast of Russell Point, and almost due north of the west end of the long island known as McKeesick Island. There are several small islands abreast of the shore line here, and one very small one with a lone tree on it lies below and about 90 meters distant from the station. The station is on a flat-topped rock about 15 meters from the river. Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

Reference Monument 212 (Maine, Washington County; N. W. Smith, 1918).—On the south bank of the St. Croix River at Russell Point, one-half mile northeast of the international highway bridge at Baring. The station is on the same rock as triangulation station "Russell" and is 21 centimeters northwest therefrom. Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

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**Reference Monument 213** (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the west shore of the St. Croix River, about 1,200 meters upstream from the Milltown highway bridge across the river. The station is on a huge bowlder projecting into the river in the rear of and 12 meters from the pier at the head of a boom along the Canadian shore above Milltown.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 214** (Maine, Washington County; N. W. Smith, 1918).—On the east side of the St. Croix River, about 1,200 meters upstream from the Milltown bridge across the St. Croix River, in an open rocky pasture, 90 meters upstream from a pier on the bank of the river, and about 60 meters back from the shore line.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a huge bowlder.

**Reference Monument 215** (Maine, Washington County; J. E. McGrath, 1912; 1922).—At Milltown, Me., about 75 meters below the Milltown bridge and about 50 meters below the water company's pumping plant, on the large rock in the edge of the St. Croix River locally known as Goose Rock.

Station mark: A bronze disk stamped "215" set in a drill hole in the rock. A large iron ringbolt is set in the rock a little west of the mark.

**Reference Monument 216** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the bank of the St. Croix River at Milltown, New Brunswick, about 125 meters below the Milltown bridge, on the north side of and about 3 meters from the Canadian Pacific Railway tracks. The station is 35 meters above the end of the dam crossing the channel at Eaton's lower sawmill and 6 meters above a ledge of rock rising out of the river and ending 1.5 meters from the track.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock some 60 centimeters below the general level of the ground. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in a rock 2.49 meters northwest of the station, a like mark is cut in a rock 1.54 meters northeast of the station, and a third like mark is cut in a rock 2.03 meters east of the station.

**Reference Monument 217** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the upper end of the island in the St. Croix River at Milltown, known as Todd Island, on a cracked rock 3.7 meters wide by 6 meters long and 1.5 meters high at its north end; its south end is covered with earth and is about half that height.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. The letters "C. R. M." and three crosses within triangles are cut in the rock. The northwest and southwest crosses are each 2.63 meters from the station, and the third cross is 3.60 meters from the station.

**Reference Monument 218** (New Brunswick, Charlotte County; F. H. Brundage, 1922).—On the lower end of the island in the St. Croix River at Milltown, known as Todd Island. The station is 12 meters from the shore of the island across from the street railway company's dam and 46 meters from the brick incinerator on the island, on a large bowlder, the highest on this end of the island.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 219** (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the east side of the St. Croix River directly across the river from the cotton mill at Milltown, New Brunswick. It is on the flat-topped bluff directly above the railroad bridge by which the Maine Central Railroad connects with the Canadian Pacific Railway. Just to the northeast of the station is the Calais Poor House and Poor Farm, and a road which runs from North Street to the poor house passes between the station and the poor-farm fence.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in an exposed ledge of rock. A cross within a triangle cut on a granite bowlder on a little rise across the road from the station bears

north  $34^{\circ} 40'$  east, 20.73 meters distant from the station; and a cross within a triangle cut on the top of a dark-colored bowlder bears north  $71^{\circ} 21'$  east, 15.78 meters distant from the station.

**Reference Monument 220** (New Brunswick, Charlotte County; J. A. Pounder, 1922).—On the west bank of the St. Croix River at the cotton mill at Milltown, New Brunswick. The station is about 45 meters below the cotton-mill dam, between the lower mill building and the river, opposite the gate house on the spillway of the dam. It is about 20 meters from the mill building, 32 meters upstream from the downstream end of the building, and about 5 meters from the river, on the highest ledge of rock in the vicinity.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

**Reference Monument 221** (New Brunswick, Charlotte County; J. A. Pounder, 1922).—On the west bank of the St. Croix River at Milltown, about 300 meters downstream from the cotton mill smokestack and on the first high ledge below the cotton mill. It is about 7.5 meters in elevation above the normal level of the river and about 9 meters back from the water's edge.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

Reference Monument 222 (Maine, Washington County; F. H. Brundage, 1922).—At Calais on the east shore of the St. Croix River on the first rocky point, about 52 meters above the Union Mills bridge.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the upper end of the ledge. A  $1\frac{1}{2}$ -inch iron bar is set in a drill hole in the same ledge 46 centimeters north of the station.

**Reference Monument 223** (New Brunswick, Charlotte County; J. A. Pounder, 1922).—On the west side of the St. Croix River, about 60 meters above the dam and electric-light plant at Union Mills. A little brook flows into the mill pond 9 meters downstream from the station, and there is an old wooden building supported on piles at the mouth of the brook. The station is 4.26 meters from this building on line with the riverward side of the building. It is at the water's edge on a rock having an exposed surface about 1 meter square.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 224** (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the east side of the St. Croix River at Calais, Me., about 700 meters upstream from the Calais-St. Stephen bridge. The station is on a rocky point belonging to the Indians who live in Calais, about 60 meters riverward from the street and about 70 meters inland from the river. The western boundary of the Indian tract is marked by six 1-inch iron rods set in a row and projecting about 6 inches above the ground. The station is 20 centimeters north of the iron rod nearest the river.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in exposed rock. A cross within a triangle cut on a protruding knob of granite bears south  $87^{\circ}$  11' west, 1.44 meters distant from the station, and a cross within a triangle cut on a bare sloping face of ledge bears north  $31^{\circ}$  45' west, 9.28 meters distant from the station.

**Reference Monument 225** (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the bank of the St. Croix River in Calais, about 575 meters upstream from the Calais-St. Stephen bridge. The station is on the top of the bank above Indian Point Siding of the Maine Central Railroad. It is on the property of James Hill, 10.7 meters southwest of the northeast building line of the houses on the southwest side of Poole Street and almost at the edge of the steep bank.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the top of a granite post 15 centimeters square and 60 centimeters long, set 50 centimeters in the ground. The subsurface mark is the center of a 3-inch tile, 12 inches in length, set under the granite post. A cross in the top of a cement-filled tile set flush with the ground 1.5 meters riverward from the last telephone pole on Poole Street bears north 46° 02' east, 23.87 meters distant from the station; and a cross within a triangle cut on a granite rock at the end of Poole Street bears north 59° 16' east, 17.41 meters distant from the station.

**Reference Monument 226** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the bank of the St. Croix River on the south side of the point just above the big cove that is on the upstream side of the Calais-St. Stephen bridge. The station is 38 meters south of the barn on the Young estate, and about 20 meters from the river.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the largest bowlder in the vicinity. The letters "C. R. M." are cut in the bowlder. Three crosses are cut in rocks, respectively northeastward 14.02 meters, southeastward 11.55 meters, and westward 13.50 meters distant from the station.

Reference Monument 227 (Maine, Washington County; F. H. Brundage, 1924).—At Calais, on the capstone of the midriver pier of the Calais-St. Stephen bridge, on the west side of the truss.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the stone. Triangulation station "International Bridge" bears north 55° 27′ east, 0.63 meter distant from the station.

Reference Monument 228 (New Brunswick, Charlotte County; N. W. Smith, 1921; 1922).—On the bank of the St. Croix River, about 1 mile downstream from the Calais-St. Stephen bridge, 500 meters upstream

from the mouth of Denny Stream, and just south of Haley's lumber mill. The shore line turns abruptly from west to north about 100 meters upstream from the station, then runs north for 100 meters, thence west again.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a bare spot on a ledge that rises gradually from the water. A bronze disk, set in the same ledge beside the station mark, marks triangulation station "Haley."

**Reference Monument 229** (Maine, Washington County; N. W. Smith, 1921; 1922).—On the south shore of the St. Croix River in the eastern part of Calais, about 50 meters east of the river end of Barker Street, on a little knoll about 30 meters from the river.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in a rock. Triangulation station "Box" bears north 68° 08' west, 72.4 meters distant from the station.

**Reference Monument 230** (New Brunswick, Charlotte County; N. W. Smith, 1921; 1922).—On the northeast shore of the St. Croix River, 2 miles below the international bridge at Calais. The station is on a sharp and prominent point at the end of a long sloping ridge that comes down to the river from the northeast, three-eighths of a mile above Long Point. There was a dock on this point at one time and a road leading down to it.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in an exposed ledge. The copper disk marking "Stroud" triangulation station is set in the same ledge a few centimeters from the station.

**Reference Monument 231** (Maine, Washington County; N. W. Smith, 1921; 1922).—On the west bank of the St. Croix River, about 2 miles below the Calais-St. Stephen Bridge on the first point below the lower wharf at the steamer landing. The point is covered with large pine trees—the largest below the Calais-St. Stephen Bridge—and is a favorite spot for picnics. The station is on a bowlder with exposed dimensions 1.2 by 0.8 by 0.6 meter. A bronze disk marking "Big Trees Tablet" triangulation station is in the same bowlder, beside the station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 232** (New Brunswick, Charlotte County; N. W. Smith, 1921; 1922).—On the eastern shore of the St. Croix River at "The Narrows," on the downstream part of Hills Point, opposite Bog Brook (Whitlocks Mill) Lighthouse. The station is about 20 meters from the water's edge and bears north 24° 11′ east, 1.10 meters from triangulation station "Hills."

Station mark: A standard 8-inch manganese-bronze reference post set in a concrete base.

**Reference Monument 233** (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the south bank of the St. Croix River 33% miles below Calais and across The Narrows from Hills Point.

Station mark: The center of the stone lighthouse known as Bog Brook or Whitlocks Mill Lighthouse.

**Reference Monument 234** (New Brunswick, Charlotte County; J. A. Pounder, 1922).—On the north shore of the St. Croix River, on Pine Point, about one-half mile upriver from Mark Point Lighthouse, on a bowlder 1.2 meters high, on the edge of the woods at extreme high-water mark. The station is north 15° 12' east, 13.21 meters from a copper bolt marking triangulation station "Pine Point."

Station mark: A standard 8-inch manganese-bronze reference post set in the top of the bowlder.

**Reference Monument 235** (Maine, Washington County; F. H. Brundage, 1922).—On the south shore of the St. Croix River on the point opposite Mark Point Lighthouse. At this point the river widens out. The station is on a bowlder 3 meters long, 2.4 meters wide, and 1.5 meters high, in the woods 9 meters back from and 3 meters above high-water mark. Triangulation station "Quarantine" bears north 44° 30' west, 16.37 meters from this station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the bowlder.

**Reference Monument 236** (New Brunswick, Charlotte County; N. W. Smith, 1921; 1922).—On the north shore of the St. Croix River on Mark Point, about one-fourth mile upstream from The Ledge, New Brunswick, and about 8.5 meters upstream and riverward of the outer upper pier of Mark Point Lighthouse. The station is on a rock, nearly flush with the ground, and a copper bolt marking triangulation station "Mark Point" is beside it in the same rock.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 237** (Maine, Washington County; N. W. Smith, 1921; 1922).—On the south shore of the St. Croix River, about 1 mile below The Ledge, New Brunswick, on Miller Point, opposite Spruce Point Lighthouse. The station is on a ledge of rock about 25 meters below the land end of a fish weir. A bronze disk marking triangulation station "Miller" is set in the same ledge beside this station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

Reference Monument 238 (New Brunswick, Charlotte County; N. W. Smith, 1921; 1922).—On the north shore of the St. Croix River, about 1 mile below The Ledge, New Brunswick, on Spruce Point, on the

ledge of rock in front of Spruce Point Lighthouse. A copper bolt marking triangulation station "Spruce Point" is set in the same ledge beside the station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

**Reference Monument 239** (Maine, Washington County; N. W. Smith, 1921; 1922).—On the south shore of the St. Croix River on the upstream side of the point where the river makes nearly a right-angle turn to the south, about 100 meters northwest of a road leading to the point. The station is on a smooth rocky ledge about 3 meters outside the line of vegetation and about 2 meters inside the ordinary high-water mark. The bronze disk marking triangulation station "De Monts" is in the same ledge beside the station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

**Reference Monument 240** (New Brunswick, Charlotte County; N. W. Smith, 1921; 1922).—On the north shore of the St. Croix River on the ledge running southwest from the cut clay bank at the southwest end of Oak Point at the entrance to Oak Bay, about 45 meters southwest from the clay bank. The ledge is broad and covered with water at high tide. A copper bolt marking triangulation station "Oak Point" is set in the same ledge beside this station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

**Reference Monument 241** (New Brunswick, Charlotte County; N. W. Smith, 1921; 1922).—On the east shore of the St. Croix River, about 1¾ miles above Dochet Island and across the river from Devils Head. The station is on a rock ledge on the upper shore of a small bay about 200 meters wide. A copper bolt marking triangulation station "Wiley" is set beside it in the same ledge.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock.

**Reference Monument 242** (Maine, Washington County; N. W. Smith, 1921; 1922).—On Dochet Island in the St. Croix River, near the summit of the rocky knoll south of the lighthouse keeper's dwelling and light. The old bell and tripod are on the summit of the same knoll, and the ground slopes very steeply toward the base of the lighthouse. A bronze disk marking triangulation station "Dochet Island" is on the same knoll beside this station.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge.

**Reference Monument 243** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the east shore of the St. Croix River a little below Dochet Island, on the cape between Johnson Cove and the first bay above Johnson Cove. The station is on a bare ledge rising gently from the shore to a narrow strip of grass where the cape extends farthest out and is at the edge of the grass about 10 meters from a fence to the northward.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the ledge. The letters "C. R. M." are cut in the ledge. Three crosses within triangles are cut in the ledge, respectively northward 2.29 meters, southward 2.60 meters, and eastward 1.84 meters from the station.

**Reference Monument 244** (Maine, Washington County; N. W. Smith, 1921; 1922).—On the southeast point of Little Dochet Island in the St. Croix River, in a clear open space. The station is on the rock about 4.5 meters from the edge of the bluff. A bronze disk marking triangulation station "Little Dochet" is set beside this station in the same rock.

Station mark: A standard 8-inch manganese-bronze reference post set in the rock.

**Reference Monument 245** (New Brunswick, Charlotte County; N. W. Smith, 1921; 1922).—On the east shore of the St. Croix River at Apple Point, about halfway between Johnson Cove and Joes Point and opposite Brooks Cove and Hilchin Point. A bronze disk marking triangulation station "Apple Point" is set beside this station.

Station mark: A standard 8-inch manganese-bronze reference post set in concrete in an excavation in the rock.

**Reference Monument 246** (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the west shore at the mouth of the St. Croix River opposite Joes Point and three-eighths mile above Liberty Point, on the point at the upper side of Smalls Cove. The station is on the most southern of three points of coarse red stone, projecting out from the grassy shore, and is on the bare rock just outside the grass line.

Station mark: A standard 8-inch manganese-bronze reference post set in a drill hole in the rock. A cross within a triangle is cut on the rock south  $79^{\circ}$  43' east, 8.83 meters distant, and a like mark bears south  $68^{\circ}$  59' west, 6.30 meters distant. The letters "U. S. R. M." are cut in the rock at the station mark.

**Bange Marks.**—The range marks, by which the boundary through Passamaquoddy Bay is referenced, are concrete pyramids 7 feet high. A diagram on page 81 shows their approximate location. This, together with the illustrations on pages 235 to 249, will furnish sufficient data for their recovery.

## SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN, MAJOR SCHEME

**Pole Hill** (Maine, Aroostook County; United States Coast and Geodetic Survey, 1889; J. L. Rannie, 1916).— In Amity Township, on the low knob known as Pole Hill. It is about 100 meters west of the international boundary and about 0.8 mile north of initial monument at the source of the St. Croix River. The station is on the highest part of the hill on a gray-sandstone bowlder, the visible part of which is 1.8 by 0.9 meter and 0.6 meter above the ground.

Station mark: Bronze disk lettered "U. S. & C. B. Survey," set in a hole drilled in the bowlder and surrounded by a triangle cut in the rock.

Kennedy (New Brunswick, York County; United States Coast and Geodetic Survey, 1889; J. L. Rannie, 1916).—In North Lake Parish, on the summit of a hill about 3 miles east of initial monument of the international boundary.

Station mark: Standard bronze disk of the United States Coast and Geodetic Survey set in a hole drilled in a bowlder which is 0.7 by 0.9 meter, its highest part projecting about 0.2 meter above the ground.

**Monument 1** (Initial monument; Maine, Aroostook County; New Brunswick, York County; United States Coast and Geodetic Survey, 1889; J. L. Rannie, 1916).—This is international boundary monument No. 1, also known as "initial monument," at the head of the St. Croix River and the southern end of the "North Line." The shaft of the monument is of cast iron, 12 inches square at the base, 6 inches square at the top, and 5.4 feet high above the concrete base. The shaft leans  $1\frac{5}{6}$  inches west and 2 inches south. The base is 5 feet square and 5 feet high above ground.

The station is the center of the iron shaft where it joins the concrete base.

**McInelly** (New Brunswick, York County; United States Coast and Geodetic Survey, 1889; H. C. O. Clarke, 1917).—In North Lake Parish, on land owned by Leonard Gould. The station is on open ground about 250 meters westward of the timbered summit of a hill about one-fourth mile southwest of the Grahamville schoolhouse.

Station mark: Bronze disk lettered "U. S. & C. B. Survey" set in a hole drilled in the rock and surrounded by a triangle cut in the rock.

**Spring Hill** (Maine, Aroostook County; United States Coast and Geodetic Survey, 1889; J. L. Rannie, 1916).—Near the center of Amity Township and west of the Houlton-Baring Road, on a large flat-topped hill, known as Spring Hill. The station is about 100 meters south of the highest part of the hill on the farm owned by Percy Boles.

Station mark: Bronze disk lettered "U. S. & C. B. Survey" set in a hole drilled in a pear-shaped bowlder, whose top is a little above the surface of the ground. A rough triangle, cut in the rock, surrounds the disk.

**Green Mountain** (New Brunswick, York County; United States Coast and Geodectic Survey, 1888; J. E. McGrath, 1911).—On the summit of Green Mountain,  $1\frac{1}{2}$  miles south-southwest of the southernmost point of North Lake, on land owned by Wallace Cosman. The station is on the highest point of a bare granite ledge.

Station mark: Bronze disk lettered "U. S. & C. B. Survey" set in a hole drilled in the rock and inclosed within a triangle cut in the rock. A cross within a triangle cut in the rock on a point of the same ledge is 5.415 meters northwest of the station mark.

**Poplar Mountain** (New Brunswick, York County; J. E. McGrath, 1912; 1917).—On the highest part of a wooded hill about 105 meters from Monument Brook at a point midway between its source and its mouth. The station is about 0.9 meter west of a birch tree in which the signal flag was fastened directly over the station.

Station mark: Bronze bolt set in a rock whose surface dimensions are 0.3 by 0.5 meter. The rock is set flush with the ground and a pile of stones about 0.6 meter high placed over it.

**Peekaboo Mountain** (Maine, Aroostook County; United States Coast and Geodetic Survey, 1889; J. E. McGrath, 1911).—In Weston Township, on the summit of Peekaboo Mountain, 1 mile north of the village of Weston. The station is on a granite ledge on the southeastern and highest part of the summit, 20 meters from the beginning of the slope toward Grand Lake.

Station mark: Bronze disk lettered "U. S. & C. B. Survey" set in a hole drilled in the rock and inclosed within a triangle cut in the rock. The west side of the triangle is a natural fissure in the ledge.

**Spruce Mountain** (Maine, Washington County; United States Coast and Geodetic Survey, 1888).—On the summit of Spruce Mountain, about five-eighths mile west by south of the head of Spruce Mountain Cove of Spednik Lake and 1½ miles southeast of the head of the south arm of Grand Lake.

Station mark: A drill hole inclosed within a triangle cut in the rock.

**Mount Henry** (New Brunswick, York County; United States Coast and Geodetic Survey, 1888; J. E. McGrath, 1911).—On the mountain of that name located about  $4\frac{1}{2}$  miles north-northeast of Vanceboro, Me., and about  $1\frac{3}{4}$  miles east of the head of Lake Palfrey. The station is on a bare ledge 25 meters southwest of and 0.6 meter lower than the highest point of the summit.

Station mark: A drill hole inclosed within a triangle cut in the rock. An arrow pointing toward the station was cut on a large bowlder 23 meters northeast of the station in 1888, but it is not mentioned in the 1908 notes of the recovery of the station.

## DESCRIPTIONS OF TRIANGULATION AND TRAVERSE STATIONS 235



Cross-range marks 1 and 2, on Joes Point, mouth of St. Croix River, cross-ranging boundary turning point 1



Cross-range marks 3 and 4, on Deer Island, Passamaquoddy Bay, cross-ranging boundary turning point 2



Cross-range marks 5 and 6, on Moose Island, Passamaquoddy Bay, cross-ranging boundary turning point 3

Walls Hill (Maine, Washington County; United States Coast and Geodetic Survey, 1888).—On the highest part of Walls Hill, about three-eighths mile from the eastern shore of the south arm of Grand Lake and about 1¼ miles south of Forest City, Me.

Station mark: A drill hole inclosed within a triangle cut in a bowlder whose top projects about 0.3 meter above the ground.

Walls Hill North (Maine, Washington County; United States Coast and Geodetic Survey, 1890).—On the eastern slope of Walls Hill, three-fourths mile from the eastern shore of the south arm of Grand Lake, about 1½ miles southeast of Forest City, Me., and about one-half mile east of the station "Walls Hill," described above.

Station mark: A drill hole in rock inclosed within a triangle cut in the rock.

**Pemberton Ridge** (New Brunswick, York County; United States Coast and Geodetic Survey, 1889; J. E. McGrath, 1911).—On the ridge of that name located about three-fourths mile east of the head of Big English Cove of Grand Lake and about three-fourths mile north of Forest City, New Brunswick. The station is about 45 meters south of the highest point of the ridge, on pasture land near a small grove of oak trees. The two largest trees are within 4 meters of the station.

Station mark: A standard United States Coast and Geodetic Survey bronze station disk wedged in a drill hole in a bowlder. A cross within a triangle is cut on a smooth exposed part of the ledge 8.12 meters from the station.

Forest City Church Spire (Maine, Washington County; United States Coast and Geodetic Survey, 1889; H. C. O. Clarke, 1917).—On the north side of the main road leading west from the bridge over the outlet of Grand Lake and 100 meters distant from it.

Station mark: The top spire, gilt martin vane.

Table Rock (New Brunswick, York County; United States Coast and Geodetic Survey, 1890; A. J. Brab-azon, 1911; 1917).—On a prominent flat-topped rock on the east shore of Spednik Lake, about 1 mile aboveHinkley Point.McAllister Cove is about three-eighths of a mile east.

Station mark: A copper bolt set in a drill hole surrounded by a triangle cut in the rock.

McAllister (New Brunswick, York County; United States Coast and Geodetic Survey, 1890; A. J. Brabazon, 1911).—On the west side of the lower end of a small island in Spednik Lake, at the west side of the mouth of McAllister Cove. The station is on a granite rock on the shore.

Station mark: A drill hole surrounded by a triangle cut in the rock.

Vance Mountain (Maine, Washington County; United States Coast and Geodetic Survey, 1888; N. W. Smith, 1917).—On the summit of Vance Mountain, about 4 miles west of Vanceboro and three-fourths mile south of the head of Walker Cove of Spednik Lake.

Station mark: A drill hole in the bare ledge rock surrounded by a triangle cut in the rock.

Tomah Mountain (Maine, Washington County; United States Coast and Geodetic Survey, 1888; N. W. Smith, 1917).—On the summit of Tomah Mountain in the western part of Codyville Township, about 14 miles west by south from Vanceboro, Me., and nearly northeast of Topsfield. The station is on a bare ledge in a cleared area.

Station mark: An iron bolt set in a drill hole within a triangle cut in the rock.

Brandy Hill (New Brunswick, York County; United States Coast and Geodetic Survey, 1888; N. W. Smith, 1917).—On a high hill about 4½ miles southeast by east from Vanceboro, about 3½ miles southwest of McAdam Junction on the Canadian Pacific Railway, and 1¼ miles east of the St. Stephen-Woodstock Road. The station is at the summit of the hill, which is bare and fairly level.

Station mark: A drill hole surrounded by a triangle cut in the rock.

Indian Island (New Brunswick, York County; United States Coast and Geodetic Survey, 1888).—On a bowlder on the southern shore of Indian Island, which is in Spednik Lake, about 3 miles above Vanceboro and 1 mile below "The Narrows." The bowlder is the largest of several in the vicinity and at low water is on a sand beach. At high water it becomes a small islet.

Station mark: A drill hole surrounded by a triangle cut in the rock.

**Elbow Rip** (Maine, Washington County; United States Coast and Geodetic Survey, 1888; N. W. Smith, 1917).—On a large granite block in the orchard of the Holbrook farm, on the west side of the St. Croix River, about 3¼ miles below Vanceboro and 15% miles below Elbow Rips. The station is about 20 meters north of a low stone fence and 33 meters from a road leading to the main road from Little Falls to Vanceboro. Mr. Holbrook's house is about 260 meters to the north-northwest of the station.

Station mark: A drill hole surrounded by a triangle cut in the rock.

Oak (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1887; N. W. Smith, 1917).—On the flat summit of Oak Hill, which is about 10 miles north of St. Stephen, on the east side of the old

## DESCRIPTIONS OF TRIANGULATION AND TRAVERSE STATIONS 237



Range marks 7 and 8, on Moose Island, Passamaquoddy Bay, ranging boundary course 1-2



Cross-range marks 9 and 10, on Moose Island, Passamaquoddy Bay, cross-ranging boundary turning point 4



Range mark 11, on Deer Island, and range mark 12, on Campobello Island, Passamaquoddy Bay, ranging boundary course 2-3

Ridge Road also known as Oak Hill Road. The station is in an open glade about 8 meters wide and 17 meters long, which is surrounded by a heavy growth of spruce and cedar.

Station mark: A drill hole surrounded by a triangle cut in the rock.

Neal (Maine, Washington County; United States Coast and Geodetic Survey, 1887; J. E. McGrath, 1908).—On the highest point of the summit ledge of Neals Hill, a high rocky-topped hill on the east side of the Princeton-Forest City Road, about 8 miles from Princeton. The station is in pasture land.

Station mark: A drill hole surrounded by a triangle cut in the rock.

McGlinchy, 1917 (Maine, Washington County; N. W. Smith, 1917).—On the highest point of the old McGlinchy field, about one-third mile west of Rocky Rips of the St. Croix River. The station is near the middle of the northern end of the oval ridge, and about 180 meters west of the old cellar where the McGlinchy house stood.

Station mark: Bronze disk marked "U. S. & C. B. Survey"set in a drill hole in a rock and buried 0.25 meter underground.

**Howland**, 1917 (New Brunswick, York County; J. E. McGrath, 1911; N. W. Smith, 1917).—Near the summit of a high ridge on the old Howland farm, about  $1\frac{5}{8}$  miles northeast of Vanceboro, Me. The station is on the north edge of the pasture, 0.6 meter south of the rail fence which runs along the edge of the hardwood timber, about 122 meters west of the corner of the pasture, and about 30 meters west of the top of the ridge.

Station mark: Bronze disk marked "U. S. & C. B. Survey" set in a drill hole in a large granite bowlder nearly flush with the ground. A triangle is cut in the rock around the disk.

St. Croix (New Brunswick, York County; N. W. Smith, 1917).—On the brow of a hill about 400 meters northeast from the Maine Central Railroad bridge at St. Croix, New Brunswick, about 100 meters north at right angles from the same railroad, and near three small cedars about 23 meters east of the edge or brow of the hill.

Station mark: Bronze disk marked "U. S. & C. B. Survey" set in a drill hole in a large round rock about 1.5 meters in diameter and projecting one-half meter above the surface of the ground.

Vanceboro Schoolhouse Flagstaff (Maine, Washington County; Jesse Hill, 1924).—About 12 meters east, or in front of the Vanceboro, Me., high school. The station was located directly under the ball of the slightly leaning flagstaff. The center of the supporting post of the flagstaff is 0.58 meter from the station, in azimuth 100°.

Station mark: A railroad spike buried 1 inch below the surface of the ground, vertically under the ball at the top of the flagstaff.

**Canoose** (New Brunswick, Charlotte County; N. W. Smith, 1917).—On the highest point of a ridge about 225 meters east of the St. Croix River and about 500 meters north of the Canoose River.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole in a rock and buried 14 inches underground.

**Keene** (Maine, Washington County; N. W. Smith, 1917).—On a high triangular knoll on the old clearing just south of the Keene farmhouse at Grassy Islands in the St. Croix River. The station is on about the highest point of and equally distant from the three corners of the knoll.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole in a rock and buried about 20 inches underground.

**Collins** (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1887; J. E. McGrath, 1908).—On the highest part of St. David Ridge, on the eastern side of the Ridge Road about 5 miles north-northeast from St. Stephen. The station is 11.3 meters east of the road, 14.66 meters from the northwest corner of Mr. Collin's house, 24.29 meters from the southwest corner of the house, and 18.78 meters from the north post of the road gate.

Station mark: A drill hole in the top of a large bowlder whose exposed surface is slightly above the ground level.

**Rye** (Maine, Washington County; United States Coast and Geodetic Survey, 1867; J. E. McGrath, 1908).—On the hill or mountain of that name, about  $5\frac{1}{2}$  miles west by north from Baring and about  $2\frac{1}{2}$  miles southwest from Woodland. The station is on the eastern part of the summit, and the ground to the westward is slightly higher.

Station mark: A copper bolt set in a hole in the rock. Four drill holes filled with sulphur were placed as reference marks, viz, to the north, west, and south, 18 inches distant, and to the east, 6 inches distant from the station.

Middlemiss (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1887; N. W. Smith, 1918).—In St. James Parish, on the highest part of Little Ridge, about 6 miles west-northwest of St. Stephen, about 3½ miles north of Woodland, Me., and one-half mile south-southwest of Little Ridge church.



Range mark 13, on Dog Island, and range mark 14, on Moose Island, Passamaquoddy Bay, ranging boundary course 3-4



Range marks 15 and 16, on Campobello Island, Passamaquoddy Bay, ranging boundary course 4-5



Range mark 17, on Cherry Island, and range mark 18, on Thrumbcap Island, Passamaquoddy Bay, ranging boundary course 5-6

The station is about one-eighth mile west of the road in an old stone fence 23 meters from its southern end and 30 meters from its northern end.

Station mark: A drill hole within a triangle cut on a large flat stone around which other stones are laid, making a rough platform.

Scotch Ridge Church Steeple (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1887; N. W. Smith, 1918).—On the south slope of the Scotch Ridge in St. James Parish and 9 miles northwest of St. Stephen.

Station mark: The station is the steeple.

Clark, 1918 (New Brunswick, Charlotte County; N. W. Smith, 1918).—On Clark Point, in the rear of the guides' cottage. The station is 21.12 meters from the southwest corner of the cottage, 18.44 meters from a cross cut in a rock in a rock pile to the westward, and 24.26 meters from a cross cut in a rock 5.48 meters west of the trees along the road.

Station mark: Bronze disk marked "U. S. & C. B. Survey" set in a drill hole in a rock buried flush with the ground.

**Ross** (Maine, Washington County; N. W. Smith, 1918).—On the peninsula made by the backwater from the Grand Falls Dam and nearly a mile above the dam. The station is about one-half mile above the point of the peninsula, on the highest point of the hill.

Station mark: Bronze disk marked "U. S. & C. B. Survey" set in a drill hole in a rock and buried 8 inches under the **gro**und.

**Pomeroy** (New Brunswick, Charlotte County; N. W. Smith, 1917.)—In Little Ridge settlement, about 2½ miles southeast of Grand Falls on the St. Croix River. The station is in the front yard of Samuel Pomeroy's home.

Station mark: A pine hub, from which a cross cut in a stone about 10 by 12 inches in size, set flush with the ground at the most northern corner of Mr. Pomeroy's house, bears south  $3^{\circ}$  east, 5.45 meters distant; and the most western corner of the house bears south  $32^{\circ}$  west, 11.11 meters distant.

**Chamcook** (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1857; A. J. Brabazon, 1909).—On Chamcook Mountain, about  $3\frac{1}{2}$  miles north of St. Andrews. The station is a little south of the summit, which is bare and in a slight depression in the rocky ledge.

Station mark: A copper bolt set in the rock, with four drill holes, each 0.91 meter distant from the station, forming a square whose diagonals intersect on the station mark. Two drill holes in the rock, at distances, respectively, of 10.66 and 22.06 meters, bear south 63° west in line toward Cooper Mountain.

**Cooper** (Maine, Washington County; United States Coast and Geodetic Survey, 1859; 1913).—On the highest hill in the township of Cooper, known as Western Ridge or Cooper Hill. The hill is about 750 feet high and covered with timber. A fire lookout tower is built directly over the station.

Station mark: A copper bolt set in a hole in the rock. A copper bolt marking the old Latitude Station of 1859, set in the solid ledge of rock, is 14.0 meters west and 1.3 meters south. Drill holes in rock are at the following ranges and distances from the mark: In range with Chamcook, 3.84 meters; Prince Regents Redoubt, 4.48 and 40.81 meters; Grand Manan, 4.27 and 37.55 meters; Trescott Rock, 3.66 meters.

Maguerrewoc (Maine, Washington County; United States Coast and Geodetic Survey, 1887; J. E. McGrath, 1909).—On the southwest summit of Maguerrewoc Mountain located about three-fourths mile east of the St. Croix River and one-fourth mile east of the road from Calais and Milltown to Baring. The station is on a ledge surrounded by a thick growth of trees and is 6 meters north of a fence crossing the mountain. In 1908 three drill holes were made, each 2.13 meters from the station, for fastening guy wires. In 1909 other holes at greater distances were made for guy wires.

Station mark: A drill hole surrounded by a triangle cut in the rock. A bronze disk set in a drill hole in the top of a small rock knob bears northeast 7.503 meters distant, and a cross within a 5-inch triangle cut on the flat surface of the ledge 1 foot north of the fence bears south by east, 5.634 meters distant.

Mohannas (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1887; J. E. McGrath, 1909).—On the summit of the hill in St. Stephen Parish, formerly known as Thompson's Hill but later owned by William Libby, about a mile from the St. Croix River, 3 miles west of Milltown, New Brunswick, and just north of the St. Stephen-Milltown Road. The station is on the bare ledge in a small cleared area on the highest point of the hill, about 15 meters south of an east and west fence and about 36 meters east of a north and south fence.

Station mark: A drill hole surrounded by a circle cut in the rock. A cross within a triangle cut in a rock bears south 13.795 meters, and a cross within a triangle cut in a rock 4 inches above the ground, bears east 7.174 meters.

Baring School Cupola (Maine, Washington County; United States Coast and Geodetic Survey, 1887; N. W. Smith, 1918).—In the town of Baring, on Church Street.

Station mark: The finial over the cupola of the schoolhouse.



Cross-range marks 19 and 20, on Moose Island, Passama quoddy Bay, cross-ranging boundary turning point 6



Cross-range marks 21 and 22, on Treat Island, Passamaquoddy Bay, cross-ranging boundary turning point 7



Range marks 23 and 24, on Pope's Folly Island, Passama quoddy Bay, ranging boundary course 6–7  $47378^\circ-34--17$ 

Sinclair 2 (New Brunswick, Charlotte County; J. E. McGrath, 1908).—On the summit of a round-topped hill, about 2½ miles below St. Stephen, 1½ miles above the settlement called "The Ledge." The station is about 280 meters northeast of the road between the places mentioned.

Station mark: An iron bolt set in a drill hole in the rock and projecting 2 inches. The point is referenced by 3 ringbolts set in the rock in azimuth and distance from the station as follows: Azimuth 104°, distance 2.19 meters; azimuth 224°, distance 2.17 meters; and azimuth 343°, distance 2.25 meters.

Todd Mountain (New Brunswick, Charlotte County; J. E. McGrath, 1908).—On the hill of that name about one-half mile west of Milltown, New Brunswick, on the north side of the Milltown Road. The station is about one-fourth mile from the road, about 130 meters northwest of the Todd Mountain Reservoir, and about 130 meters southeast of the summit of the hill. It is on a ledge or bowlder in open pasture land east of the trees which have grown up in the old lane leading to the summit.

Station mark: A steel rod set in a drill hole in the rock and projecting 2 inches. A large maple tree in the old lane, marked with a blaze and three nails in the form of a triangle 27 inches above the ground, is 16.87 meters distant; and a large maple tree, marked in like manner 16 inches above the ground, is 20.99 meters distant.

Anderson (Maine, Washington County; United States Coast and Geodetic Survey, 1887; J. E. McGrath, 1908).—On the summit of Bailey Hill, about  $3\frac{1}{2}$  miles west-northwest of Baring,  $1\frac{1}{2}$  miles south by east of Woodland, and on the west side of the Baring-Princeton Road. The station is on a granite bowlder which forms part of the base of a stone fence between the adjoining farms.

Station mark: A drill hole in the top of the bowlder. A triangle is cut on the south face of the bowlder.

Murchie (New Brunswick, Charlotte County; J. E. McGrath, 1908).—On a ridge about one-half mile from the St. Croix River and about 1½ miles east of Woodland, Me., 50 meters north of the road leading from St. Stephen via Milltown and Upper Mills, New Brunswick, to Woodland. The foundations of several buildings destroyed by fire are near the station.

Station mark: A drill hole in a flat stone 12 by 15 inches. A cross cut in a stone on the north corner of the most western foundation is south-southwest 17.87 meters from the station.

Arcus (Maine, Washington County; United States Coast and Geodetic Survey; 1860; 1913).—On the hill known as Mount Dorcas, on the peninsula known as Hurley Point between the north branch of the Cobscook River and Duck Harbor, and about 2 miles east of Dennysville. The top of the hill is bare. The road from Dennysville is about one-eighth mile southwest of the station.

Station mark: A drill hole surrounded by a triangle cut in the rock, with a pile of stones around it.

**Trescott Rock** (Maine, Washington County; United States Coast and Geodetic Survey, 1861; 1913).— On a very prominent bare, rocky hill about 4 miles southeast of Whiting and about 1 mile west of the head of Haycock Harbor. The shore road from Lubec to Cutler lies about one-half mile to the south, and a road leading to Whiting lies about the same distance to the east. The station is on the highest point of the hill.

Station mark: A copper bolt set in a drill hole in the bare rock ledge and surrounded by a triangle cut in the rock.

**Grand Manan** (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1861; 1913).—On a high hill on the northwest side of Grand Manan Island, about three-eighths mile east of the shore of Dark Harbor. The top of the hill is timbered, and the station is on the northwest part of a small plateau. The ledge on which the station is placed is not at all prominent and is lower than a number of more conspicuous ledges to the eastward.

Station mark: A three-fourths-inch drill hole in the center of a triangle cut in the rock. The triangle has a drill hole at each apex.

**Porcupine** (Maine, Washington County; United States Coast and Geodetic Survey, 1860; 1913).—On a high commanding hill known as Thayer Ledges, one-half mile northwest of Porcupine Mountain, about 3 miles southwest of Lubec, and seven-eighths mile southeast of the road from Lubec to Whiting. The station is about 10 meters south of the highest point of the hill.

Station mark: A Coast and Geodetic Survey bronze disk set in a drill hole in a bowlder.

Quoddy (Maine, Washington County, United States Coast and Geodetic Survey, 1860; J. E. McGrath, 1913).—On the southernmost of the two summits of the hill near the center of the peninsula of West Quoddy Head, about five-eighths mile west of the lighthouse and 200 meters south of the road. The lookout of the United States Coast Guard is on the other summit about 100 meters to the north-northwest. The station is on a fairly flat part of a bare ledge about  $2\frac{1}{2}$  meters west of the highest point.

Station mark: A copper bolt set in a drill hole in a bowlder and inclosed within a triangle cut in the rock. A standard Coast and Geodetic Survey reference disk set in a drill hole in a bowlder with the arrow pointing to the station is 2.66 meters distant.

Hersey (Maine, Washington County; United States Coast and Geodetic Survey, 1887; 1913).—On the summit of a hill near the southeast end of Hersey Neck, which lies between the Pennamaquan River and East Bay,



Cross-range marks 25 and 26, on Campobello Island, Passamaquoddy Bay, cross-ranging boundary turning point 8



Range marks 27 and 28, in Lubec, Me., Passamaquoddy Bay, ranging boundary course 7-8



Range marks 29 and 30, on Moose Island, Passamaquoddy Bay, ranging boundary course 8-9

an arm of Cobscook Bay, and about 3 miles southeast of Pembroke. The station is about one-half mile northwest of Garnet Point and about 250 meters from the north shore of the river. The road from Pembroke to Garnet Point is less than 100 meters southwest of the station.

Station mark: A drill hole surrounded by a triangle cut in a rock. A standard Coast and Geodetic Survey reference disk set in concrete in a tin pipe on a bare rock is 12.77 meters distant in azimuth 175°.

Trott (Maine, Washington County; United States Coast and Geodetic Survey, 1887; 1913).—On Pigeon Hill, about one mile north of the highway bridge to Moose Island and the same distance northwest of Carlow Island, about 100 meters east of the Eastport-Calais Road and three-fourths mile north of the junction of that road with the Pembroke Road. The station is on the outcrop of a ledge on the southwest part of the summit of the hill.

Station mark: A drill hole filled with lead within a 6-inch square cut in the rock. The reference mark is a standard Coast and Geodetic Survey reference disk with the arrow pointing toward the station. It is set in an 8-inch length of stovepipe filled with concrete, placed on a ledge on the east side of the hill at a distance of 17.41 meters.

North Head (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1861; 1913).— On a hill near the north end of Deer Island, about one-fourth mile from the north shore. The station is about 8 meters southwest of the highest point of the hill.

Station mark: A drill hole surrounded by a circle cut in the rock. A cairn was erected near it.

Navy Island (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1863; W. F. King, 1894; 1913).—On the south end of Navy Island, which lies on the east side of the mouth of the St. Croix River, about 1 mile south of St. Andrews. The station is about 100 meters from the extreme south point of the island and about 18 meters from the edge of the bluff on the west side. About 66 meters to the north there is a row of stones, evidently the remains of an old fence across the island.

Station mark: A United States Coast Survey bronze disk set in a drill hole in a bowlder projecting about 6 inches above the ground.

Shortland (Maine, Washington County; United States Coast and Geodetic Survey, 1863; J. E. McGrath, 1909).—On the high hill known as Trimble Hill, about  $1\frac{1}{2}$  miles from the west shore of the St. Croix River and about 2 miles northwest from Robbinston Congregational Church. The home of Earnest Trimble is about one-eighth mile to the eastward.

Station mark: A United States Coast and Geodetic Survey bronze disk wedged in a drill hole in a bowlder. The reference marks are as follows: A cross cut within a 4-inch triangle on a rock bears northeast by east 5.597 meters, and a similar mark bears west by north 6.303 meters distant.

**Cumming** (New Brunswick, Charlotte County; T. C. Mendenhall, 1893; 1913).—On a bare knob rising quite abruptly from the west shore of Deer Island and about three-eighths mile north of Cummings Cove.

Station mark: A brass bolt set with lead in a drill hole in the rock; over this is placed a United States Coast and Geodetic Survey brass disk set in concrete in a 1-foot length of pipe. A standard Coast Survey reference disk set in concrete in a short length of pipe on the highest part of the ledge bears north-northeast 10.53 meters from the station.

Kendall 2 (Maine, Washington County; T. C. Mendenhall, 1893; 1913).—On the southern edge of the highest ledge on Kendall Head, Moose Island.

Station mark: A cross cut on the head of a bolt set in lead in a drill hole in rock placed 18 inches below the surface of the ground. The surface mark is a United States Coast and Geodetic Survey bronze station disk set in cement and centered over the bolt. A Coast and Geodetic Survey standard reference disk is set in concrete in a 4-inch length of pipe on the highest point of the ledge, with the arrow pointing toward the station.

Treat 2 (Maine, Washington County; T. C. Mendenhall, 1893; 1919).—On Treat Island, which is about five-eighths mile south of Moose Island and about a mile north of Lubec. The station is on the highest point of the island, about 50 meters north of a white gravestone and 25 meters east by south from an old iron cannon.

Station mark: A bronze bolt set in the rock and projecting  $1\frac{1}{2}$  inches above the surface.

**Campobello** (New Brunswick, Charlotte County; T. C. Mendenhall, 1893; 1919).—On the west side of Campobello Island, about 200 meters from the Friar Roads shore, about seven-eighths mile north of Welshpool and opposite Eastport, Me. The station is 3.476 meters southwest of Range Mark 16.

Station mark: A bronze bolt set in lead in a drill hole in the rock. A United States Coast and Geodetic Survey standard reference disk is set 4.42 meters west-southwest of the mark.

Cherry Island Bell Tower (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1910).—On the southwest point of Cherry Island. Lost; replaced. (See Cherry Island tower.)



Range marks 31 and 32, on Treat Island, Passamaquoddy Bay, ranging boundary course 9-10



Cross-range marks 33 and 34, on Campobello Island, Passamaquoddy Bay, cross-ranging boundary turning point 9



Range marks 35 and 36, on Campobello Island, Passamaquoddy Bay, ranging boundary course 10-11

Friars Head 3 (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1910; Jesse Hill, 1919).—On the prominent head of that name on the west side of Campobello Island, about 1 mile northeast of Lubec, Me. The station is 5.13 meters from the southwest corner of the Friars Head pavilion and 5.65 meters from the northwest corner.

Station mark: A drill hole surrounded by a triangle cut in the rock. A rough 4-inch cross cut in the rock bears southeast 16.61 meters distant and a 4-inch letter "V" cut on a small sloping face of rock bears south 15.06 meters distant from the station.

Buckman (Maine, Washington County; United States Coast and Geodetic Survey, 1910; J. E. McGrath, 1913).—On the west side of Friar Road on Buckman Head, which is the southeast corner of Moose Island, and about one-fourth mile south of the southern extremity of Eastport. The station is on a small ledge 2.3 meters east of its western edge. It is about 45 meters northeast of James Davis's house and 4 meters from his fence.

Station mark: A United States Coast and Geodetic Survey bronze disk wedged in a drill hole in a bowlder. A Coast and Geodetic Survey bronze reference disk set in an irregular mass of concrete, with the arrow pointing toward the station, is 31.63 meters from the station and in range with the tall black stack of Seacoast factory No. 4 and the chimney of L. L. Clark's factory. The reference mark is 0.45 meter from Davis's fence and 23 meters east of the center of the walk on High Street. The station could not be found in 1919.

Lubec Church Spire (Maine, Washington County; United States Coast and Geodetic Survey, 1861; 1919).—The most prominent white spire in the town of Lubec.

Indian Point (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1861; Jesse Hill, 1919).—On the small rocky islet about one-eighth mile south of Campobello Island. At low water this islet is connected with and forms part of Duck Point. The station is on the highest point of the rocky ledge.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a hole drilled in the rock.

Wolf (New Brunswick, Charlotte County; United States Coast and Geodetic Survey, 1861; Geodetic Survey of Canada, 1918).—On the highest point of a hill in the extreme south end of the southwest Wolf Island, off the eastern end of Grand Manan Channel, Bay of Fundy. The station is about 45 meters southwest of the lighthouse.

Station mark: A bronze disk set in the outcropping granite ledge. A tripod signal and targets were erected over the station.

## SOURCE OF THE ST. CROIX RIVER TO VANCEBORO ME., MINOR SCHEMES

**Traverse Station 2** (New Brunswick, York County; A. J. Brabazon, 1912; 1921).—On the Canadian shore in the bend of Monument Brook, where it first turns toward the east below initial monument. The station is about 24 meters east of the brook where it runs south and 23 meters north of the brook where it runs east.

Station mark: A copper disk set in a drill hole in a rock about 25 by 36 centimeters in cross section and projecting about 20 centimeters above the ground. Three trees are blazed facing the station: A birch, 50 centimeters in diameter, 3.2 meters from the station; a maple, 25 centimeters in diameter, 2.1 meters from the station; and a birch, 25 centimeters in diameter, 1.3 meters from the station.

**Traverse Station 5** (Maine, Aroostook County; A. J. Brabazon, 1912; 1921).—On the outside of the elbow of Monument Brook at its second decided turn from the south to the east below initial monument. The station is about 1.5 meters from the brook.

Station mark: A copper disk set in a drill hole in the top of a rock approximately 47 by 76 by 90 centimeters set in the ground so that its exposed surface is about 30 by 46 centimeters and 10 centimeters above the ground. Three trees are blazed facing the station: A spruce, 46 centimeters in diameter, 4.1 meters from the station; a spruce, 15 centimeters in diameter, 4.3 meters from the station; and a spruce, 25 centimeters in diameter, 5.6 meters from the station.

**Traverse Station 6** (New Brunswick, York County; A. J. Brabazon, 1912; 1921).—On the Canadian side of Monument Brook where the brook turns from a southeasterly to a southerly course, about  $1\frac{1}{2}$  miles below initial monument. The station is 1.8 meters from the brook.

Station mark: A copper disk set in a drill hole in a large rock projecting but a few centimeters from the ground. Two trees are blazed facing the station: A birch, 50 centimeters in diameter, 8.5 meters from the station in a southeasterly direction, and a cedar, 46 centimeters in diameter, 3.7 meters from the station in a northeasterly direction.

Traverse Station 8 (Maine, Aroostook County; A. J. Brabazon, 1912; 1921).—In a bend of Monument Brook, about 17/8 miles below initial monument and about 9 meters south of the brook.

Station mark: A copper disk set in a drill hole in a bowlder whose dimensions are about 0.6 by 0.7 by 1.2 meters, sunk in the ground to within a few centimeters of its top. Three trees are blazed facing the station: An ash, 30 centimeters in diameter, 1.8 meters distant; a cedar, 35 centimeters in diameter, 3.4 meters distant; and a cedar, 35 centimeters in diameter, 3.7 meters distant.



Cross-range marks 37 and 38, on Campobello Island, Passamaquoddy Bay, cross-ranging boundary turning point 10



Cross-range marks 39 and 40, on Campobello Island, Passamaquoddy Bay, cross-ranging boundary turning point 11



Range marks 41 and 42, on West Quoddy Head, Passamaquoddy Bay, ranging boundary course 11-12

**Traverse Station 10** (Maine, Aroostook County; A. J. Brabazon, 1912; 1921).—On the west bank of Monument Brook, about 2¼ miles below initial monument. The station is about 3 meters southwest of the bank of the brook.

Station mark: A copper disk set in a drill hole in a rock whose dimensions are 50 by 75 by 90 centimeters, set in the ground with its top projecting about 13 centimeters above the surface. Three trees are blazed facing the station: A double birch, 30 centimeters in diameter, 5.8 meters distant; a spruce, 30 centimeters in diameter, 7.6 meters distant; and a cedar, 35 centimeters in diameter, 11.6 meters distant from the station.

Traverse Station 11 (New Brunswick, York County; A. J. Brabazon, 1912; 1921).—On the east side of Monument Brook, about 2½ miles below initial monument. The station is about 23 meters southeast of the mouth of a small stream flowing into the brook from the northeast.

Station mark: A copper disk set in a drill hole in a bowlder whose dimensions are 60 by 90 by 90 centimeters, sunk in the ground with its top projecting about 7 centimeters above the surface. Four trees are blazed facing the station: A spruce, 30 centimeters in diameter, 11.0 meters distant; a cedar, 35 centimeters in diameter, 9.4 meters distant; a birch, 25 centimeters in diameter, 5.3 meters distant; and a spruce, 15 centimeters in diameter, 2.9 meters distant from the station.

Traverse Station 14 (Maine, Aroostook County; A. J. Brabazon, 1912; 1921).—On Monument Brook, about 9 meters west of the bank of the stream. The station is about 1 mile upstream from the mouth of Glendenning Brook and 518 meters east of Bartlet, or Glendenning, Landing.

Station mark: A copper disk set in a drill hole in a rock whose exposed surface is 30 by 90 centimeters and which projects about 10 centimeters above the surface of the ground. Three trees are blazed facing the station: An ash, 25 centimeters in diameter, 5.2 meters distant; an ash, 20 centimeters in diameter, 15.8 meters distant; and a spruce, 20 centimeters in diameter, 6.5 meters distant from the station.

Traverse Station 16 (Maine, Aroostook County; A. J. Brabazon, 1912; 1921).—On Monument Brook, about three-fourths mile above the mouth of Glendenning Brook. The station is 33.5 meters from the brook and 14.6 meters west of the road at Bartlet, or Glendenning, Landing.

Station mark: A copper disk set in a drill hole in a rock whose exposed surface is 30 by 35 centimeters set with its top nearly level with the ground. Three trees are blazed facing the station: A cedar, 25 centimeters in diameter, 6.5 meters distant; an ash, 20 centimeters in diameter, 4.6 meters distant; and a spruce, 46 centimeters in diameter, 4.0 meters distant from the station.

**Traverse Station 17** (New Brunswick, York County; A. J. Brabazon, 1912; 1921).—On Monument Brook, about one-third mile below Bartlet Landing and nearly the same distance above the mouth of Glendenning Brook. The station is about 14 meters south of the shore of Monument Brook. A meadow extends along the brook for some distance upstream on the opposite side.

Station mark: A copper disk set in a drill hole in a rock whose exposed surface is about 30 by 60 centimeters, set with its top projecting about 10 centimeters above the ground. A dead tree 20 centimeters in diameter, blazed facing the station, is 3.7 meters distant, and a spruce tree 20 centimeters in diameter, blazed facing the station, is 9.5 meters distant from the station.

**Traverse Station 18** (Maine, Aroostook County; A. J. Brabazon, 1912; 1921).—On Monument Brook, about one-fourth mile below the mouth of Glendenning Brook and about one-third mile below the upper dam. The station is just on the upper edge of a bight in the brook where it broadens below swift water.

Station mark: A copper disk set in a drill hole in a rock whose surface dimensions are about 1.8 by 2.4 meters. A rock 0.6 meter by 1.2 meters, projecting 0.5 meter out of water, is abreast of the station in the stream 3.7 meters distant. Three trees are blazed facing the station: A birch, 35 centimeters in diameter, 11.3 meters distant; an ash, 20 centimeters in diameter, 10.7 meters distant; and an ash, 20 centimeters in diameter, 7.0 meters distant from the station.

**Traverse Station 18-F** (New Brunswick, York County; N. W. Smith, 1921).—On Monument Brook, about 122 meters below the mouth of Glendenning Brook on the Canadian shore.

Station mark: A bronze disk set in a drill hole in the top of a bowlder that is 2.4 meters in diameter and 0.9 meter high.

Traverse Station 19-B (Maine, Aroostook County; N. W. Smith, 1921).—In Monument Brook, about one-half mile below the mouth of Glendenning Brook. The station is on the largest flat rock in the center of the stream, about 9 meters upstream from a sharp point on the Canadian side, and is at the head of a long stretch of dead water.

Station mark: A bronze disk set in a drill hole in the top of the rock about 30 centimeters above the bed of the stream.

Avernus Tablet (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook just west of the long straight east and west course of the brook along the base of Poplar Mountain. The station is on a rock, back in the woods 6.7 meters south of the stream.

Station mark: A bronze disk set in a drill hole in the top of a rock and surrounded by a triangle cut in the rock. The rock is approximately 1.3 meters by 0.4 meter in cross section and 0.7 meter high.





Range marks 43 and 44, on the west shore of Quoddy Roads, Passamaquoddy Bay, ranging boundary course 12-13



Range marks 45 and 46, on Campobello Island, Passamaquoddy Bay, ranging boundary course 13-14





Cross-range marks 47 and 48, on Liberty Point, Campobello Island, Passamaquoddy Bay, cross-ranging boundary turning point 13

Acheron Tablet (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook at the head of a small island at the foot of a long pool in the first elbow or turn of the brook to the north below Poplar Mountain. The station is on a bare black rock 1.2 meters long, 0.7 meter wide, and 0.3 meter above the water.

Station mark: A bronze disk set in a hole drilled in the rock and surrounded by a triangle cut in the rock.

Dam Tablet (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 46 meters below the lower, or Eaton, dam and about three-eighths mile below Poplar Mountain. The station is at the edge of the water on a block of gneiss, 2.0 meters long, 1.1 meters wide parallel to the water, and 0.5 meter high.

Station mark: A bronze disk set in a drill hole in the rock and surrounded by a triangle cut in the rock.

Chub Tablet (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 300 meters below the lower, or Eaton, dam, and about 2 miles above the mouth of Greenleaf Brook. The station is in the woods, back about 30 meters from the stream.

Station mark: A bronze disk set in a drill hole in a grayish-blue stone whose exposed dimensions are 1.0 by 0.8 by 0.26 meter high. The disk is surrounded by a triangle cut in the rock.

Sucker Tablet (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, about three-eighths mile below the lower, or Eaton, dam and a little less than 2 miles above the mouth of Green-leaf Brook. The station is on the edge of the bank of the brook about 30 meters below a small but decided oxbow bend of the brook.

Station mark: A bronze disk set in a drill hole in a rock 2.5 by 1.7 meters in cross section and 0.75 meter high. The disk is surrounded by a triangle cut in the rock.

**Pickerel Tablet** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 134 miles above the mouth of Greenleaf Brook. The station is on a rock whose exposed cross section is about 0.8 by 1 meter and 0.15 meter above the surface of the ground. It is about 20 meters west of the brook.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

**Perch Tablet** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 134 miles above the mouth of Greenleaf Brook. This station is on the same rock as reference monument 11, and is 0.8 meter to the east of that station. The rock is 1.5 meters from the edge of the water and measures 2.3 by 1.7 by 0.9 meter.

Station mark: A bronze disk set in a drill hole in the rock. A triangle is cut in the rock near it.

**Trout Tablet** (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, 15% miles above the mouth of Greenleaf Brook on a sharp right-angle bend of the brook, the vertex of the angle pointing south, The station is at the edge of the water in the stream on a rock 0.8 by 0.6 meter and 0.6 meter above the water level.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

**Camp Collier Mark** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 1.6 miles above the mouth of Greenleaf Brook, 60 meters below a sharp-angle turn, the vertex of the angle pointing north. It is in the middle of the stream. The station is on a rock about 0.4 by 0.9 meter, nearly level with the water.

Station mark: A drill hole surrounded by a triangle cut in the rock.

Twist Tablet (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 1½ miles above the mouth of Greenleaf Brook on a rock in the water about 3 meters from the United States shore. The rock is about 0.9 by 0.7 meter in cross section, is about level with the water, and is dark in color. Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

Curve Tablet (Maine, Aroostook County; New Brunswick, York County; J. E. McGrath, 1912; 1921).— On Monument Brook, about 1½ miles above the mouth of Greenleaf Brook, in the middle of the stream on a dark-colored rock that is 1.3 meters long, 1.0 meter wide, and nearly level with the water. The station is turning point 469 of the international boundary.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

Hornet 2 Tablet (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 1.4 miles above the mouth of Greenleaf Brook in a right-angle bend of the brook where the course of the stream turns from southwest to southeast. The station is about 46 meters due east from the point in the angle of the bend and about 18 meters south of the brook at its nearest point. At this bend of the brook there is a noticeable pool with a sharp indentation in the United States shore and a small stream flowing in from the northwest.

Station mark: A bronze disk set in a hole surrounded by a triangle cut in the top of a large gray-blue rock.

**Spring Tablet** (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 1.3 miles above the mouth of Greenleaf Brook, on a large light-colored rock at the water's edge. Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

**Road** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 1.3 miles above the mouth of Greenleaf Brook, at the river end of a wood road that extends to the town of Amity. The station is on the north bank 1.6 meters from the water's edge.

Station mark: A bronze disk set in the top of a granite post which is 20 centimeters square and 76 centimeters long and is set in a concrete foundation.

Ley (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 1¼ mile above the mouth of Greenleaf Brook and about 3.5 meters south from the water line of the stream.

Station mark: The subsurface mark is a half-pint bottle filled with sand placed 90 centimeters below the surface of the ground. The surface mark is a bronze disk set in the top of a granite post 20 centimeters square and 76 centimeters long set and centered over the subsurface mark and nearly flush with the ground. The letters "U. S. R. M." are carved, one letter on each of the four faces of the post.

**Dan** (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, a little more than a mile above the mouth of Greenleaf Brook, abreast of a little cove on the Canadian shore. The station is about 4 meters back from the water's edge.

Station mark: The subsurface mark is a pint bottle filled with sand placed 76 centimeters below the surface of the ground. The surface mark is a bronze disk set in the top of a granite post 20 centimeters square and 76 centimeters long, centered over the subsurface mark. On the vertical faces of the post are cut the letters "U. S. C. B.," one letter on each face.

Joe (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 0.9 mile above the mouth of Greenleaf Brook and about 15 meters east of the brook. The station is on the bend of the brook about 76 meters above a large slough or backwater coming in from the United States side.

Station mark: The subsurface mark is a pint bottle filled with sand set 76 centimeters below the surface of the ground. The surface mark is a bronze disk set and centered over the subsurface mark in a granite post 20 centimeters square and 76 centimeters long. On the vertical faces of the post are cut the letters "U.S.C.B.," one letter on each face.

Tom (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, about fourfifths mile above the mouth of Greenleaf Brook. The station is about 23 meters east of the brook, just below a slough or backwater coming in from the United States side.

Station mark: The subsurface mark is a 2-ounce Sal Hepatica bottle filled with sand and set 76 centimeters below the surface of the ground. The surface mark is a bronze disk set and centered over the subsurface mark in a granite post 20 centimeters square and 76 centimeters long. On the vertical faces of the post are cut the letters "U. S. C. B.," one letter on each face.

**Phil** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook at the edge of the stream, three-fourths mile above the mouth of Greenleaf Brook.

Station mark: The subsurface mark is a pint bottle filled with sand set 86 centimeters below the level of the ground. The surface mark is a bronze disk set and centered over the subsurface mark in a granite post 20 centimeters square and 76 centimeters long. On the vertical faces of the post are cut the letters "U. S. C. B.," one letter on each face of the post.

**Pete** (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook near the water, about three-fifths mile above the mouth of Greenleaf Brook and at the first bend above Drybush Cove.

Station mark: A bronze disk set in the top of a granite post 20 centimeters square and 76 centimeters long. The letters "U.S.C.B." are cut in the vertical faces of the post, one letter in each face. The post is set in a concrete base which rests on rock 76 centimeters below the surface of the ground.

Drybush Tablet (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On one of two rocks in the stream at Drybush Cove of Monument Brook, two-fifths mile above the mouth of Greenleaf Brook.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

Leaf (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 53 meters west of the brook and about one-eighth mile above the mouth of Greenleaf Brook, on a tiny knoll in the midst of the swamp.

Station mark: The subsurface mark is a pint bottle filled with sand set about 76 centimeters below the surface of the ground. The surface mark is a bronze disk set and centered over the subsurface mark in a granite post 20 centimeters square and 76 centimeters long. The letters "U.S.C.B." are cut in the vertical faces of the post, one letter in each face.

**Bockmaple Tablet** (Maine, Aroostook County; J. E. McGrath, 1912).—On Monument Brook, about 68 meters south of the brook and about one-eighth mile below the mouth of Greenleaf Brook. The station is on a dry knoll.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in a granite rock whose approximate dimensions are: Length, 2.2 meters; width, 1.8 meters; height, 1.3 meters.

Hardwood Tablet (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On a big bend of Monument Brook, about one-half mile down the brook from the mouth of Greenleaf Brook. The station is about 15 meters from the stream on the eastern edge or point of a hardwood knoll of some prominence, known as Hardwood Point.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in a large rock whose exposed dimensions are 2.2 by 1.7 meters.

Moose Tablet (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 60 meters back from the stream and about three-fifths mile below the mouth of Greenleaf Brook on the outer end of the first point below Hardwood Point. The station is on a rock approximately 0.6 by 1.2 meters in cross section and 0.4 meter high.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

Ness Tablet (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 30 meters back from the stream, about 175 meters below the Eastern Maine Railroad, and three-fourths mile below the mouth of Greenleaf Brook. The station is in a granite block whose exposed dimensions are: Length, 0.9 meter; width, 0.5 meter; height, 0.5 meter.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

**Birch Tablet** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On the bank of Monument Brook, about 2 miles above North Lake. The station is south 66° 30′ west, 15.6 meters from reference monument 16. One of the old "Collier" lumber camps is on the Canadian shore opposite the station.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in a gray granite rock whose exposed surface is 0.3 by 0.6 meter.

North Stump (New Brunswick, York County; H. C. O. Clarke, 1917; 1921).—On Monument Brook, across the brook from, and south 69° 22′ east, 79.4 meters from reference monument 16. (See description of Birch Tablet, above.)

Station mark: A large nail driven in the top of a large pine stump.

**Baspberry** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook on the bank at the foot of the lower edge of a "hogback" or low ridge that parallels the brook about 1.7 miles above North Lake. The station is at the lower end of an old clearing where a logging camp once stood.

Station mark: The subsurface mark is a pint bottle filled with sand set 68 centimeters below the surface of the ground. The surface mark is a bronze disk set and centered over the subsurface mark in a granite post 20 centimeters square and 76 centimeters long. The letters "U. S. C. B." are cut in the vertical faces of the post, one letter in each face.

**Cropley** (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, 1½ miles above North Lake, just above the old Cropley Landing. An old road runs to the river between the station and the landing, giving access to the abandoned Cropley farm.

Station mark: A bronze disk set in the top of a granite post 20 centimeters square and 76 centimeters long, firmly planted in the ground. The letters "U. S. C. B." are cut on the vertical faces of the post, one letter on each face.

Landing Tablet (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, 1.4 miles above North Lake, near the lower end of an old clearing at what is called Cropley Landing.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in a granite bowlder which is about 1 meter long, 0.4 meter wide, and 0.3 meter high as exposed above the surface of the ground.

Cedar (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, 1¼ miles above North Lake, on the first point on the United States shore above "The Narrows."

Station mark: The subsurface mark is a pint bottle filled with sand set 90 centimeters below the surface of the ground. The surface mark is a bronze disk set and centered over the subsurface mark in a granite post 20 centimeters square and 76 centimeters long. The letters "U.S.C.B." are cut in the vertical faces of the post, one letter in each face.

Narrows Tablet (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, a little more than 1 mile above North Lake. The station is north 55° west, 8.6 meters from reference monument 18.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the surface of a granite rock whose exposed surface is 0.6 by 0.8 meter.

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Fawn (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about two-fifths mile, above North Lake, on the outer end of a tree-covered point extending out toward the river from the firm land. The station is about 68 meters from the brook at the nearest point.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long, set in a concrete base. The letters "U. S. R. M." are cut on the vertical faces of the post, one letter on each face.

Calf (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, about one-half mile above North Lake, on a point in the marsh a little above the general level, about 45 meters from the stream. Station mark: A bronze disk set in a granite post 15 centimeters square and 60 centimeters long, set in a concrete base. The letters "U. S. R. M." are cut in the vertical faces of the post, one letter in each face.

**Deer** (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On Monument Brook, about 150 meters from the brook and about one-fourth mile from North Lake. The station is at the edge of the swamp 25 meters from a "horseback" or natural dike.

Station mark: A bronze disk set in the top of a granite post 20 centimeters square and 90 centimeters long, set firmly in the ground. The letters "U. S. C. B." are cut in the vertical faces of the post, one letter in each face. A triangle cut in a blaze facing the station on a birch tree 60 centimeters in diameter is 15.12 meters distant from the station, and a second reference mark consisting of a drill hole surrounded by a triangle cut in a wedge-shaped granite bowlder is south 23° west, 15.8 meters from the station.

Deer Mark.—This is the second reference mark for station "Deer." (See above.)

Doe (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On Monument Brook, 0.2 mile from North Lake and about 35 meters from the brook.

Station mark: A bronze disk set in the top of a granite post 20 centimeters square and 90 centimeters long firmly set in the ground. The reference mark is a drill hole surrounded by a triangle cut in a block of granite whose exposed surface is 1.2 meters by 0.9 meter, which bears south  $35^{\circ}$  east, 14.3 meters from the station. This station could not be found in 1921, but the reference mark (called "Doe Mark" in table of positions) was found.

Wall (Maine, Aroostook County; J. E. McGrath, 1912; 1921).—On the west shore of North Lake, about 240 meters south of the mouth of Monument Brook, on a narrow dike which is about 1 meter wide at the station. The dike is locally known as the "Sea Wall."

Station mark: The subsurface mark is a pint bottle filled with sand set 82 centimeters below the surface of the ground. The surface mark is a bronze disk set and centered over the subsurface mark in a drill hole in the top of a granite post 20 centimeters square and 90 centimeters long. The letters "U. S. C. B." are cut in the vertical faces of the post, one letter in each face.

Buck (New Brunswick, York County; N. W. Smith, 1921).—On Monument Brook, about 300 meters above North Lake. The station is near station "Doe." (See above.)

Station mark: A bronze disk set in a drill hole in the only high rock along this part of the stream.

Gull Rock 2 (Maine, Aroostook County; J. E. McGrath, 1911; 1912).—On the rock of that name in North Lake. The rock is about 190 meters offshore, about halfway between the mouth of Monument Brook and The Thoroughfare, the outlet of the lake. The surface of the rock measures approximately 6 by 12 meters, and it rises 1.5 meters above low-water mark. It is probably submerged at extreme high water.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the summit of the rock.

**Picnic** (New Brunswick, York County; J. E. McGrath, 1912).—On Sam Foster's Point at the northeast entrance of Moxon Cove of North Lake, on a flat-topped rock on the shore a little above the water level. A huge bowlder whose top is at least 2 meters higher lies just east of the station. This bowlder projects out from the shore line, and a cross surrounded by a triangle cut in its slanting top bears north 89° 09' east, 5.3 meters from the station. Two other large bowlders are in the water near and northeast of the station.

Station mark: A bronze disk marked "U. S. & C. B. Survey" leaded in a drill hole in the rock. Three holes are drilled in the rock around the station mark for the purpose of fastening eyebolts for signal guys.

**Boulders** (New Brunswick, York County; J. E. McGrath, 1912; 1917).—On the end of a narrow tonguelike peninsula 200 meters east of The Thoroughfare, the outlet of North Lake. The station is north 25° 08′ west, 5.3 meters from reference monument 22.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole surrounded by a triangle cut in a flat-topped gray-granite bowlder. Three holes are drilled in the rock around the station mark for the purposes of fastening eyebolts for signal guys.

Watson (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On the Canadian point at The Thoroughfare, the outlet of North Lake, on the northern and larger of two large bowlders.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole surrounded by a triangle cut in the bowlder.

Wet (New Brunswick, York County; H. C. O. Clarke, 1917).—On the Canadian point at The Thoroughfare, the outlet of North Lake. The station is on a large bowlder which is surrounded by water at normal level.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole in the rock.

**Piedra** (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On the Canadian shore of The Thoroughfare, just below the first cove below the outlet of North Lake. The station is on a great block of gray granite just opposite a wooded point on the United States shore and is 130 meters from the North Lake outlet. The size of the rock easily identifies the station.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole in the rock.

**Difficile** (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On the south shore of The Thoroughfare, about midway between Grand and North Lakes. The station is on the first large bowlder in the water on the south shore after passing the swamp above Fox's Mill in going from Grand Lake to North Lake.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole surrounded by a triangle cut in the rock.

Logs (Maine, Aroostook County; J. E. McGrath, 1912; 1917).—On the north shore of The Thoroughfare at the upper end of a little clearing about halfway between Grand and North Lakes.

Station mark: The subsurface mark is a 2-ounce bottle filled with sand placed 80 centimeters below the surface of the ground, with a few scraps of old iron over it. The surface mark is a bronze disk marked "U. S. & C. B. Survey" set and centered over the subsurface mark in the top of a granite post 20 centimeters square and 90 centimeters long. The letters "U. S. C. B." are cut in the vertical faces of the post, one letter in each face.

**Packard** (Maine, Aroostook County; J. E. McGrath, 1911; 1917).—On the point of land made by the north shore of Grand Lake and the west bank of The Thoroughfare. The station is on a lone bowlder about 3 by 3 meters in cross section and 0.8 meter high, in an uninclosed clearing on the north side of the road leading west from The Thoroughfare. The rock is about 25 meters from the road and about 100 meters from the bridge across The Thoroughfare.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock. A cross surrounded by a triangle cut on the surface of a coarse-grained stone, whose exposed surface is about 1 by 1 meter and whose height is 0.3 meter, bears south 80° 29' west, 31.93 meters distant. The reference mark is about 12 meters from the middle of the road.

Thoroughfare (Maine, Aroostook County; J. E. McGrath, 1911).—At the western end of The Thoroughfare bridge near Grand Lake, 4.8 meters from the southwest corner of the Watson warehouse and 15 meters from the approach of the bridge.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the top of a granite bowlder whose exposed dimensions are about 1.4 by 1.1 meters in cross section and 0.7 meter high.

Fox (New Brunswick, York County; J. E. McGrath, 1912; 1921).—On the Canadian bank of The Thoroughfare, about 5 meters from the water, about 4 meters north of the roadway from the bridge across The Thoroughfare, and about 10 meters from Fox's sawmill.

Station mark: A bronze disk set in a drill hole in the top of an irregularly shaped blue stone whose exposed dimensions are 1.1 by 0.7 meters in cross section and 0.1 meter high.

**Bubar 2** (Maine, Aroostook County; J. E. McGrath, 1911; 1917).—About  $1\frac{1}{8}$  miles west of the mouth of The Thoroughfare and on the north side of the road leading west from the bridge. The station is in an open field 3 meters inside the road fence and 21 meters west of a subdivision fence. The stone used to mark the station is too small to be stable and should be checked up with the reference mark before using.

Station mark: A drill hole in a small trapezoidal stone. The reference mark is a bronze disk set in a drill hole surrounded by a triangle cut in the top of a bowlder that measures 1.2 by 0.8 by 0.4 meter. The reference mark bears south  $15^{\circ}$  06' west, 28.055 meters from the station, and is 2.2 meters north of the south fence of the roadway.

Bubar 2 Tablet.—This is the reference mark for Bubar 2. (See above.)

North Point (New Brunswick, York County; J. E. McGrath, 1911).—On the upper end of the most northern point of the large Canadian peninsula in the northern part of Grand Lake. This point is known as North Point. The station is above high-water mark on one of the largest bowlders of those grouped around the point.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock. A cross surrounded by a triangle cut in the sloping face of a large granite bowlder bears south  $0^{\circ}$  43' west, 7.52 meters distant.

**Caribou** (Maine, Aroostook County; J. E. McGrath, 1911; 1917).—On Caribou Point in the northern part of Grand Lake. The station is on a small granite bowlder nearly flush with the ground just south of the most eastern extremity of the point.

Station mark: No record was made of the character of the mark. A cross surrounded by a triangle cut in the sloping face of a coarse conglomerate rock, nearly flush with the ground, bears south 39° 36' west, 5.57 meters distant from the station mark. There is an eyebolt set in a drill hole in the reference-mark rock.

Medselene Tablet (Maine, Aroostook County; J. E. McGrath, 1911).—On the extreme southeastern point of Half Moon Island in Grand Lake.

Station mark: A bronze disk set in a drill hole in a granite bowlder that is 2.4 meters long, 1.4 meters wide, and 1.1 meters high. It is covered by the lake in extreme high water.

Cedar Point 2 (Maine, Aroostook County; J. E. McGrath, 1911; 1917).—On Cedar Point, southwest of Round Island, on the west shore of Grand Lake. The station is about 4 meters back in the woods.

Station mark: A bronze disk set in a drill hole in a small bowlder. A cross surrounded by a triangle cut in the upper end of a bowlder 1.8 meters long by 1.5 meters wide bears south 10° 44′ east, 7.39 meters distant.

York (New Brunswick, York County; J. E. McGrath, 1911).—At the outer or southern point formed by a small sandy cove on the east shore of Grand Lake, opposite to and a little south of Half Moon Island. The station is on a large square granite rock about 4 meters inside the line of vegetation on the bank.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock. A cross surrounded by a triangle cut on the sloping face of a bowlder, which is 3.7 meters long, 2.2 meters wide, and 2.4 meters high, bears north 74° 00' east, 8.20 meters distant; and a cross surrounded by a triangle cut in the top of an irregularly shaped bowlder, whose length is 4.3 meters, breadth 3.0 meters, and height 2.2 meters bears south  $26^{\circ}$  32' west, 3.62 meters distant.

**Piney Point** (Maine, Aroostook County; J. E. McGrath, 1911; 1917).—On Piney Point on the west shore of Grand Lake, just opposite Burnt Island. The station is on a bowlder that is 3.7 by 3.5 meters in cross section and 2.0 meters high. This bowlder is 15 meters back from the line of vegetation along the shore and about 25 meters back from the first line of bowlders whose tops are above high-water mark.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the top of the bowlder. A cross surrounded by a triangle cut in the upper southeast corner of a bowlder 2.6 by 2.1 meters in cross section and 2.2 meters in height bears north  $13^{\circ} 47'$  east, 5.67 meters distant.

Work (Maine, Aroostook County; J. E. McGrath, 1911; 1917).—On the most southeastern point of the peninsula between Work Cove and Little River Cove of Grand Lake. The point of the peninsula is known as Norway Point. The station is on a bowlder which is 5 meters long, 4 meters wide, and 2.5 meters high and is the largest bowlder outside the tree line on the point.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

Little River Point (Maine, Aroostook County; J. E. McGrath, 1911).—On the most southeastern point of the peninsula between Little River Cove and Dark Cove of Grand Lake. The peninsula ends in a double point with a small cove between the two parts. The eastern point, on which the station is located, is called Little River Point; the western point across the cove is known as Birch Point. The station is on a distinctive triangular bowlder whose length is 3.1 meters, mean width 1.5 meters, and height 1.4 meters and is just outside the tree line on the point.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

**Greenland Point** (Maine, Washington County; J. E. McGrath, 1911: 1917).—On the rocky northern point of Greenland Island in Grand Lake. The station is on a sloping bowlder about 5.6 meters across in either direction and about 2 meters high at its highest point. A bowlder at the upper end of the island is about 40 meters distant.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

**Haley** (New Brunswick, York County; J. E. McGrath, 1911).—On Haley Point in Grand Lake. The peninsula which forms the western side of Haley Cove, and is known as Haley Point, terminates at the north in two distinct points with a small cove between them. The station is on the western point of the two, on a flat-topped rock 5.5 meters long, 4.0 meters wide, and about 1 meter high. It is about 145 meters northwest from the center of the mainland of the upper end of the point. There are other bowlders on the point outside of the station bowlder.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

**Tongue** (Maine, Washington County; J. E. McGrath, 1911; 1917).—On a rock in the water off the long narrow point called Tongue Point, or "Tongue of the Arm," in Grand Lake. The rock is about 4 meters long, 3 meters wide, and 2 meters high.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

Narrows (Maine, Washington County; J. E. McGrath, 1911).—This station on the north end of Manley Island, Grand Lake, was destroyed by blasting in 1918.

Camp (Maine, Washington County; H. C. O. Clarke, 1917).—On the north side of the center of Foster Island in Grand Lake, just off Forest City, and about 28.4 meters south of reference monument 55. Station mark: A bronze disk set in a drill hole in solid rock.

Field (New Brunswick, York County; H. C. O. Clarke, 1917).—In the northeast corner of a field in the northwest part of the village of Forest City. The station is on the top of a granite field bowlder just south of the road leading to Clark's sawmill and about 200 meters west of the main road leading into the village from the north.

Station mark: Not described.

Brabazon No. 2 (New Brunswick, York County; A. J. Brabazon, 1912).—In Forest City on the south edge of the Mud Lake Road, about 67 meters west along the road from its intersection with the main road leading into Forest City from the north.

Station mark: A bronze disk set in a drill hole in a rock that projects a little above the ground.

Brabazon No. 1 (New Brunswick, York County; A. J. Brabazon, 1912).—In Forest City on the north side of the road leading to Mud Lake and about 336 meters east along the road from its intersection with the main road leading into Forest City from the north.

Station mark: A bronze disk set in a drill hole in a rock.

City (New Brunswick, York County; A. J. Brabazon, 1912).—On the west shore of Mud Lake, about 15 meters from the water's edge and 14.8 meters south of the south fence line of the road from Forest City, New Brunswick, to Mud Lake.

Station mark: A copper disk set in a drill hole in a small rock embedded in the ground with the top projecting 0.2 meter above the surface of the ground. A cross surrounded by a triangle cut in a rock 0.4 meter high bears south 14.02 meters distant; a cross surrounded by a triangle cut in a rock flush with the ground is inland 2.94 meters distant; a cross surrounded by a triangle cut in a round-topped rock 1.5 meters high is lakeward 26.29 meters distant.

**Tassel** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the prominent open ridge southeast of Forest City and about 600 meters southeast of the international highway bridge in Forest City.

Station mark: This station is known to be marked, but the description of the mark has been lost. The mark is presumed to be a bronze or copper disk set in a drill hole in a rock, as Mr. Brabazon's stations were usually so marked.

Forest City Baptist Church Spire (New Brunswick, York County; H. C. O. Clarke, 1917).—In Forest City, New Brunswick. The station is the white spire of the Baptist Church, which stands on the west side of the highway leading north from the international highway bridge across the river between the two villages of Forest City. The church is about 180 meters north of the bridge.

Station mark: The point or tip of the spire.

Gould (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the west shore of Mud Lake, about one-half mile north of Forest City, on a prominent rounded point of the shore line. The point is wooded and just north of a large field of stumps. The station is on a rock 2 by 1.4 meters on top and 1.2 meters high and is in the woods about 8 meters back from the shore line.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut on a small low rock 2.32 meters lakeward from the station. A cross within a triangle is cut on a low rock 2.72 meters directly inland from the station. The station is 0.21 meter south of a line drawn between the two crosses. Another cross within a triangle is cut on a rock 1 meter high, 21.79 meters north of the station.

**Dry** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the east shore of Mud Lake, about three-fourths mile northeast of Forest City, at the foot of a steep bank just south of a prominent point of the shore line. The station is on a flat-topped rock 1.1 by 1.2 meters in cross section at the edge of a clump of pines.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut on the largest of a pile of rocks 3.47 meters lakeward from the station. Another cross within a triangle is cut on a low bowlder on the shore 15.70 meters north of the station.

**Stag** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the east shore of Mud Lake, about 0.8 mile north of Forest City, on the point just north of the largest bay on the United States side of the lake. The shore is very flat, with many bowlders strewn over it, and is sparsely covered with small trees.

Station mark: A copper disk set in a drill hole in a large irregularly shaped rock. A cross within a triangle cut in a low flat rock is 5.29 meters lakeward from the station. A cross within a triangle is cut on a low round-topped rock 8.64 meters north of the station. The station is 0.85 meter east of a line drawn between these two crosses. Another cross within a triangle is cut on a low round-topped rock 7.38 meters directly inland from the station.

South Base (New Brunswick, York County; A. J. Brabazon, 1912).—On the west shore of Mud Lake, about 0.7 mile north of Forest City. The station is on a rock entirely surrounded by trees. It is about 15 meters from the shore and 55 meters south of the clearing of Harvey Boone's farm.

Station mark: A copper disk set in a drill hole in a rock 2.4 by 1.5 meters in cross section and 0.7 meter high. A cross within a triangle is cut on a large bowlder 5.31 meters directly inland from the station. A cross within a triangle is cut on each of two low rocks, respectively, 3.44 and 2.71 meters north of the station.

North Base (New Brunswick, York County; A. J. Brabazon, 1912).—On the west shore of Mud Lake, about 0.9 mile north of Forest City. The station is on a large white rock 1.8 meters high at the lake end of a crooked fence on the farm of Harvey Boone and is 83 meters south of the line fence between the farms of Harvey Boone and George Boone.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut on a small rock near the fence 5.25 meters inland from the station. Another cross within a triangle is cut in a rock in line with the fence 13.70 meters lakeward from the station. The station is 1.89 meters south of the line joining these two crosses. A cross within a triangle is cut on a rock 7.28 meters south of the station.

**Butter** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the east shore of Mud Lake, about 1 mile north of Forest City. The station is on the first rise of a ledge of rock about 7.6 meters high that is quite noticeable from the south and is opposite a large red barn on the opposite side of the lake.

Station mark: A copper disk set in a drill hole in the rock ledge. A cross within a triangle is cut in the rock 8.69 meters inland from the station. A cross within a triangle is cut in the rock 3.29 meters directly lakeward from the station. The station is 0.77 meter north of the line joining these two crosses. A cross within a triangle is cut in the rock 6.95 meters inland and south of the station.

Milk (New Brunswick, York County; A. J. Brabazon, 1912).—On the west side of Mud Lake, about 1 mile north of Forest City and at the lower end of Harvey Boone's farm. The station is on a round topped rock firmly embedded in the ground and projecting about 0.45 meter above the surface and is in the woods about 6 meters from the shore.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle cut in a bowlder at the edge of the field is 9.38 meters directly inland from the station. A cross within a triangle is cut in a bowlder 8.03 meters lakeward from the station. The station is 3.35 meters north of the line joining these two crosses. Another cross within a triangle is cut on a low flat bowlder 5.67 meters south of the station.

Gib (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the east shore of Mud Lake at the narrow section of the lake, about 1.3 miles north of Forest City. The station is at the shore line on a rock that is split on the south side, is about 5 meters by 3.5 meters in cross section and 2 meters high.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a bowlder 6.60 meters northward and lakeward from the station. A cross within a triangle is cut on the inside part of a split rock on the tree line 11.33 meters south of the station. The station is 2.15 meters east of the line joining these crosses. Another cross within a triangle is cut in a low rock 3.23 meters inland from the station.

**Baldy** (New Brunswick, York County; A. J. Brabazon, 1912).—On the west shore of Mud Lake, about the middle of the narrow section of the lake, about 1.3 miles north of Forest City. The station is at the tree line on a low triangular rock whose sides are, respectively, 2, 3, and 2.4 meters.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut on a peaked rock 6.07 meters lakeward from the station. A cross within a triangle is cut on a low round-topped rock 4.97 meters shoreward and north of the station. The station is 0.7 meter south of the line joining these two crosses. Another cross cut in a low flat rock is 5.09 meters directly shoreward from the station.

Narrow (Maine, Washington County; A. J. Brabazon, 1912).—On the east shore of Mud Lake, about 1.5 miles north of Forest City, at the narrowest part of the lake. The station is about 6 meters from the tree line on a rock 3.5 by 1.5 meters in cross section and 1.2 meters high.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut on a large peaked rock 2 meters high, 8.78 meters north of the station. A cross within a triangle is cut in a rock 3.69 meters lakeward from the station. A cross is cut in a low triangular rock 3.50 meters landward from the station. The station is 0.40 meter north of the line joining the last two crosses.

Way (New Brunswick, York County; A. J. Brabazon, 1912).—On the west side of Mud Lake, about 1.5 miles north of Forest City, and at the narrowest part of the lake. The station is on a rock about 3.5 by 3.5 meters at its widest part and 1.2 meters high.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in the next rock lakeward 3.67 meters from the station. A cross within a triangle is cut in the next rock northward 3.54 meters from the station. Another cross within a triangle is cut on a large rock 1.5 meters high and on the tree line 10.34 meters to the south of the station. The station is 1.74 meters west of the line joining these last two crosses.

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**Pemb** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the east shore of Mud Lake, about 400 meters south of the outlet of the lake. The station is on the edge of the pine bluff on the first point just south of the outlet and is on a rock about 2 meters long, with an average width of 1.2 meters and a height of 1.2 meters.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut on each of two rocks to the south of the station; the one farther inland is 15.15 meters from the station; the other is 6.55 meters from the station. Another cross within a triangle is cut in a rock in the woods 6.75 meters north of the station. The station is 2.00 meters east of the line joining the last two crosses.

**Ton** (New Brunswick, York County; A. J. Brabazon, 1912).—On the west side of Mud Lake, about 500 meters due southwest of the outlet of the lake. The station is on a rock about 12 meters from the tree line and is opposite the pine bluff on the east shore just south of the dam at the outlet of the lake. The rock is 5.8 by 3 meters, sloping toward the south, and is 1.2 meters high at the north side.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 4.42 meters to the north of the station. Another cross within a triangle is cut in a rock 7.04 meters north by west from the station.

Oldgate (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the east shore of Mud Lake, just above and north of the dam at the outlet of the lake. The station is on a rock 2.7 meters high, with a flat triangular top about 3.3 meters on each side. The distance from the station to the dam at a point 26 meters north of the gate is 43.74 meters.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in the station rock 1.87 meters north of the station mark. A similar mark is cut in a rock 13.52 meters upstream from the station.

**Green** (New Brunswick, York County; A. J. Brabazon, 1912).—On the west shore of Mud Lake, opposite the dam at the outlet of the lake. The station is about 10.5 meters from the timber line, on the largest rock in the vicinity. The rock is triangular in shape, with sides 3.0, 2.1, and 2.6 meters, respectively, and is 1.2 meters high.

Station mark: A bronze disk set in a drill hole in the rock. Crosses within triangles are cut on two rocks west of the station, one at a distance of 16.94 meters and the other at a distance of 12.67 meters from the station.

**Driver** (New Brunswick, York County; A. J. Brabazon, 1912).—On the north bank of the stream connecting Mud and Spednik Lakes, about 180 meters below the dam at the outlet of Mud Lake. The station is on a ledge of rock that rises gently from the river and is 28.8 meters perpendicularly distant from the wing dam at a point 2.4 meters from its outer and lower end.

Station mark: A copper disk set in a drill hole in the ledge. Between the wing dam and the station two crosses within triangles are cut in the ledge; the more eastern one is 0.91 meter distant, and the other is 3.24 meters distant from the station. There are two drill holes in the ledge northwest of the station. The more northern one is one-half inch deep and 4.26 meters from the station. The other is 3 inches deep and is 3.23 meters from the station.

**Rapids** (Maine, Washington County; A. J. Brabazon, 1912).—On the south side of the stream connecting Mud and Spednik Lakes, about 140 meters below the dam at the outlet of Mud Lake. The station is on a rock about 1.5 meters high, about 3 meters offshore in the river bed, and about 21 meters from the wing dam.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a rock on shore 10.77 meters upstream from the station. A cross within a triangle is cut in a rock on shore 8.35 meters downstream from the station.

Salmon (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the northeast bank of the stream connecting Mud and Spednik Lakes, about 300 meters downstream from the dam at the outlet of Mud Lake. The station is on a large rock, near two other rocks, one on top of the other, the upper of which is 1.5 meters higher than the rock the station is on.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 1.1 meters high, 4.98 meters inland and upstream from the station. A cross within a triangle is cut in a rock 0.7 meter high, 4.95 meters inland and slightly downstream from the station. A cross within a triangle is cut in the rock referred to as being on top of another, 1.82 meters riverward from the station.

**Shade** (Maine, Washington County; A. J. Brabazon, 1912).—On the south side of the stream connecting Mud and Spednik Lakes and about 250 meters below the dam at the outlet of Mud Lake. The station is on a pointed rock projecting about one-third meter above the ground and is in a cleared spot about 12 by 12 meters in area.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a pointed rock about 0.6 meter high, 23.44 meters inland and slightly upstream from the station. A cross only is cut in a sharp rock projecting a half meter above the ground 12.77 meters inland and slightly downstream from the station.

**Mouth** (New Brunswick, York County; A. J. Brabazon, 1912).—On the eastern or Canadian side, near the mouth of the stream connecting Mud and Spednik Lakes. The station is on a rock about 2 meters long,  $1\frac{1}{2}$  meters wide, and one-half meter high, situated about 20 meters above the lower end of the path from Mud to Spednik Lake. A huge rock in the river just touching the shore is 17 meters from the station. A huge rock beside the path is 34 meters upstream from the station.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 1 meter high, 10.65 meters inland and east of the station. A cross within a triangle cut in a rock 0.6 meter high is 5.62 meters upstream from the station. A cross within a triangle is cut in a rock 1.5 meters high, 14.59 meters from the station on a line that passes between the other two crosses.

**Sockalexis** (Maine, Washington County; A. J. Brabazon, 1912).—On the west side of the bay of Spednik Lake into which the river from Mud Lake flows. The station is on a rock 3.3 meters long, 2.7 meters wide, and 1.2 meters high and is about 228 meters below the mouth of the river and 21 meters back in the woods from the shore. The bay is much narrower at the station than it is a short distance below.

Station mark: A bronze disk set in a drill hole in the rock. Two crosses within triangles are cut in rocks, one 3.55 meters downstream and inland from the station, and the other 4.57 meters inland and slightly upstream from the station.

**Bob** (New Brunswick, York County; A. J. Brabazon, 1912; 1917)—On the east side of the bay of Spednik Lake into which the river from Mud Lake flows, and on the bay side of the point on the north of the mouth of the bay. The station is on a rock 3.7 meters long, 3.4 meters wide, 1.5 meters high at the downstream end, and 0.5 meter high at the upstream end.

Station mark: A copper disk set in a drill hole in the rock. Two crosses within triangles are cut in the rock; one is lakeward 1.12 meters distant and the other is bayward 1.06 meters distant from the station mark.

**Nogo** (Maine, Washington County; A. J. Brabazon, 1912).—On the :rest side of the bay of Spednik Lake into which the river from Mud Lake flows. The station is about 500 meters north of the south end of the bay, on a rock 7.3 meters long, 6.7 meters wide, and 3 meters high. A line produced from the station over the highest rock on the islandlike part of the point at the mouth of the bay strikes Hamilton's cottage on the east shore of Pirate Cove.

Station mark: A copper disk set in a drill hole in the rock. There are three crosses within triangles cut in the rock. The first is uplake 1.58 meters, the second is downlake and inland 1.80 meters, and the third downlake and lakeward 2.58 meters from the station.

Halo (Maine, Washington County; A. J. Brabazon, 1912).—On the west shore of the bay of Spednik Lake into which the river from Mud Lake flows. The station is just oposite the mouth of the bay on a rock in the water 23 meters from the shore. The rock is 5.8 meters long, 5.5 meters wide, and 1.4 meters high.

Station mark: A cross cut in the rock.

**Hy-u** (Maine, Washington County; A. J. Brabazon, 1912).—On the point in Spednik Lake that forms the south side of the mouth of the bay into which the river from Mud Lake flows. The station is 24 meters back from the shore in the woods on a rock 2 meters wide, 3.5 meters long, and 1.5 meters high.

Station mark: A bronze disk set in a drill hole in the rock. Three crosses within triangles are cut in the rock at the following distances from the station: 0.73, 0.73, and 1.14 meters.

**Upper** (New Brunswick, York County; A. J. Brabazon, 1912).—In Spednik Lake, on the upper end of the first island outside of and below the entrance to the bay into which the river from Mud Lake flows. The island is about 1.4 miles north of Forest City Landing. The station is on a rock 4.5 meters long, 3.7 meters wide, and 0.6 meter high.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 8.40 meters downstream from the station. A cross within a triangle is cut in a rock 3.29 meters south, and a cross within a triangle is cut in a rock 6.66 meters west of the station.

**Duck** (Maine, Washington County; A. J. Brabazon, 1912).—On the west shore of Spednik Lake, 0.35 mile south of the entrance to the bay into which the river from Mud Lake flows and 1.15 miles north of Forest City Landing. The station is in the woods a short distance from the shore and is opposite the lower end of the timbered part of the first island above Forest City Landing.

Station mark: A copper disk set in a drill hole in a rock 2.1 meters long, 1.5 meters wide, and 0.9 meter high. A cross within a triangle is cut in a rock 6.34 meters downstream from the station. A cross is cut in a rock 2.62 meters lakeward from the station, and another similar mark is cut in a rock 2.81 meters inland from the station.

**Loose** (New Brunswick, York County; A. J. Brabazon, 1912).—On the east shore of Spednik Lake on the bend of the shore opposite Forest City Landing. The station is 4 meters back in the woods on a rock 1.7 meters long, 1.1 meters wide, and 0.3 meter high.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 3.69 meters south and lakeward from the station. A like mark is cut in a big rock 13.88 meters south and inland from the station, and another like mark is cut in a big rock 6.78 meters north and inland from the station.

**Orphan** (Maine, Washington County; A. J. Brabazon, 1912).—On the west shore of Spednik Lake on a small sharp point 0.3 mile below Forest City Landing. The station is on a rock 6.4 by 6.4 meters in cross section, 3 meters high at the southern side and 1.5 meters high at the northern side.

Station mark: A copper disk set in a drill hole in the rock. Two crosses within triangles are cut in the rock; one is 1.41 meters and the other is 2.94 meters from the station.

Jim (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the west shore of Spednik Lake, 1 mile below Forest City Landing. The station is at a little projecting curve of the shore opposite Current Island, on a rock 2.7 meters long, 2.1 meters wide, and 2.1 meters high. Two big rocks on the Canadian shore are visible from the station, one over the north end and the other over the south end of Current Island.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 6.89 meters north and inland from the station; a second like mark is cut in a rock 2.88 meters lakeward from the station; and a third like mark is cut in a rock 2.72 meters inland from the station.

None (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the east shore of Spednik Lake opposite the low rocky point at the upper end of Current Island.

Station mark: A cross cut in a rock 5.8 meters long, 5.8 meters wide, 3 meters high at the southern side and 1.5 meters high at the northern side.

**Byron** (Maine, Washington County; A. J. Brabazon, 1912).—On the west shore of Spednik Lake, 1.4 miles south of Forest City Landing, one-half mile below Current Island. The station is in the edge of the woods on a rock 5.2 meters long, 4.6 meters wide, 1.5 meters high on the lake side, and 0.6 meter high on the inland side.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in each of two high rocks inland from the station at distances of 12.01 and 8.60 meters, respectively. A like mark is cut in a lower rock 8.35 meters lakeward from the station.

Short (New Brunswick, York County; A. J. Brabazon, 1912).—On the east shore of Spednik Lake, about 100 meters below the lower end of Current Island.

Station mark: A copper disk set in a drill hole in a rock 3 meters long, 1.8 meters wide, and 1.2 meters high. A cross within a triangle is cut in a rock 1.83 meters north and lakeward from the station. A like cross is cut in a rock 3.74 meters north and inland from the station, and a third like mark is cut in a rock 4.46 meters south and inland from the station.

Shaw (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the west shore of Spednik Lake, about 12 meters back in the woods from the shore line, just north of the place where the lake narrows suddenly about 1½ miles above Spruce Mountain Cove.

Station mark: A copper disk set in a drill hole in a rock 2.4 meters long, 1.5 meters wide, and 1.1 meters high. A cross within a triangle is cut in a rock 3.47 meters upstream and inland from the station. A cross within a triangle is cut in a rock 4.98 meters south and inland from the station, and another like mark is cut in a rock 3.57 meters south and lakeward from the station.

**Creek** (Maine, Washington County; A. J. Brabazon, 1912).—On the west shore of Spednik Lake, abou 250 meters north of the north end of the long island that lies along the west shore at the entrance to Spruce Mountain Cove. A small creek enters the lake about 130 meters below the station. The station is on a rock 2.1 meters long, 1.8 meters wide, and 0.6 meter high. A sharp-topped rock 1.5 meters high stands beside and south of the station rock.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 4.33 meters north and inland from the station. A cross within a triangle is cut in a rock 5.93 meters north and lakeward from the station, and another like mark is cut in a rock 3.38 meters inland and south of the station.

**Crab** (New Brunswick, York County; A. J. Brabazon, 1912).—On the east shore of Spednik Lake, 0.45 mile north of Hinkley Point. McAllister Cove is 0.35 mile eastward across the point from the station. The station is on a rock 6 meters long, 4.6 meters wide, 3 meters high on the land side and sloping to the water on the lake side.

Station mark: A copper disk set in a drill hole in the rock. Three crosses within triangles are cut in the rock, respectively 1.55 meters upstream, 1.38 meters downstream, and 1.12 meters lakeward from the station mark.

**Hinkley** (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On Hinkley Point in Spednik Lake, about 15 meters back in the woods and a little above high-water mark.

Station mark: A copper disk set in the top of a bowlder about 0.7 by 0.6 by 0.4 meter in size placed in the ground with its top projecting about 15 centimeters. A cross within a triangle is cut in a rock 5.88 meters inland and east of the station. A cross within a triangle is cut in a rock 4.08 meters inland and west of the station, and a third like mark is cut in a rock 10.00 meters lakeward from the station.
Lyons (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the sharp prominent point of the west shore of Spednik Lake opposite the north end of Birch Island. There is a very large rock 15 meters lakeward from the station. A line from the station to the upper end of Birch Island passes 30 meters north of a small island in mid-channel.

Station mark: A bronze disk set in a drill hole in a rock 5.5 meters long, 4.3 meters wide, 3 meters high at its uplake side, and 1.2 meters high at its downlake side. Two crosses within triangles are cut in the rock; one is inland 1.24 meters, and the other is lakeward 1.23 meters from the station mark. A cross only is cut in the rock 1.16 meters uplake from station mark.

**Spingolly** (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the east shore of Spednik Lake at the entrance to McAllister Cove. The station is on a point that is flooded at high water and is north 72° east, a little more than 1,000 meters from Hinkley Point, and north 42° west, the same distance from the upper end of Birch Island. From the station, Hinkley Point is seen over the middle of the clump of trees on the upper end of the island in the entrance to McAllister Cove.

Station mark: A copper disk set in a drill hole in a ridge-shaped rock 4.1 meters long, 3 meters wide, and 1.5 meters high. Three crosses within triangles are cut in the rock; the first downstream and inland 1.38 meters, the second downstream and lakeward 1.66 meters, and the third lakeward 0.61 meter from the station mark.

**Upper End Birch Island** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the extreme upper end of Birch Island in Spednik Lake. The station is at the edge of the woods on a rock 1.5 meters long, 0.7 meter wide, and 0.9 meter high.

Station mark: A copper disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 4.85 meters inland from the station. A cross within a triangle is cut in a rock 1.09 meters east of the station, and another like mark is cut in a rock 2.03 meters west of the station.

**Pike** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the west shore of Spednik Lake at the entrance to Pike Cove, 1.25 miles from the head of the cove. The station is on a bowlder about 1.5 meters in cross section and 0.9 meter high.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 4.39 meters uplake and slightly inland from the station. A cross within a triangle is cut in a rock 4.54 meters down-lake and slightly inland from the station. A cross is cut in a rock 2.43 meters inland from the station.

Patterson (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the east shore of Spednik Lake, 1 mile below Birch Island Brook, one-half mile above Norway Point, beside a logging road 240 meters above Patterson's lumber camp.

Station mark: A bronze disk set in a drill hole in a bowlder 0.9 meter high. A cross within a triangle is cut in a rock 1.65 meters upstream from the station. A cross within a triangle is cut in a rock 1.28 meters downstream from the station.

Lower End Birch Island (Maine, Washington County; A. J. Brabazon, 1912).—On the lower end of Birch Island in Spednik Lake, 23 meters back in the woods from the lower end of the island, 21 meters from the clearing on the east side of the point, and 9 meters from the clearing on the west side. This portion of the island is separated from the main part of the island at high water. The station is on a ridge-shaped rock 5.5 meters long, 4.5 meters wide, and 1.2 meters high.

Station mark: A copper disk set in a drill hole in the ridge of the rock. Three crosses within triangles are cut in the rock; the first eastward 1.09 meters, the second upstream 0.90 meter, and the third downstream 1.08 meters from the station.

Bright (Maine, Washington County; A. J. Brabazon, 1912).—In Spednik Lake on a light-colored rock near the entrance to Pike Cove Brook and about 200 meters north of the headland that separates Pike Cove Brook and Pike Cove. The rock is entirely surrounded by water, and there is a large island about 120 meters north of it. Station mark: A cross cut in the rock.

**Norway** (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the east shore of Spednik Lake on Norway Point, on a light-colored rock about 2.5 meters long, 1.5 meters wide, and 1.4 meters high. The rock is lakeward and about 21 meters from a clump of trees cut off from shore at high water. The whole point is a mass of bowlders at low water and partially submerged at high water.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a low flat rock 2.96 meters inland and south of the station. A cross within a triangle is cut in a low flat rock at an unknown distance inland and north of the station. A third like mark is cut in a rock 1.5 meters high, 2.98 meters lakeward from the station.

**Garfield** (Maine, Washington County; A. J. Brabazon, 1912).—On the west shore of Spednik Lake, about 100 meters east of the point at the east side of the entrance to Robertson Cove. The station is on a rock 4.9 meters long, 3.7 meters wide, and 1.8 meters high.

Station mark: A copper disk set in a drill hole in the rock. Three crosses within triangles are cut in the rock; the first is slightly up the lake and inland, 1.66 meters; the second is up the lake and toward the shore 0.88 meter; and the third is down the lake, 1.23 meters from the station.

Dirty (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On a flat-topped rock in Spednik Lake, a short distance below Norway Point. The rock is entirely submerged at high water. The rock appears to be one of a reef of bowlders extending out from a point of the mainland in a straight line in a southeasterly direction. Two other little islands in the reef to the southeast are in line with the station.

Station mark: A cross cut in the rock.

**Robertson** (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the west shore of Spednik Lake near the "Five Islands." The station is on the most northern and eastern point of the square headland that lies just east of Robertson Cove. The station is on a rock about 3 by 3 meters in cross section and 1.5 meters high and is north 88° 25′ east, 69.4 meters from reference monument 97.

Station mark: A bronze disk set in a drill hole in the rock. Two holes are drilled in the station rock, the upper one 1.72 meters and the lower one 1.87 meters from the station mark. A hole is drilled in a rock 3.62 meters lakeward from the station.

Fog (New Brunswick, York County; A. J. Brabazon, 1912; 1917).—On the west shore of the peninsula that lies west of Sandy Bay Cove and about 1.25 miles uplake from Sandy Point at the tip of the peninsula. The station is opposite the largest and most eastern of the "Five Islands" on a rock about 4 by 5 meters in cross section and 1.5 meters high.

Station mark: A bronze disk set in a drill hole in the rock. Three holes are drilled in the station rock, one uplake 1.87 meters, one downlake 1.87 meters, and one inland 1.93 meters from the station.

Martin (Maine, Washington County; A. J. Brabazon, 1912).—On the west shore of Spednik Lake, fourfifths mile above Muncy Cove and two-thirds mile almost due west of Sandy Point. The station is on a rock 3.7 meters long, 2.4 meters wide, and 1 meter high.

Station mark: A bronze disk set in a drill hole in the rock.

Aurora (New Brunswick, York County; United States Coast and Geodetic Survey, 1890; A. J. Brabazon, 1912).—On the southwest shore of the peninsula in Spednik Lake that separates Sandy Bay Cove from the main body of the lake. The station is about 1¼ miles below "Five Islands" and three-fourths mile above Sandy Point, and is on a rock 2.3 meters long, 1.5 meters wide, and 0.8 meter high, the largest rock in the vicinity.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the rock.

Muncy (Maine, Washington County; A. J. Brabazon, 1912).—On the west shore of Spednik Lake, across the channel and a little uplake from Sandy Point, and four-fifths mile above Muncy Cove. The station is on a rock 6 meters long, 4 meters wide, and 2 meters high. Looking east from the station, the two points at the mouth of Mud Cove are in line.

Station mark: A bronze disk set in a drill hole in the rock.

Herb (New Brunswick, York County; A. J. Brabazon, 1912).—On the southwest shore of the peninsula in Spednik Lake that separates Sandy Bay Cove from the main body of the lake proper and about one-fourth mile above Sandy Point.

Station mark: A bronze disk set in a drill hole in a rock 2.7 meters long, 2.4 meters wide, 0.9 meter high.

**Cove** (Maine, Washington County; A. J. Brabazon, 1912).—On the west shore of Spednik Lake opposite Sandy Point in a little bay above the entrance to Muncy Cove.

Station mark: No record was made of the kind of mark.

Sandy (New Brunswick, York County; A. J. Brabazon, 1911; 1917).—On Sandy Point in Spednik Lake. The station is well out on the point on a rock 2.7 meters long, 1.8 meters wide, and 0.6 meter high. A line produced joining the station and the upper end of Hardwood Island crosses a hill inland and to the northward of Hardwood Island.

Station mark: A bronze disk set in a drill hole in the rock. Three crosses are cut in the rock, one uplake 81 centimeters, one downstream 32 centimeters, and one toward Hardwood Island 56 centimeters from the station mark.

Mud (Maine, Washington County; A. J. Brabazon, 1911; 1917).—On the point at the upper or western side of Mud Cove of Spednik Lake. The station is a little below high-water mark, in front of a cottage on the point, and is on a rock 1½ meters long, 1 meter wide, and one-half meter high.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 4.12 meters west of the station. Reference monument 101 is south 19° east, 20.0 meters from the station.

**Snake** (New Brunswick, York County; A. J. Brabazon, 1911).—On the lower end of a narrow reef of rocks and gravel in Spednik Lake, between Sandy Point and Hardwood Island.

Station mark: No record was made of the kind of mark.

Cleft (Maine, Washington County; A. J. Brabazon, 1911; 1921).—On the southwest shore of Spednik Lake, on the point, sometimes called Mud Point, at the east and lower side of the entrance to Mud Cove. The station

is on the lake side of the point some 200 meters downlake from the extreme end of the point. A line from the station to the point that projects farthest into the water on the west shore of Sandy Cove passes along the side of the biggest rock on Mud Point. This rock is about 180 meters uplake from the station. The station is on the southeast portion of a cleft rock. This portion of the rock is 4.9 meters long, 2.4 meters wide, and 2.1 meters high. Station mark: A bronze disk set in a drill hole in the rock.

Hardwood Island (New Brunswick, York County; A. J. Brabazon, 1911; 1917).—On Hardwood Island in Spednik Lake. The station is on the point at the west side of the little bay on the lower end of the island.

Station mark: A bronze disk set in a drill hole in a light-colored rock about 2 meters high. Three holes are drilled in the rock around the mark; one is uplake 2.12 meters, one is downlake 1.23 meters, and the third one is inland 1.95 meters from the station.

Walker (Maine, Washington County; A. J. Brabazon, 1911; 1917).—On the east side of the island at the entrance to Walker Cove of Spednik Lake. The channel separating the island from the mainland is dry at low water. Reference monument 103 bears northwest from the station about 50 meters distant.

Station mark: A bronze disk set in a drill hole in the rock. A hole is drilled in a rock 18.23 meters lakeward from the station.

**Pine** (New Brunswick, York County; A. J. Brabazon, 1911; 1917).—On the northeast shore of Spednik Lake, on the prominent and most southern point of the shore a mile east and a little south of Hardwood Island. In midlake almost due south from the station there is a large rock known as Gull Rock that is in line from the station with the island in the entrance to Walker Cove. The station is near the low-water line of the point, on a rock 4.9 meters long, 3.4 meters wide, and 0.9 meter high.

Station mark: A bronze disk set in a drill hole in the rock. Three crosses within triangles are cut in the rock; one downlake 1.37 meters, one toward the island 0.75 meter, and one toward a sand beach 1.60 meters distant from the station.

Musquash (New Brunswick, York County; A. J. Brabazon, 1911; 1917).—About one-third mile west of "The Narrows" in Spednik Lake, on the southern shore of a large island. The station is on the most southern point of the island near the low-water line on a rock about 6 meters long, 3 meters wide, and 3 meters high.

Station mark: A bronze disk set in a drill hole in the rock. Three <sup>3</sup>/<sub>4</sub>-inch holes are drilled in the rock; one in the direction of Scraggy Island, 1.76 meters; the second toward the south, 1.62 meters; and the third 1.80 meters distant from the station mark.

**Bay** (Maine, Washington County; A. J. Brabazon, 1911).—On the southern shore of Spednik Lake, about three-fourths mile south of "The Narrows" and about the same distance east of Dark Cove. Station mark: A cross cut in a rock.

Breeze (Maine, Washington County; A. J. Brabazon, 1911).—On a little rocky island in Sandy Bay just south of "The Narrows" in Spednik Lake and about 400 meters offshore.

Station mark: A cross cut in a rock.

White Owl (Maine, Washington County; A. J. Brabazon, 1911; 1917).—On the point of the United States shore that is on the east side of "The Narrows" of Spednik Lake. The station is quite close to the timber, on a rock about 3 by 3 meters in cross section and nearly a meter high.

Station mark: A bronze disk set in a drill hole in a rock.

Heifer (New Brunswick, York County; A. J. Brabazon, 1911; 1917).—On the most eastern point of the large island that forms the west side of "The Narrows" of Spednik Lake. The station is on a rock 2.7 meters long, 2 meters wide, 0.8 meter high.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 6.40 meters southwest from the station; a like mark is cut in a rock 5.87 meters inland from the station; and a third like mark is cut in a rock 10.72 meters toward "The Narrows" from the station.

Morrison (Maine, Washington County; A. J. Brabazon, 1911; 1917).—On the south shore of Spednik Lake, on Morrison Point two-thirds mile north of and below "The Narrows." The station is on a rock 4.3 meters long, 2.9 meters wide, and 2.7 meters high.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 10.41 meters upstream from the station; a like mark is cut in a big rock 16.01 meters inland from the station; and a third like mark is cut in rock toward a dugout 10.64 meters from the station. These are slope measurements.

Lindsay (New Brunswick, York County; A. J. Brabazon, 1911; 1917).—On the eastern point of Lindsay Island in Spednik Lake.

Station mark: A bronze disk set in a drill hole in a rock 2.7 meters long, 2.4 meters wide, and 1.2 meters high.

Haley, 1911 (Maine, Washington County; A. J. Brabazon, 1911).—On Haley Point on the shore of Spednik Lake, 3 miles above Vanceboro, Me. The station is on a rock 1.2 by 1.2 meters in cross section and 0.4 meter high. This station is listed as Haley's Point, with a slightly different determination of position, by the United States Coast and Geodetic Survey.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 3.27 meters toward the water from the station, and another like mark is cut in a rock 5.41 meters inland from the station.

Betula (Maine, Washington County; A. J. Brabazon, 1912; 1917).—On the shore of Spednik Lake on Birch Point, which is the first point above La Coute Point. The station is below high-water mark on a light-colored rock, the largest on the point, 4.3 meters long, 3.9 meters wide at the end next the water, and running to a point inland. The side next the water is almost vertical and 2.4 meters high.

Station mark: A bronze disk set in a drill hole in the rock. Two holes are drilled in the rock; one, on the upper side, 1.61 meters from the station; one, on the lower side, 1.76 meters from the station. A hole is drilled in a rock in the direction of the upper end of Pine Island, 3.39 meters from the station.

**Campus** (Maine, Washington County; A. J. Brabazon, 1911).—On the west shore of Spednik Lake, a little below high-water mark and about halfway between Birch Point and La Coute Point.

Station mark: A cross cut on a rock.

Flat Top (New Brunswick, York County; A. J. Brabazon, 1911).—On the northwestern point of O'Malley Island in Spednik Lake and about 400 meters north of La Coute Point. The station is on a rock 5.6 meters long, 3.4 meters wide, and 2.1 meters above the water and is about on the low-water line of the point.

Station mark: A bronze disk set in a drill hole in the rock. Three holes are drilled in the rock around the station mark; one, on the outer edge, 1.51 meters; one, on the lower edge, 1.51 meters; and one, on the upper edge, 1.62 meters from the station mark.

O'Malley (New Brunswick, York County; A. J. Brabazon, 1911; 1917).—On the southern end of O'Malley Island just opposite La Coute Point. The station is above high-water mark on a rock 2.3 meters long, 1.8 meters wide at inland end, and running to a point at the end toward the water, at which end it projects 0.6 meter above the ground.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 4.36 meters north of the station; a like mark is cut in a rock 2.13 meters below the station; and a third like mark is cut in a rock 10.12 meters inland from the station.

**Casey** (New Brunswick, York County; A. J. Brabazon, 1911; 1924).—On the east shore of Spednik Lake, on a little point 300 meters below Casey Brook and opposite Ice House Point. The station is on a rock 1.4 meters long, 1.2 meters wide, and 0.6 meter high.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a rock projecting 30 centimeters above the ground, 15.20 meters upstream from the station; a like mark is cut in a rock projecting 60 centimeters above the ground, 10.50 meters downstream from the station; a third like mark is cut in a rock projecting 30 centimeters above the ground, 15.00 meters inland from the station.

McGrath (Maine, Washington County; J. E. McGrath, 1911; 1917).—On the west shore of Spednik Lake, about 1 mile north of Vanceboro, on a sandy shore at the outside of a little point at the narrowest part of the lake along the "Horseback." The station is outside the grass line below high-water mark, on an irregularly shaped gray bowlder whose greatest dimension is 2.4 meters and greatest height 1.6 meters. A large pier to which is attached a line of boom logs stands about 30 meters out in the lake from the station.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole in the rock.

Lacey (New Brunswick, York County; A. J. Brabazon, 1911; 1917).—On the east shore of Spednik Lake, 1 mile north of Vanceboro, on a point at the west side of the entrance to a little bay and slough just opposite the "lower cutting away place." The station is on a rock 1.5 meters long and 0.7 meter wide, projecting 0.3 meter above the ground. Reference monument 122 is north 66° east, 31.7 meters distant from the station.

Station mark: A bronze disk set in a drill hole in the rock. Two large rocks toward the water are in line with the station; the nearer one is marked by a cross within a triangle cut in the rock 12.85 meters from the station; the farther rock is 15.6 meters from the station. A cross is cut in a rock with a sharp top projecting 30 centimeters above the ground, 4.21 meters uplake from the station.

Sept (New Brunswick, York County; J. E. McGrath, 1911; 1924).—On the east shore of Spednik Lake, on the second point above Varny Island and nearly 1 mile north of Vanceboro. The station is on a large rock about 12 meters from the edge of the timbered shore.

Station mark: A drill hole surrounded by a triangle cut in the highest point of the rock.

Vanceboro (Maine, Washington County; J. E. McGrath, 1911; 1924).—On the west shore of and at the lower end of Spednik Lake, opposite the upper end of Varny Island. The station is on the east side of the road which runs along the "Horseback," a ridgelike formation paralleling the water. It is between the roadway

and the water, about 3 meters from the center of the road, and is 25.5 meters south  $63^{\circ}$  east from the southeast fence corner of Maxwell's field.

Station mark: The subsurface mark is a pint gin bottle filled with sand set 90 centimeters below the surface of the ground. The surface mark is a drill hole in the top of a granite post 15 centimeters square and 76 centimeters long set and centered over the subsurface mark. The letters "U. S. R. M." are cut in the vertical sides of the post, one letter on each side. The top of the post is about 8 centimeters above the surface of the ground.

**Hutchins' House Chimney** (Maine, Washington County; Jesse Hill, 1924).—On the west side of and at the lower end of Spednik Lake. The house is a summer cottage known as Hutchins' house, and stands about 250 meters above the dam at the foot of the lake on the northeast edge of a little knoll on the western side of the road paralleling the lake shore.

Station mark: The center of the brick chimney, the only chimney on the house.

**East Abutment** (New Brunswick, York County; J. E. McGrath, 1911; 1924).—On the east abutment of the Canadian Pacific Railway bridge across the St. Croix River, at St. Croix, New Brunswick. The station is on the north side of the railway on the top surface of the abutment wall.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole in the masonry.

West Abutment (Maine, Washington County; J. E. McGrath, 1911; 1924).—On the west abutment of the Canadian Pacific Railway bridge across the St. Croix River at Vanceboro, Me. The station is on the north side of the railway on the top surface of the abutment wall.

Station mark: A bronze disk marked "U. S. Coast and Geodetic Survey" set in a drill hole in the masonry.

Vanceboro Bench Mark (Maine, Washington County; J. E. McGrath, 1911; 1924).—On the west abutment of the Canadian Pacific Railway bridge across the St. Croix River at Vanceboro, Me. The station is south of the tracks.

Station mark: A United States Coast and Geodetic Survey bronze bench mark set in a drill hole in the masonry.

#### VANCEBORO, ME., TO WOODLAND, ME., MINOR SCHEMES

Duck (Maine, Washington County; Jesse Hill, 1924).—On the north bank of the St. Croix River, on the west side of Duck Point, about 200 meters above the Upper Reach of Cedar Island Rips, and near the old Duck Point River Drivers' Camp. The station is 72 meters downstream from reference monument 148, at the edge of the stream on a bowlder 1.2 by 1.2 meters in size and 0.9 meter high.

Station mark: A bronze disk set in a drill hole in the bowlder.

Boot Point Bench Mark (Maine, Washington County; N. W. Smith, 1917).—On the north bank of the St. Croix River at the head of the bay at Boot Point, about 150 meters above Tyler Rips and reference monument 150.

Station mark: A bronze bench-mark disk set in a drill hole in a large bowlder.

Scott Brook (Maine, Washington County; Jesse Hill, 1924).—On the north bank of the St. Croix River, 15 meters upstream from the mouth of Scott Brook. The station is on a bowlder 1.8 meters square and 1.2 meters high and detached from the shore about 3 meters.

Station mark: A bronze disk set in a drill hole in the bowlder.

Split Rock (Maine, Washington County; Jesse Hill, 1924).—In the St. Croix River, near the middle of Split Rock Rips. The station is 12 meters from the west shore and 3 meters southwest from the river end of the wing dam, on a large flat-topped bowlder that adjoins another large bowlder at the end of the dam. Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the bowlder.

Meetinghouse Rock (New Brunswick, Charlotte County; N. W. Smith, 1921).—On the east side of the St. Croix River, near the middle of Meetinghouse Rips, on a large bowlder in the river inshore from the large pointed bowlder known as Meetinghouse Rock.

Station mark: A bronze disk set in a drill hole within a triangle cut in the bowlder.

**Grassy** (Maine, Washington County; Jesse Hill, 1924).—On the west shore of the St. Croix River, about seven-eighths mile below Meetinghouse Rock, on the narrow portion of the river between the upper and middle groups of the Grassy Islands. The station is in front of the old Elisha Keene home, on the edge of the shore, on a conglomerate bowlder 1.5 meters in diameter. Reference monument 160 is about 120 meters downstream from the station.

Station mark: A bronze disk set in a drill hole surrounded by a triangle cut in the bowlder.

Grassy Island Bench Mark (Maine, Washington County; N. W. Smith, 1917).—On the west bank of the St. Croix River, about halfway down the open "Keene" field, and opposite the head of the largest island of the middle group of the Grassy Islands.

Station mark: A bronze bench-mark disk set in a drill hole in a large rock near the bank of the river.

Irish (New Brunswick, Charlotte County; A. J. Brabazon, 1911).—On the east bank of the St. Croix near the head of the broad portion of the river known as Loon Bay. The station is 180 meters below the big rock at the ferry landing, in the McGlinchey field near the river bank, on a rock about 0.8 meter in diameter and 0.4 meter high.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in a rock 6.49 meters inland from the station, and a like mark is cut in a rock 6.87 meters downstream from the station. A cross within a triangle is cut in a rock 6.97 meters upstream from the station.

**Coot** (New Brunswick, Charlotte County; A. J. Brabazon, 1911; 1917).—On the east shore of the St. Croix River at the head of the wide section of the river known as Loon Bay. The station is 8.5 meters below the road at the ferry landing, on a rock 4.3 meters long, 3 meters wide, and 2 meters high that rises out of the water.

Station mark: A bronze disk set in a drill hole in the rock.

**Rock** (Maine, Washington County; A. J. Brabazon, 1911; 1917).—In the St. Croix River near the head of Loon Bay about 75 meters downstream from the lower and larger island at the head of the bay. The station is on a large rock in the middle of the stream opposite the end of the road from Canoose post office.

Station mark: A bronze disk set in a drill hole in the rock.

**Cottage** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east shore of the St. Croix River just below the mouth of Canoose River. The station is on an outcropping rock only a little above the surface of the ground, 6.23 meters from the northwest corner of Ham's new cottage.

Station mark: A broken bronze bolt set in a drill hole in the rock. A cross is cut in a rock flush with the ground 4.25 meters riverward from the station. A piece of iron pipe is driven in the ground below the surface 3.70 meters upstream and riverward from the station. Another piece of iron pipe is similarly planted 3.83 meters downstream and a little riverward from the station.

**Traverse Station B-36** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east shore of the St. Croix River, about 150 meters above the dam at Dog Island Rips beside an old logging road which ends at a little marshy cove or bay on the river. The station is about 50 meters from the river in an outcropping of rock.

Station mark: A bronze disk set in a drill hole in the rock. A cross is cut in a rock 8.07 meters downstream from the station. A cross within a triangle is cut in a rock 11.42 meters riverward and downstream from the station, and a cross within a triangle is cut in a rock 8.90 meters riverward from the station.

**Traverse Station B-37** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east bank of the St. Croix River, about 20 meters upstream from the Canadian end of the upper dam at the head of Dog Island Rips.

Station mark: A bronze disk set with cement in a drill hole in an outcropping ledge. A cross is cut in a rock 4.75 meters riverward from the station, a cross is cut in a rock 4.18 meters upstream and riverward from the station, and a cross is cut in a rock 9.78 meters downstream and riverward from the station.

**K** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east bank of the St. Croix River, about 200 meters below Horse Island and 650 meters below the mouth of Hound Brook. A small brook flows into the river on the opposite shore a short distance above the station.

Station mark: A bronze disk set in a drill hole in a rock 2.4 meters long, 1.5 meters wide, and 1 meter high. A cross within a triangle is cut in a rock 5.65 meters riverward and upstream from the station, a cross within a triangle is cut in a rock 7.10 meters upstream and inland from the station, and a cross alone is cut in a rock 6.38 meters inland from the station.

**Fin** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east side of the St. Croix River about three-fourths mile above Gleason Point, opposite the upper end of the largest island off Corkin Field. The station is about 13.7 meters north and 48.7 meters east of reference monument 169–A.

Station mark: A bronze disk set in a drill hole in an outcropping bowlder. A cross is cut in a rock 6.07 meters downstream from the station, a second cross is cut in a rock 5.53 meters upstream from the station, and a third cross is cut in a rock 7.87 meters inland from the station.

McNicholl (New Brunswick, Charlotte County; J. E. McGrath, 1910; 1924).—On the east bank of the St. Croix River at Gleason Point. The station is on the north side of the Gleason Point Road, about 75 meters north of Doctor McNicholl's house, and about 30 meters northeast of the concrete swimming tank.

Station mark: A bronze disk, stamped "209," cemented in a drill hole in a bowlder about 0.3 meter high. A piece of a  $\frac{3}{4}$ -inch steel drill is wedged in a drill hole in a bowlder about 2 meters north of the board walk which leads from the house to the boat landing, distant 22.12 meters in azimuth 76° 21' from the station.

**Beaver** (Maine, Washington County; J. E. McGrath, 1910).—On the west bank of the St. Croix River, about 600 meters below Gleason Point, at the lower end of a long straight shore line where the shore begins a long curve downstream to the left. The station is about 15 meters upstream from a very small brook called Beaver Brook, and on the outer end of a ledge of argillaceous rock which juts out into the river above a prominent granite bowlder.

Station mark: A Coast and Geodetic Survey bronze triangulation disk set in a drill hole in the ledge near the water's edge.

Chub Rock (New Brunswick, Charlotte County; J. E. McGrath, 1911; 1921).—On the east bank of the St. Croix River, about 700 meters above the Pomeroy Ridge Road at Clark Point, and about twice that distance below Gleason Point. The station is on the large, lone conspicuous rock on the river bank known as Chub Rock. Station mark: A bronze disk set in a drill hole in the rock.

**Cabin** (New Brunswick, Charlotte County; J. E. McGrath, 1912).—On the east side of the St. Croix River at Spednik Falls, which are about 23¼ miles above Grand Falls Dam at the head of the backwater from that dam. The station is at the west end of the little knoll on which the river drivers' camp stands, 5.87 meters from the northwest corner of the camp and 8.77 meters from the southwest corner of the camp.

Station mark: A bronze disk set in a drill hole in the rock flush with or a little below the surface of the ground.

Turning Point 956 (New Brunswick, Charlotte County; Maine, Washington County; Jesse Hill, 1924).— In the St. Croix River at Grand Falls, in the concrete walkway under the dam. The station is under the middle one of the seven concrete spans over the main channel of the river, 0.326 meter north of the south edge of the walk and 18.166 meters eastward from the bottom step of the stairway at the entrance to the walk.

Station mark: A bronze disk marked "U. S. & C. B. Survey, C 38" set in the concrete floor of the walk.

West Dam (Maine, Washington County; N. W. Smith, 1917; 1924).—On the west side of the St. Croix River at Grand Falls. The station is on the concrete dam near the north or upstream corner of the outer end of the broad concrete walk built from the shore out to the stairway leading to the passage across the river under the dam and is just west of this entrance near the railing around the walk.

Station mark: A bronze disk set in a drill hole in the concrete of the dam.

Lower Pitch (New Brunswick, Charlotte County; J. E. McGrath, 1910; 1918).—On the east bank of the St. Croix River at the lower pitch of Grand Falls and about 125 meters upstream from the head of the large island that divides the stream at the Gorge. There was a dam abreast the station at one time, the remains of which were well defined at the time of marking.

Station mark: A bronze disk marked "U. S. & C. B. Survey" set in a drill hole in an exposed rock ledge.

Gorge (Maine, Washington County; J. E. McGrath, 1910; 1918).—On the west shore of the St. Croix River, nearly abreast of the second falls in the lower pitch of Grand Falls and north 5° 43' east, 13.8 meters from reference monument 184.

Station mark: A Coast and Geodetic Survey bronze triangulation disk set in a drill hole in the rock.

**Pomhanan** (New Brunswick, Charlotte County; J. E. McGrath, 1910; 1918).—On the east bank of the St. Croix River, about 23⁄4 miles below the Grand Falls Dam, about one-fourth mile below Pomeroy Landing and 26 meters northeast of reference monument 185. The station is on a large granite bowlder near the property line between John Pomeroy and Mrs. Charles Hanan, 3 meters west of a barbed-wire fence and 2 meters east of a road.

Station mark: A bronze U. S. Coast and Geodetic Survey triangulation disk stamped "147" set in a drill hole in the bowlder.

Maurel (Maine, Washington County; J. E. McGrath, 1910; 1918).—About 5 meters north of reference monument 186. (See description, p. 227.)

Station mark: A bronze disk set in a drill hole in the rock close to the edge of the water.

Weatherby (New Brunswick, Charlotte County; J. E. McGrath, 1910; 1918).—On the east shore of the St. Croix River, about 2½ miles above Woodland, Me., about 100 meters below Mosquito Island. The station is back about 15 meters from the water's edge in a growth of young trees, on a gray stone whose top just emerges from the ground with an exposed surface of 60 by 90 centimeters.

Station mark: A bronze Coast and Geodetic Survey triangulation disk set in a drill hole in the rock.

Whidden (Maine, Washington County; J. E. McGrath, 1910; 1918).—On the west bank of the St. Croix River, about 2 miles above Woodland, Me., just above the clearing known as the old Whidden place, sometimes called Ryan's Interval. The station is between the Maine Central Railroad and the river, approximately opposite the third telegraph pole above the upper end of the clearing at the railroad. The shore line makes a big right-angled turn to the northeast about 300 meters below the station.

Station mark: A bronze disk set in a drill hole in a granite bowlder showing exposed dimensions of 50 by 90 by 40 centimeters. A cross within a triangle is cut in the same rock.

Ledges (Maine, Washington County; N. W. Smith, 1918).—On the west bank of the St. Croix River, about 1 mile above the railroad bridge at Woodland, on a point at the lower end of a narrow place in the backwater from the Woodland Dam. A small brook runs into the river just below the station.

Station mark: A bronze disk set in the top of a square granite slab which projects about 13 centimeters above the ground about 2 meters from the shore line.

New (New Brunswick, Charlotte County; N. W. Smith, 1918).—On the east side of the St. Croix River, about three-fourths mile above the railroad bridge at Woodland, on a low flat open point that is nearly due east of the "sorting pen." The station is near the middle of the open place and about 7 meters from the shore.

Station mark: A bronze disk set in the top of a square granite slab projecting 10 centimeters above the ground and set in a large concrete base.

Mill (Maine, Washington County; N. W. Smith, 1918).—On the west shore of the St. Croix River, onefourth mile above the Woodland railroad bridge, on the prominent point directly out from the sawmill and box factory. The station is near the center of the point 4.5 meters from the shore line.

Station mark: A bronze disk set in the top of a square granite slab projecting about 10 centimeters above the ground and set in a large concrete base.

#### WOODLAND, ME., TO THE ATLANTIC OCEAN, MINOR SCHEMES

Abutment (Maine, Washington County; J. E. McGrath, 1909; 1918).—On the northwest abutment of the railroad bridge at Woodland Junction, Me., north 50° 55′ east, 0.71 meter distant from reference monument 194.

Station mark: A bronze disk set in the concrete of the abutment.

**East Abutment** (New Brunswick, Charlotte County; A. J. Brabazon, 1910; 1918).—On the southeast concrete abutment of the railroad bridge at Woodland Junction, Me., south 50° 15′ west, 3.83 meters distant from reference monument 193.

Station mark: A bronze disk set in the concrete.

Telline (Maine, Washington County; J. E. McGrath, 1909).—On the west side of the St. Croix River at Woodland, Me., on a little bank on the west side of the Woodland branch of the Maine Central Railroad which leaves the main line at Woodland Junction. The station is 300 meters down the track toward Woodland from the Y, 0.3 meter north of the line of telegraph poles and between two fills on which the railroad crosses inlets from the backwater of the dam.

Station mark: A bronze disk set in a granite bowlder that projects about 40 centimeters out of the ground A cross within a triangle is cut in a small rock south  $22^{\circ}$  west, 9.42 meters distant, and a cross within a triangle is cut in a stone north  $73^{\circ}$  west, 11.86 meters from the station.

Suburb (Maine, Washington County; J. E. McGrath, 1909).—On the west bank of the St. Croix River, opposite the first angle in the road that runs north along the river and railroad track from Woodland to Woodland Junction. The road passes over a long fill just north of this angle. The station is on a triangular granite rock about 0.3 meter high and about 1 meter on each side. It is 6 meters west of the west rail of the railroad track and about 33 meters north of the house that stands just north of the section hands' tool house.

Station mark: A bronze disk set in a drill hole in the rock. A cross inclosed in a triangle is cut in a pyramidal rock about 1 meter high, south  $2^{\circ}$  18' east, 13.95 meters distant; and a like mark is cut in an argillace-ous rock of small exposure south  $58^{\circ}$  24' west, 12.70 meters from the station.

Woodland (Maine, Washington County; J. E. McGarth, 1908).—On the St. Croix River in Woodland, Me., on the concrete dam belonging to the St. Croix Paper Co. The station is on the top of a concrete wall 30 centimeters thick and is between the two large gate chambers (nearest the wasteway) which admit the water to the grinding machinery of the paper mill.

Station mark: A bronze disk set in the concrete.

**Cement** (New Brunswick, Charlotte County; A. J. Brabazon, 1910; 1918).—On the St. Croix River opposite Woodland, Me. The station is on the top of the concrete abutment at the Canadian end of the Woodland Dam.

Station mark: A copper disk set in a drill hole in the concrete. Four crosses inclosed in triangles are cut in the top of the abutment; one is near the lower outer corner, and another is near the upper outer corner, 3.51 and 3.20 meters, respectively, distant from the station; the third is near the inner upper corner of the upper wing, and the fourth is near the inner lower corner of the lower wing, distant 11.53 and 8.26 meters, respectively, from the station.

**Upper Base** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east side of the St. Croix River opposite Woodland, Me., 28.7 meters below the Woodland Dam, on an abandoned railway grade. The measurement given was made along the center line of the railway grade produced toward the dam.

Station mark: A copper disk set in a drill hole in a rock flush with the ground. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in a rock 8.59 meters from the station in the direction of the abutment of the dam; a cross within a triangle is cut in a rock 14.94 meters inland and downstream from the station; and a third cross within a triangle is cut in a rock 8.74 meters riverward and downstream from the station.

**Spoilbank** (Maine, Washington County; J. E. McGrath, 1910).—On the west bank of the St. Croix River just below the St. Croix Paper Mills at Woodland, Me. The station is on a large spoil bank composed of spalls with a few pieces of larger stones scattered among them. The station is on one of these larger stones.

Station mark: A drill hole in the stone. A triangle and cross are cut in the same stone. "Spoilbank tablet" is a brass disk set in a drill hole in one of the bare rocks of a ledge which juts out into the river abreast of a little group of islets. It is about 5 meters from the water and  $1\frac{1}{2}$  meters above it and bears north 79° 11' east, 36.46 meters from the station.

Lower Base (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east bank of the St. Croix River opposite Woodland, Me. The station is on the north edge of an abandoned railroad grade 66 meters below the beginning of the first curve of the grade below the Woodland Dam and between the Maine Central Railroad and the river, approximately 70 meters from the railroad and 40 meters from the river.

Station mark: A copper disk set in a drill hole in a rock nearly flush with the ground. The letters "C. R. M." are cut in the station rock. A cross inclosed by a triangle is cut in a rock 22.37 meters upstream from the station at the edge of the grade; a cross inclosed by a triangle is cut in rock 4.73 meters inland and slightly downstream from the station; and a cross alone is cut in a rock 6.05 meters inland and a little upstream from the station.

Turning point 1006 (New Brunswick, Charlotte County; Maine, Washington County; Jesse Hill, 1924).— On the St. Croix River at Woodland, Me., on the crest of the concrete dam under the wooden superstructure, at the middle of the main channel of the St. Croix River. It is a marked point on the international boundary. Station mark: A 2-inch iron shaft with a center hole in it set nearly flush with the surface of the concrete.

**Crossing** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east bank of the St. Croix River, opposite Woodland, Me. The station is inland from the top of the river bank 12 meters from the water and is nearly in line with the most southern street of Woodland, which parallels Wapsaconhagan Brook on its northern side. A small brook flows into the river 75 meters below the station.

Station mark: A copper disk set in a drill hole in a rock projecting a little above the surface of the ground. The letters "C. R. M." are cut in the rock. A cross is cut in a big white rock 4.16 meters upstream and inland from the station; a cross inclosed in a triangle is cut in a rock 6.66 meters downstream and a little inland from the station; and a cross within a triangle is cut in a rock 10.91 meters downstream from the station.

Wapsaconhagan (Maine, Washington County; J. E. McGrath, 1910).—In the southeastern part of Woodland, Me., on the bank of the St. Croix River, about 14 meters from the river and about 40 meters above the mouth of Wapsaconhagan Brook. The station is on a bowlder in an irregular stone pile. The bowlder's greatest exposed dimensions are 0.9 by 0.8 by 0.3 meter.

Station mark: A Coast and Geodetic Survey triangulation disk set in a drill hole in the bowlder. Two crosses within triangles are cut in rocks of the same stone pile at distances of 9.53 and 8.12 meters, in azimuths of 176° and 2°, respectively, from the station.

**Nearby** (Maine, Washington County; J. E. McGrath, 1910).—In the southeastern part of Woodland, Me., on the bank of the St. Croix River. The station is about 12 meters inland from the top of the river bank and about 140 meters upriver from the mouth of Wapsaconhagan Brook.

Station mark: A Coast and Geodetic Survey triangulation disk set in a drill hole in a granite bowlder about 1.2 by 0.7 by 0.3 meter high. Two crosses within triangles are cut in rocks at distances of 11.21 and 5.95 meters, in azimuths of 330° and 21°, respectively, from the station.

**Pond** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east side of the St. Croix River opposite and a little below Woodland, Me. The station is about 40 meters from the river bank and 23 meters west of the west end of a large pond that is crossed by the railway, 260 meters to the eastward.

Station mark: A copper disk set in a drill hole in a rock projecting a little above the ground. The letters "C. R. M." are cut in the rock. Three crosses, two of which are inclosed in triangles, are cut in rocks; one 22.45 meters eastward from the station, another 20.06 meters southeastward, and the third 15.90 meters southwestward from the station.

**Gauge** (Maine, Washington County; J. E. McGrath, 1910).—On the west bank of the St. Croix River, seven-eighths mile below the Woodland Dam, one-fourth mile below the mouth of Wapsaconhagan Brook, on a little point of the shore line about 20 meters upstream from the cable of the United States Geological Survey stream-gauging station.

Station mark: A bronze disk set in a drill hole in a bare rocky ledge about 15 centimeters outside the grass line. There are two drill holes in the rock near the station mark. A cross within a triangle is cut in the rock 1.89 meters downriver from the station, and a like cross is cut in the rock 10.93 meters inland from the station.

Curve (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the east bank of the St. Croix River, 1½ miles below the dam at Woodland and about 250 meters above Grass, or Irving, Island. The station is about 8 meters north of the Maine Central Railroad and is abreast of the curve of the track, 17 meters west of the point of curvature. The shore line of the river makes a long, right-angled turn just in front of the station. Station mark: A copper disk set in a drill hole in a rock projecting about 0.4 meter out of the ground. The letters "C. R. M." are cut in this rock. A cross within a triangle is cut into each of three rocks, respectively 5.76 meters northwestward, 2.05 meters northward, and 3.93 meters southeastward from the station.

Lovering (Maine, Washington County; J. E. McGrath, 1910; 1918).—On the east bank of the St. Croix River, 1½ miles below the Woodland Dam, one-half mile below, and on the second point from the mouth of Wapsaconhagan Brook. The station is 200 meters above Grass, or Irving, Island, on the shore line on a flattopped bowlder measuring 1.7 by 2.3 by 0.6 meter. The ground rises steeply in a rocky bluff just back of the station.

Station mark: A bronze disk set in a drill hole in the bowlder. A cross within a triangle is cut in a rock 5.83 meters riverward of the station, and a cross within a triangle is cut in the face of a rock in the bluff 5.82 meters inland from the station.

Irving (Maine, Washington County; A. J. Brabazon, 1910).—In the St. Croix River, 1¼ miles below the Woodland Dam, on Grass, or Irving, Island. The station is on the northeast side of the island 193 meters from the upper end of the little bay in the lower end of the island, 134 meters from the upper end of the island, and 7 meters back from the shore.

Station mark: A copper disk set in a drill hole in a rock. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in a rock 2.17 meters downstream and shoreward of the station; a cross is cut in a rock 3.50 meters upstream and shoreward from the station; and a cross is cut in a rock 2.89 meters inland from the station.

**Casey's Barn Finial** (New Brunswick, Charlotte County; J. E. McGrath, 1908; 1924).—About 1¼ miles east of Woodland, Me., on the side hill about one-fourth mile from the St. Croix River. It is a large octagonal barn with the pointed roof terminating in a finial.

Station mark: The finial at the apex of the roof.

Secrip (Maine, Washington County; J. E. McGrath, 1909; 1924).—On the west bank of the St. Croix River, about 2 miles below Woodland, Me. The station is on a little flat near the head of Bailey Rips, below and just across a small channel from the lower end of a small island which causes a decided bend in the shore line of the river just above the station.

Station mark: A drill hole filled with lead, in a small stone. A cross within a triangle is cut in a bowlder south 24° 43' west, 7.82 meters from the station, and a cross is cut in a bowlder north 67° 18' west, 19.81 meters distant from the station.

**Bailey** (Maine, Washington County; J. E. McGrath, 1909; 1924).—On the west bank of the St. Croix River, 2½ miles below the Woodland Dam. The station is abreast of an indentation in the shore line about midway between the two large islands at the head and foot of the rips. It is about 30 meters from the river at an elevation of about 6 meters above the water.

Station mark: A bronze disk set in a drill hole in a large bowlder. Reference monument 200 is set in the same bowlder, distant 41 centimeters. A cross within a triangle cut on a rock bears south  $30^{\circ}$  42' east, 2.37 meters from the station.

Smith (Maine, Washington County; J. E. McGrath, 1909).—On the west side of the St. Croix River, about 2 miles southeast of Woodland and about one-fourth mile back from the river on the hillside on the dairy farm of Gorham Smith. The station is about 160 meters northeast by north from the farm buildings on a rock flush with the ground.

Station mark: A drill hole in the rock, filled with lead. A drill hole filled with lead in a large granite bowlder bears north  $62^{\circ}$  04' east, 21.75 meters from the station. A triangle is cut in the side of this granite rock facing the station.

Midrip (Maine, Washington County; J. E. McGrath, 1909; 1924).—On the west shore of the St. Croix River, about 2 miles below Woodland, Me., near the foot of Bailey Rips and about 250 meters upstream from the large island that lies just below Bailey Rips. The station is just flush with the top of the river bank on a bowlder measuring 1.2 by 0.7 by 0.4 meter. Reference monument 199 is on the Canadian shore directly opposite the station.

Station mark: A drill hole in the bowlder, filled with lead. A cross within a triangle is cut on a stone north 88° 50′ west, 7.66 meters from the station.

**Head** (New Brunswick, Charlotte County; Jesse Hill, 1924).—On the east bank of the St. Croix River, about 2 miles below Woodland, Me., opposite the upper pitch of Bailey Rips. The station is about 100 meters below the island that lies at the head of Bailey Rips, is about 70 meters below the mouth of a little brook, and is about 6 meters from the shore at an elevation of 1 meter above the water.

Station mark: A copper disk set in a drill hole in the rock. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in a rock 5.67 meters upstream from the station; a cross within a triangle is cut in a rock 4.78 meters upstream and inland from the station; and a cross within a triangle is cut in a rock 5.99 meters downstream and inland from the station.

Lounder (New Brunswick, Charlotte County; Jesse Hill, 1924).—On the east bank of the St. Croix River, about 2¼ miles below Woodland, on the rounded point opposite the lower end of the first island below Bailey Rips. The station is about 2 meters from the shore and about the same distance above the water, on a rock 2.4 meters long, 1.5 meters wide, and 1.5 meters high on the river side.

Station mark: A bronze disk set in a drill hole in the rock. There is another drill hole in the same rock 0.636 meter inland from the mark, and the letters "C. R. M." are cut in the rock beside the mark. A cross within a triangle is cut in a rock 4.70 meters northwestward from the station; a cross within a triangle is cut in a rock 6.92 meters northward from the station; and a like mark is cut in a rock 10.36 meters southeastward from the station.

Clark (Maine, Washington County; J. E. McGrath, 1910; 1924).—On the western bank of the St. Croix River, about 2<sup>3</sup>/<sub>4</sub> miles below Woodland and about 250 meters above the head of Butler Islands.

Station mark: A bronze disk set in a drill hole in the exposed surface of a bowlder. A cross inclosed in a triangle is cut in the vertical face (toward the station) of a rock south  $41^{\circ}$  50' west, 3.35 meters from the station (an eyebolt is also set in this rock); and a cross within a triangle is cut in a rock north  $45^{\circ}$  31' west, 2.91 meters from the station.

**Ephraim** (New Brunswick, Charlotte County; A. J. Brabazon, 1910; 1924).—On the east side of the St Croix River, about  $2\frac{3}{4}$  miles below Woodland, Me., and opposite the upper end of the upper Butler Island. The station is at the river's edge on a rock about 2 meters across and  $1\frac{1}{2}$  meters high on the side next the river and flush with the ground on the upper side.

Station mark: A copper disk set in a drill hole in the rock. The letters "C. R. M." are cut in the rock A cross within a triangle is cut in a rock 2.92 meters northward from the station; a like mark is cut in a rock 3.56 meters southward from the station; and a third such mark is cut in a rock 5.34 meters eastward from the station.

**Ringbolt** (Maine, Washington County; J. E. McGrath, 1910; 1924).—On the west bank of the St. Croix River, about 3 miles below Woodland and opposite the lower end of the upper Butler Island. The station is 90 meters upriver from Malloy's meadow fence on a ledge of reddish-gray granite showing an exposed surface of about 8 meters at right angles to the river. There are some old piers downstream from the station, the nearest one being 37 meters distant.

Station mark: A bronze disk set in a drill hole in the ledge. A large ringbolt is set in the ledge south  $25^{\circ} 42'$  west, 3.55 meters from the station. A cross within a triangle is cut in the rock south  $40^{\circ} 57'$  west, 5.92 meters from the station, and a like mark is cut in the sloping face of a ledge north  $77^{\circ} 45'$  west, 10.96 meters from the station.

**Hall** (New Brunswick, Charlotte County; A. J. Brabazon, 1910; 1918).—On the east bank of the St. Croix River, about  $3\frac{1}{2}$  miles below Woodland, at the lower end of the expanded stretch of the river which incloses Butler Islands and directly opposite the mouth of Stoney Brook. The station is about 2 meters back from the shore on a rock projecting a little above the ground.

Station mark: A copper disk set in a drill hole in the rock. A cross is cut in a rock 4.25 meters southwestward from the station; a cross within a triangle is cut in a rock 1.54 meters southward from the station; and a cross within a triangle is cut in a rock 8.33 meters northwestward from the station. The letters "C. R. M." are cut in the station rock.

Malloy (Maine, Washington County; J. E. McGrath, 1910).—On the west bank of the St. Croix River about 1<sup>3</sup>/<sub>4</sub> miles above Baring, 125 meters above the mouth of Stoney Brook, and about 47 meters from the river. The station is in the east end of an open field belonging to George Malloy and 2.7 meters from the line fence between George Malloy and Ross Lawler.

Station mark: A bronze disk marked "Coast and Geodetic Survey" set in a drill hole in the exposed surface of a bowlder. A cross within a triangle cut in a large bowlder on the fence line bears north  $63^{\circ}$  57' east, 3.71 meters from the station, and a like mark is cut in another bowlder in the fence line south  $46^{\circ}$  55' east, 2.32 meters from the station.

Lawler (Maine, Washington County; J. E. McGrath, 1910; 1918).—On the southwest bank of the St. Croix River, about 1<sup>3</sup>/<sub>4</sub> miles above Baring in the low, level meadow that lies on the point below the mouth of Stoney Brook. The station is on a little knoll marked by a number of large bowlders and a forked and spreading elm tree. The station is nearly 100 meters from the river and about as far from Stoney Brook.

Station mark: A bronze disk set in a drill hole in the exposed surface of a bowlder nearly flush with the ground. A cross within a triangle cut in the vertical face of a split bowlder near the elm tree bears south 76° 27' west, 7.98 meters from the station, and a cross within a triangle cut in the top of a large bowlder bears north  $33^{\circ} 24'$  west, 15.37 meters distant from the station.

Stillman (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the northeast bank of the St. Croix River, about 1½ miles above Baring. The station is about 250 meters below the lower end of the large island that lies just below Butler Islands and is opposite a small grassy island that lies near the United

States shore. A large cleft rock in the river in the direction of the large island just mentioned is 37 meters upstream from the station.

Station mark: A copper disk set in a drill hole in a rock projecting a little from the ground about 1.5 meters back from the water. A cross is cut in a rock 3.08 meters inland from the station; a cross within a triangle is cut in a rock 3.20 meters upstream from the station; and a cross within a triangle is cut in a rock 3.73 meters downstream from the station.

**Bockfield** (Maine, Washington County; J. E. McGrath, 1910).—On the south side of the St. Croix River, about  $1\frac{1}{2}$  miles above Baring. The station is about 100 meters north of the Baring-Woodland Road, near the head of the big slough or inlet whose mouth is opposite Haywood Island. It is about 150 meters northwest of the mouth of a little brook that flows across the road and into the slough.

Station mark: No record was made of the kind of mark. A cross within a triangle cut in the sloping face of a large stone bears north  $76^{\circ}$  53' east, 8.76 meters from the station, and a cross within a triangle cut in the vertical face of a large stone bears south  $19^{\circ}$  01' west, 10.13 meters distant.

Waters (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the north bank of the St. Croix River in the big bend of the river about 13% miles above Baring, and on the upstream side of the bend where the shore line begins to run northwest and southeast. There are three large rocks in the river in front of the station.

Station mark: A copper disk set in a drill hole in a large rock about 5 meters back from the shore. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in a rock in the water 6.11 meters from the station. A cross is cut in a rock 7.44 meters inland from the station, and a cross is cut in a rock 4.79 meters downstream from the station.

Interval (Maine, Washington County; J. E. McGrath, 1910).—On the south bank of the St. Croix River, about three-fourths mile above Baring on the low flat meadowland on the point between the big bend in the river and the slough above Haywood Island. The station is about 70 meters south of the river and about 30 meters west of the small outlet channel of the slough. A large elm about 1 meter in diameter stands about 60 meters northwest of the station.

Station mark: A bronze disk set in a drill hole in a small bowlder beside a farm road. A cross within a triangle cut in a large rock bears north  $65^{\circ}$  53' west, 18.49 meters from the station, and a cross cut in a large rock in the wet meadow bears north  $5^{\circ}$  19' west, 23.20 meters from the station.

Haywood (Maine, Washington County; J. E. McGrath, 1910; 1918).—On Haywood Island in the St. Croix River, about 13% miles above Baring. The station is 40 meters downstream from the upper end of, and on the main channel side of the island on a bare part of a ledge near the shore line.

Station mark: A Coast and Geodetic Survey bronze disk set in a drill hole in the ledge. A cross within a triangle is cut in the ledge south  $41^{\circ}$  39' east, 7.20 meters from the station, and a cross within a triangle is cut in the ledge south  $9^{\circ}$  57' west, 9.03 meters from the station. Reference monument 204 was later set at this last mark.

Will (New Brunswick, Charlotte County; A. J. Brabazon, 1910; 1918).—On the north bank of the St. Croix River in the big bend of the river about 13% miles above Baring, on the downstream side of the bend just where the shore begins to run in a northeasterly direction downstream. The station is opposite the upper end of Haywood Island and just east of a little meadow. It is on a large rock projecting into the river.

Station mark: A copper disk set in a drill hole in the rock. The letters "C. R. M." and a cross and triangle are cut in the rock. A cross within a triangle is cut in each of two rocks upstream from the station; the one nearest the river is 4.27 meters, and the one farthest inshore is 11.69 meters from the station.

**Cove** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the north bank of the St. Croix River, about 1 mile above Baring and about 200 meters above the first big island above Baring. The station is on the outer or river side and 100 meters above the end of a point behind which there is a little cove.

Station mark: A copper disk set in a drill hole in a rock on the shore. The letters "C. R. M." are cut in the rock. A cross is cut in a rock at the edge of the water 2.11 meters downstream from the station; a cross within a triangle is cut in a rock at the edge of the water 4.17 meters upstream; and a cross within a triangle is cut in a rock in the water 3 meters from the shore and 7.70 meters from the station.

**Frostfield** (Maine, Washington County; J. E. McGrath, 1910).—On the south bank of the St. Croix River, about 1 mile above Baring, on Frostfield Point, which is the first point on the south side of the river above the large island first above Baring, sometimes known as Marpole Island. The station is at the shore line about 40 meters from the upper crib of the boom across the United States channel of the river.

Station mark: A Coast and Geodetic Survey bronze disk set in a drill hole in an exposed bowlder nearly flush with the ground. A cross within a triangle is cut in a rock south  $42^{\circ}$  34' east, 3.74 meters from the station, and a cross within a triangle is cut in a rock south  $32^{\circ}$  26' west, 5.66 meters from the station. A third cross was cut on a rock riverward from the station some 3 meters distant, but it is frequently covered by water and the distance to it was not measured.

**Abbott** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the north bank of the St. Croix River, about three-fourths mile above Baring, opposite the big island above Baring sometimes called Marpole Island. The station is on a rock at the shore line about 120 meters above the mouth of the first brook on the Canadian side above Baring.

Station mark: A copper disk set in a drill hole in the rock. A ringbolt and two other bolts are set in the rock within a foot of the station mark, and the letters "C. R. M." are cut in the rock. Three crosses are cut in rocks, two of which are inclosed in triangles, one 1.36 meters upstream, another 4.33 meters inland, and the third 2.88 meters riverward from the station.

**Doten** (Maine, Washington County; J. E. McGrath, 1909).—On the south bank of the St. Croix River, three-fourths mile above Baring, on the bare slope of an extensive ledge on the east side of Doten Point. The station is about 9 meters west of the prolongation of the main line of the fence between the properties of Edward and Alvin Doten and about 8 meters from the shore line.

Station mark: A bronze disk set in a drill hole in the ledge. A cross within a triangle is cut in the ledge south  $55^{\circ} 59'$  east, 6.48 meters from the station, and a cross within a triangle is cut in the ledge north  $76^{\circ} 43'$  west, 1.56 meters from the station.

Heater (New Brunswick, Charlotte County; A. J. Brabazon, 1910; 1918).—On the north bank of the St. Croix River, about one-half mile above Baring, on the point at the narrow part of the river opposite Pratt Point.

Station mark: A copper disk set in a drill hole in a ledge below high-water mark. The letters "C. R. M." are cut in the ledge. Four crosses are cut in the rock, two of which are inclosed in triangles. The first is 2.78 meters upstream, the second is 5.82 meters upstream and inland, the third is 2.84 meters inland, and the fourth is 6.32 meters downstream from the station, near the water's edge. Reference monument 205 is north 67° 19' west, 19.57 meters distant from the station.

**Pratt** (Maine, Washington County; J. E. McGrath, 1909; 1918).—On the south side of the St. Croix River, about one-half mile above Baring, on Pratt Point. The station is about midway of the point and about 80 meters back from the river in the stony pasture land.

Station mark: A bronze disk set in a drill hole in the exposed surface of a large, embedded bowlder. A cross within a triangle cut in a large bowlder bears north  $21^{\circ}$  12' east, 7.29 meters distant, and a cross within a triangle cut in an exposed ledge of rock bears south  $45^{\circ}$  04' west, 11.63 meters distant from the station.

English (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the north side of the St. Croix River just south of Upper Mills, about 180 meters west of the west end of the Maine Central Railroad bridge across the St. Croix River, and about 70 meters north of the Maine Central Railroad track. The station is on the point 2.4 meters back from the brink of the English gravel pit.

Station mark: A copper disk set in a drill hole in a rock placed with its top below the surface of the ground. The letters "C. R. M." are cut in the rock. A cross in the top of a tile filled with cement and set in the ground below the surface bears north  $85^{\circ} 28'$  east, 2.52 meters; another like mark bears north  $57^{\circ} 49'$  west, 2.19 meters; and an iron bolt 48 centimeters long with a cross cut on its head is driven below the surface of the ground north  $9^{\circ} 10'$  east, 2.67 meters from the station.

**Poppelmill** (Maine, Washington County; J. E. McGrath, 1909).—On the east bank of the St. Crcix River in the southern part of the town of Baring. The station is on high ground about 2 meters back from the top of the bank above the grade of the railroad spur that runs from Baring south along the river bank, is about 50 meters from the river bank and about 290 meters south of the international highway bridge.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long firmly set in the ground. The subsurface mark is a nail set in cement in the top of a 3-inch draintile set 60 centimeters below the surface of the ground. Three nails in a blaze on a large oak tree south of the railroad spur bear north  $30^{\circ}$  56' west, 11.44 meters distant, and a nail flush with the ground, set in cement in the top of a 3-inch draintile, bears north  $57^{\circ}$  10' east, 5.50 meters distant from the station.

**Rock** (Maine, Washington County; J. E. McGrath, 1909).—On the south side of the St. Croix River on the summit of the high rocky knoll 1 mile southeast of Baring and between the forks of the main highway paralleling the river.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle is cut in the rock south  $44^{\circ}$  03' east, 5.83 meters distant, and a like mark is cut in the rock north 5° 07' east, 3.97 meters distant from the station.

**Phinney** (Maine, Washington County; J. E. McGrath, 1909; 1918).—On the east side of the St. Croix River in Baring, Me. The station is on the north side of the first street south of and paralleling the Maine Central Railroad, about 100 meters northeastward from the main street of Baring, on a bare outcropping of rock 16.6 meters below the top of a rocky ledge.

Station mark: A bronze disk set in a drill hole in the rock. A number of names and initials have been inscribed in the face of the rock. A cross within a triangle is cut in the rock north 35° 04' east, 11.61 meters from the station, and a similar mark bears south 19° 40' east, 11.37 meters distant from the station.

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South Bar (Maine, Washington County; J. E. McGrath, 1910).—On the south side of the St. Croix River in Baring, Me. The station is at the intersection of the northeast line of the main street in Baring with the northeast line of the international highway bridge across the St. Croix River.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long set flush with the ground. The subsurface mark is a nail set in concrete in the top of a tile set 70 centimeters under the surface of the ground. The nearest corner of the granite foundation of Polley's store bears south  $75^{\circ}$  04' east, 13.49 meters distant, and the distance from the station to the center line of the Maine Central Railroad in the direction of the downstream side of the highway bridge is 3.50 meters.

Murphy (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the west bank of the St. Croix River a little below Baring, Me., at a narrow place in the river about 300 meters below the international highway bridge. The station is about 10 meters back from the river on the exposed surface of a rock projecting 1 little above the surface of the ground.

Station mark: A copper disk set in a drill hole in the rock. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in a rock 3.36 meters upstream and inland from the station, and a cross within a triangle is cut in a rock 4.72 meters downstream and riverward from the station. Between these is a third similar mark which is distant 2.93 meters from the station.

**Chain Rock** (Maine, Washington County; J. E. McGrath, 1909; 1918).—On the east bank of the St. Croix River, on the summit of a square rocky headland that projects into the narrows of the river 400 meters north of the international highway bridge at Baring, Me.

Station mark: A bronze disk set in a drill hole in the ledge rock. A cross within a triangle is cut in the rock north  $87^{\circ}$  44' east, 3.73 meters, and a large eyebolt holding an iron ring is set in the rock south  $31^{\circ}$  34' west, 7.51 meters distant from the station.

**Towers** (New Brunswick, Charlotte County; A. J. Brabazon, 1910; 1918).—On the bank of the St. Croix River, one-fourth mile north of Baring. The station is on the Canadian point opposite Sawdust Island where the river suddenly broadens out into a lakelike expanse.

Station mark: A copper disk set in a drill hole in the ledge rock 15 meters back from the extreme end of the point. The letters "C. R. M." are cut in the ledge. A cross cut in the ledge in the direction of the nearest island is 1.20 meters distant from the station, and a cross cut in the ledge in the opposite direction is 9.09 meters from the station. Two marks, not described, are 1.65 and 3.84 meters, respectively, from the station.

Sawdust Island (Maine, Washington County; J. E. McGrath, 1909).—In the St. Croix River, onefourth mile north of Baring, on Sawdust Island in the mouth of the narrow channel where it suddenly broadens out into a lakelike expanse. The island is small and very low and the station is at its southwestern extremity

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long set firmly in the ground.

**Bartlett** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the west shore of the St. Croix River, one-half mile northeast of Baring and about 250 meters northwest of where the river suddenly broadens out.

Station mark: A copper disk set in a drill hole in a rock 1.5 meters long and 1 meter wide which juts into the water and projects about 0.3 meter above it. A large rock in the mouth of a little brook bears northwestward 43 meters distant. A cross within a triangle cut in a rock in the river close to the shore is 3.38 meters upstream from the station. Another cross within a triangle is 2.20 meters downstream and inland, and a cross alone is cut on a rock 2.80 meters upstream and inland from the station. The letters "C. R. M." are cut in the station rock.

**Butler** (New Brunswick, Charlotte County; A. J. Brabazon, 1910).—On the west shore of the St. Croix River, three-fourths mile northeast of Baring and just above the mouth of Mohannas Creek, on Butler's farm. The station is about 4 meters back from the marshy shore in the alders on a rock about 1.7 meters long projecting about 0.4 meter above the ground with another rock lying partly over it.

Station mark: A copper disk set in a drill hole in the rock. The letters "C. R. M." are cut in the rock. A cross is cut into each of three rocks; one upstream, one downstream, and one inland from the station, at distances of 3.75, 13.85, and 3.35 meters from the station, in the order given.

**Canal** (Maine, Washington County; J. E. McGrath, 1909; 1918).—On the bank of the St. Croix River. three-eighths mile north of the international bridge at Baring, on Canal Point. The station is on a bare ledge at the edge of a wooded tract.

Station mark: A bronze disk set in a drill hole in the ledge. A cross within a triangle is cut in the ledge inside the tree line south  $27^{\circ} 07'$  east, 9.60 meters distant from the station.

**Haw Point** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the bank of the St. Croix River, about five-eighths mile north of Baring, on Haw Point just below the mouth of Mohannas Creek and about 115 meters west of a point of the shore from which the shore line begins to bend decidedly downstream. The station is on a rock 2.4 meters long, 1.5 meters wide, 1 meter high, and in the edge of the water. Station mark: A copper disk set in a drill hole in the rock. The letters "C. R. M." are cut in the rock. A cross is cut in a rock 3.66 meters upstream from the station and 4 meters from the shore. A cross within a triangle is cut in a rock 10.55 meters downstream from the station at the edge of the water.

**Russell** (Maine, Washington County; J. E. McGrath, 1909; 1918).—On the south bank of the St. Croix River on Russell Point, one-half mile northeast of the international highway bridge at Baring. The station is well out on the tip of the point outside the grass line, on a large bowlder 10 meters from the water line.

Station mark: A bronze disk set in a drill hole in the bowlder. Reference monument 212 is set in the same bowlder 21 centimeters northwest of the station. A cross within a triangle is cut in a large rock inside the line of alders south 54° 46′ east, 15.36 meters from the station, and a cross within a triangle is cut on a large granite bowlder that emerges from the water on the east side of the point north 84° 32′ east, 16.82 meters from the station.

**Rideout** (Maine, Washington County; J. E. McGrath, 1909; 1918).—On the south side of the St. Croix River, about three-fourths mile northeast of Baring, on the high rolling meadow lands lying between the Baring-Calais highway and the Maine Central Railroad. The station is a little north of the highest part of the meadow and is on the land of William Rideout near his west line. It is almost due south of the east end of McKeesick Island, 120 meters from the river, about 90 meters from the railroad, and about 150 meters from the highway.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long and set with its top flush with the ground. The subsurface mark is a nail set in concrete in the top of a 3-inch drain tile placed 66 centimeters below the surface of the ground. A nail set in the top of a 3-inch drain tile 14 inches long, filled with cement and set flush with the ground in the hedge-row on the west property line of the Rideout place, is 92.2 meters along the hedge-row, south of the railroad right-of-way fence, and is south 57° 17′ west, 31.28 meters distant from the station.

Squirrel Point (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On Squirrel Point on the north bank of the St. Croix River, three-fourths mile northeast of Baring. This station is directly north of McKeesick Island, at the outer edge of the marshy shore of the point on the upper side of the first bay above J. I. Hill's house. A large maple stands partly in the water on the point, and a large partly submerged rock rises from the river 6 meters from the station.

Station mark: A copper disk set in the top of a stone about 30 by 45 centimeters in size and 75 centimeters long, set with its top flush with the ground. The letters "C. R. M." are cut in the stone. A cross is cut in a rock at the edge of the water 4.77 meters riverward and slightly downstream from the station, and a cross is cut in a rock at the edge of the river 6.33 meters upstream from the station.

**Birch Hill** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the north bank of the St. Croix River, about 1 mile northeast of Baring, at a point where the river begins to make a long, circular curve to the left downstream. The station is on the top of a little hill that rises from a small watercourse 23 meters west of the station, and is 138.4 meters nearly due east from the nearest corner of the kitchen in the dwelling house of J. I. Hill.

Station mark: A copper disk set in the top of a granite block 60 centimeters long and 30 centimeters square sunk endwise in the ground. The letters "C. R. M." are cut in the stone. Two pieces of tile filled with cement and marked with a nail set in the cement top are sunk below the surface of the ground as witness marks; one of them is south 39° 42′ east, 8.10 meters from the station, and the other is south 3° 13′ east, 7.64 meters from the station.

**Stonyfield** (Maine, Washington County; J. E. McGrath, 1909).—Two miles south of Milltown, Me., on the summit of the first bare knoll south of the intersection of the Calais-Baring highway and the Maine Central Railroad. The station is about 200 meters southeast of the highway and about 250 meters southwest of the railroad.

Station mark: A bronze disk set in a drill hole in the outcropping rock. A cross within a triangle is cut in the outcropping rock south  $34^{\circ}$  44' east, 8.03 meters from the station, and a cross within a triangle is cut in the outcropping rock north  $17^{\circ}$  00' west, 12.83 meters from the station.

**Balcolm** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—About 1½ miles south of Milltown New Brunswick, and about 325 meters west of the St. Croix River in Balcolm's meadows in the big bend of the river. The station is 113 meters southeast of the southeast corner of Balcolm's barn.

Station mark: A copper disk set flush with the ground in the top of a granite post 30 centimeters square and 85 centimeters long firmly embedded in the ground. The letters "C. R. M." are cut in the granite. Two pieces of tile pipe filled with cement and marked with a nail set in the cement are set 23 centimeters under the ground for witness marks. The first is north  $59^{\circ}$  09' west, 4.24 meters distant from the station. The second is north  $25^{\circ}$  05' west, 4.41 meters from the station.

Junction (Maine, Washington County; J. E. McGrath, 1909).—About 1½ miles south of Milltown, Me., at St. Croix Junction, on the Maine Central Railroad. The station is between the two tracks and between the platforms, just south of the trainmen's registration booth.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long, firmly set in the ground. The subsurface mark is a nail in the top of a cement-filled 3-inch tile set 56 centimeters below the surface of the ground. A piece of 3-inch drain tile 1 foot long, filled with cement and marked with a nail set in the top of it, is set flush with the ground north of the north end of the main platform, 1.49 meters from the nearest edge of the top of the nearest rail of the railroad, and north 10° 02′ east, 41.65 meters from the station mark.

**Campbell** (Maine, Washington County; J. E. McGrath, 1909).—About 1 mile south of Milltown, Me., in an open field between the Maine Central Railroad and the St. Croix River, about 200 meters north of Maguerrewoc Stream and abreast of the south end of Campbell's Siding. The station is on a small bowlder, about 0.5 by 1 meter in cross section and 0.2 meter in height, which is one of a pile of stones made in clearing the surrounding field. The center of the main track of the Maine Central Railroad is 72.75 meters from the station.

Station mark: A bronze disk set in a drill hole in the bowlder. A cross within a triangle is cut in a rock north  $13^{\circ} 53'$  east, 8.02 meters from the station, and a cross within a triangle is cut in the rock of an outcropping ledge north  $82^{\circ} 43'$  west, 9.76 meters from the station.

**Pineo** (Maine, Washington County; J. E. McGrath, 1909).—About 1 mile south of Milltown, Me., on the east bank of the St. Croix River and about one-fourth mile below the mouth of Maguerrewoc Stream. The station is 42 meters from the river on the northeast corner of an embankment which was at one time the site of a house. The ruined stone walls of the cellar still remain, and the station is about 1 meter northeast of the northeast corner of the old wall. There is a sand and gravel pit just across the old cellar from the station.

Station mark: A bronze disk set a little above the surface of the ground in the top of a granite post 15 centimeters square and 60 centimeters long. The letters "U. S. R. M." are cut, one letter on each of the vertical sides of the post. The subsurface mark is a nail set in concrete in a 12-inch length of 3-inch drain tile. A cross within a triangle is cut in the top of a stone south  $37^{\circ}$  48' west, 23.56 meters distant from the station, and a nail set flush with the ground in the top of a cement-filled tile is north  $38^{\circ}$  24' west, 6.13 meters distant from the station.

White (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1918).—On the west bank of the St. Croix River on the point at the upper end of the marshy shore that extends upstream from Milltown for a half mile. The station is on a light colored granite rock about 35 meters back from the shore line.

Station mark: A copper disk set in a drill hole in the rock. The letters "C. R. M." are cut in the rock, A cross within a triangle is cut in each of three rocks, one 3.70 meters eastward, another 2.03 meters southward, and the third 5.84 meters westward from the station.

Kelley (Maine, Washington County; J. E. McGrath, 1909).—Just south of Milltown, Me., in the Kelley meadow. The station is about 650 meters south of the international bridge at Milltown. It is between the Maine Central Railroad and the St. Croix River, about 240 meters from the railroad, about 140 meters from the river, about 70 meters south of the edge of the swampy land that extends along the river from Milltown, and about 40 meters north of a lane which leads to the Milltown Bridge Road.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long set with its top nearly flush with the ground. The letters "U. S. R. M." are cut, one letter in each of the vertical faces of the post. The subsurface mark is a nail set in the top of a cement-filled tile set 58 centimeters below the level of the ground. A tile filled with cement with a nail in the top of it is set alongside the lane fence on the south side of the meadow south 28° 48′ east, 37.70 meters distant from the station and in line with a large lone pine tree in the field to the south. A granite post 15 centimeters square and 60 centimeters long marked with a drill hole in its top is set near the river bank south 69° 59′ west, 171.74 meters distant from the station.

**Stubbs** (Maine, Washington County; J. E. McGrath, 1909; 1921).—In Milltown, Me., in the back yard of Mrs. M. A. Stubbs about 40 meters south of the main street of Milltown, about 25 meters east of the Maine Central Railroad and about 60 meters south of the international highway bridge across the St. Croix River.

Station mark: A bronze disk set flush with the ground in the top of a granite post 15 centimeters square and 60 centimeters long. The letters "U. S. R. M." are cut, one letter in each of the vertical faces of the post. A cross inclosed in a triangle is cut in a bowlder north  $52^{\circ}$  15' east, 1.61 meters from the station, and a cross within a triangle is cut in an exposed ledge of rock south 50° 12' east, 7.98 meters from the station.

**Pumping Station** (Maine, Washington County; J. E. McGrath, 1909).—In Milltown, Me., just below the United States end of the highway bridge across the St. Croix River on the grounds of the Calais Water Co., at the rear of the emergency pump engine house. The station is on filled ground about 9 meters from a section of retaining wall that runs at right angles inland from the river wall and is 1.8 meters at right angles from the river wall.

Station mark: A bronze disk set in a drill hole in the top of a granite post 15 centimeters square and 60 centimeters long set firmly in the ground with its top about 30 centimeters below the surface. The subsurface mark is a nail set in the top of a cement-filled tile buried beneath the granite post. A nail set in the top of a

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cement-filled tile embedded in the ground is 5.96 meters from the northwest corner, and a little outside the north line of the rear building of the pumping station and is north  $84^{\circ} 47'$  east, 5.96 meters distant from the station. A cross within a triangle cut on the surface of an exposed stone is 4.0 meters south of the south rail of the Maine Central Railroad, about 6 meters west of the west rail of the electric railroad, 10.1 meters from a granite post at the northwest corner of the north fence of Mrs. Stubbs' property on Main Street, and is south  $4^{\circ} 16'$  west, 45.15 meters distant from the station. A cross within a triangle is cut in the rock, one course of stones below the top of the retaining wall along the river north  $62^{\circ} 08'$  east, 39.24 meters from the station.

Church (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the northwest bank of the St. Croix River in the southern part of Milltown, New Brunswick. The station is 50 meters upstream from the highway bridge between the two Milltowns, 3.4 meters inland from the inland rail of the Canadian Pacific Railway and 9.94 meters from the upper outer course of a barn that almost touches the railway embankment.

Station mark: A copper disk set in a drill hole in a big rock in Mr. Church's lot.

Harrison (Maine, Washington County; J. E. McGrath, 1909; 1922).—In Milltown, Me., on the corner lot at the southeast corner of Harrison and North Streets, about 9 meters south of Harrison Street and about the same distance east of North Street.

Station mark: A bronze disk set 30 centimeters underground in a drill hole in a rock ledge that extends diagonally across the lot. A cross within a triangle cut on an exposed rock 1.5 meters east of the asphalt paving of Harrison Street and near the lot corner bears north  $22^{\circ}$  38' west, 7.62 meters from the station; and a cross within a triangle cut on the surface of an exposed stone 1.25 meters east of the east line of the asphalt on North Street bears north  $85^{\circ}$  46' west, 7.19 meters distant from the station.

Milltown Baptist Church Finial (Maine, Washington County; J. E. McGrath, 1909).—On the west side of North Street in Milltown, Me., a rectangular church with a square tower on the east or street end of the building.

Station mark: The finial of the tower.

Milltown Congregational Church Spire (New Brunswick, Charlotte County; J. E. McGrath, 1909; 1918).—On the east side of the main street of Milltown, New Brunswick, a rectangular building on the north-west corner of the block, with a tall tower and spire on the northwest corner of the building.

Station mark: The point of the spire.

**Hitchings** (Maine, Washington County; J. E. McGrath, 1909).—About 1 mile southeast of Milltown, Me., on the north peak of Maguerrewoc Mountain, known locally as Hitchings Mountain. The station is about 28 meters north of the summit of the ridge and about 14 meters south of where the hill begins to break sharply into a steep slope to the north. There is higher ground to the northwest of the station.

Station mark: A bronze disk set in a drill hole in a depression in the exposed rock. A cross within a triangle is cut in a bare ledge south  $41^{\circ} 43'$  west, 11.50 meters from the station; and a cross within a triangle is cut in the station ledge north  $2^{\circ} 18'$  west, 1.15 meters from the station.

**Fowler** (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the east side of the St. Croix River, about three-eighths mile south of the Union Mills Bridge. The station is 5.5 meters north of the center line of Walnut Street produced, and about 80 meters from the river.

Station mark: A bronze disk set in a drill hole in a bowlder projecting about 0.3 meter out of the ground. The letters "U. S. R. M." are cut in the bowlder. A cross within a triangle is cut in the top of an exposed bowlder north  $21^{\circ}$  56' west, 7.58 meters from the station, and a cross within a triangle is cut in an exposed bowlder north  $69^{\circ}$  58' east, 4.86 meters from the station.

**Byre** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the west side of the St. Croix River at Union Mills, on a vacant lot between the Milltown road and the river, on the top of a hill about 300 meters south of the Union Mills Bridge. The station is 12 meters back from the top of the bluff curving toward the Milltown road and forming the lower side of the bay below the cotton mill, and 18 meters from the nearest rail of the street railway. Four elm trees, each about 40 centimeters in diameter, are distributed along the bluff in front of the station. A line joining the Baptist Church on the United States side and the lower elm will, if produced, pass through the station; and a line joining the Congregational Church in Milltown, New Brunswick, and the third elm from the lower end, will, if produced, pass through the station.

Station mark: A bronze disk set in a drill hole in an exposed rock projecting a little above the surface of the ground. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in a rock 5.84 meters southward from the station; a like mark is cut in a rock 8.98 meters westward from the station; and a third like mark is cut in a rock 9.23 meters northeastward from the station.

**Barton 2** (New Brunswick, Charlotte County; J. A. Pounder, 1922).—On the west side of the St. Croix River in the northern part of Milltown, New Brunswick. The station is in the field east of the street railway and north of the road leading from the street railway to the cotton mill, about 0.3 meter south of the line of telephone poles running from the street railway to the cotton mill, 45.1 meters from the nearest rail of the street

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railway as measured along the line of telephone poles, and 39.6 meters northeast of the northern fence line of the cotton mill road as measured from a point 32 meters along the fence line from the nearest rail of the street railway.

Station mark: A copper disk set in a drill hole in a rock projecting about 0.4 meter out of the ground. The letters "C. R. M." are cut in the rock.

**Slough** (Maine, Washington County; J. E. McGrath, 1909; 1918).—In the southwestern part of Calais in an open space east of the Maine Central Railroad, on the top of a bare ledge which rises from the water on the east side of the slough formed by the railroad fill across the mouth of Middle Landing Brook. The station is about 70 meters northeast of the railroad trestle across the brook, and about 200 meters south of the Union Bridge Road.

Station mark: A bronze disk set in a drill hole in the ledge. The letters "U. S. R. M." are cut in the ledge. A cross within a triangle is cut in the ledge north 83° 55′ east, 5.91 meters from the station, and a like mark is cut in the ledge south 88° 34′ west, 2.94 meters from the station.

**Slope** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the west side of the St. Croix River in Union Mills between the street-car track and the river, about 350 meters below the Union Mills Bridge The station is 18.4 meters from the nearest rail of the street-car track, and 20.1 meters north of Mr. Glass's house.

Station mark: A copper disk set in a drill hole in the top of a granite post 15 centimeters square and 70 centimeters long sunk endwise in the ground flush with its top. The letters "C. R. M." are cut in the post. A cross is cut in a rock 4.99 meters westward from the station.

International Bridge (Maine, Washington County; J. E. McGrath, 1908; 1922).—At Calais, Me., on the mid-channel pier of the international bridge crossing the St. Croix River to St. Stephen. The station is on the west side of the main structure of the bridge, on the top of the large I-beam that rests upon the pier between the two trusses.

Station mark: A square, cut with a cold chisel in the steel **I**-beam. Reference monument 227 is set in the capstone of the pier south 55° 27′ west, 0.63 meter distant from the station.

Calais Congregational Church Spire (Maine, Washington County; J. E. McGrath, 1909).-In Calais on Calais Avenue.

Station mark: The rod supporting the weather vane of the pinnacle of the spire.

**Barnard** (Maine, Washington County; J. E. McGrath, 1909).—In Calais at the foot of North Street on the outer end of the old Barnard wharf. The station is 15 meters from the outer end of the wharf in the earth fill.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long projecting about 10 centimeters above the ground. The subsurface mark is a nail set in the top of a cement-filled tile placed under the granite post. A triangle made of small nails driven in the top stringer of the east side of the wharf is south 70° 57' east, 12.48 meters from the station to the farthest nail in the triangle. A nail set in the top of a cement-filled tile set 2.1 meters north of the north line of the warehouse bears south 29° 36' west, 14.25 meters distant from the station.

**Hospital** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the north bank of the St. Croix River just east of St. Stephen, at the rear of Mr. Wall's property which adjoins the St. Stephen Hospital grounds. The station is on the Canadian Pacific Railway right of way about 1.5 meters north of the north rail near the eastern end of the long tangent that runs eastward from the St. Stephen railroad yards and docks. The shore line of the river makes an abrupt turn to the south about 130 meters east of the station.

Station mark: A copper disk set in a drill hole in a rock buried about 10 centimeters in the ground at the bottom of the railway ditch.

**Haley** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1921.)—This station is on the same ledge and but 0.1 meter distant from reference monument 228.

Station mark: A bronze disk set in a drill hole in the ledge.

**Box** (Maine, Washington County; J. E. McGrath, 1909; 1921).—On the south bank of the St. Croix River in the eastern part of Calais. The station is on the west side of and near the river end of Barker Street, about 40 meters from the water to the westward, and about the same distance from the water to the northward.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long set 50 centimeters in the ground. The letters "U. S. R. M." are cut, one letter in each of the vertical sides of the post. The subsurface mark is a concrete-filled tile set under the granite post. A cross in the top of a cement-filled tile is set flush with the ground at the northeast corner of Adams box factory south 1° 10′ west, 14.96 meters from the station, and a cross within a triangle is cut on a flat gray stone north 22° 02′ west, 8.40 meters from the station.

**Crocker** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On Crocker Island in the St. Croix River, 1¼ miles below the international bridge at Calais. The station is on a jagged rock projecting but a little above the ground, 14 meters from the high-tide mark at the head of the island and about 3 meters south of a big green pine tree.

Station mark: A copper disk set in a drill hole in the rock. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in each of three rocks, respectively, 3.36 meters northward, 7.57 meters northeastward, and 2.65 meters southwestward from the station.

Young (Maine, Washington County; J. E. McGrath, 1909).—On the southwest bank of the St. Croix River 1¼ miles below the international bridge at Calais. Leaving Calais on the Eastport road, follow the road to Mile Post 1 on the top of the hill, beside the electric railway, then go straight down the ridge 175 meters to the river. The station is on a rounded point just above a small bay.

Station mark: A bronze disk set in a drill hole in a ledge of rock near the high-tide mark. The letters "U. S. R. M." are cut in the rock. A cross within a triangle is cut in the ledge south 36° 23' east, 14.70 meters from the station, and a cross within a triangle is cut in the ledge south 19° 07' east, 6.26 meters from the station.

**Red House** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the north bank of the St. Croix River, 15% miles below the international bridge at Calais, three-eighths mile below Crocker Island, on a narrow elay point which projects almost straight downstream leaving a little cove behind it. The sides of the point rise abruptly to its top, which is flat, and a little above high tide. The station is 9 meters back from the lower end of the flat, about 2 meters from the riverward edge of the flat, and about 30 meters from the nearest corner of Todd's red cottage.

Station mark: A copper disk set in a drill hole in the top of a rock 1.2 meters long sunk endwise in the ground flush with its surface. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in each of three rocks, respectively, northward 2.80 meters, southward 2.69 meters, and southeastward 1.94 meters distant from the station.

Tannery (Maine, Washington County; J. E. McGrath, 1909).—On the southwest bank of the St. Croix River 1¾ miles below Calais, near J. M. Johnson's Tannery, and just above the Calais lower steamboat wharf. The station is 11.75 meters west of the west line of Steamboat Street which runs from the Calais-Eastport road to the wharf, and is on an exposed surface of dark granite rock near the high-tide mark.

Station mark: A bronze disk set in a drill hole in the rock. A cross within a triangle cut on top of a mass of trap rock bears north 56° 31' east, 10.51 meters distant from the station, and a similar mark cut on the sloping face of an irregular ledge of trap rock bears south 20° 10' west, 14.10 meters distant from the station.

**Stroud** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the northeastern shore of the St. Croix River, about 2 miles below the Calais-St. Stephen Bridge, and about three-eighths mile above Long Point. The station is on a prominent point at the end of a long sloping ridge that comes down to the river from the northeast. There was a wharf on this point in 1909 and a road leading down to it. Reference monument 230 is beside the station mark, in the same ledge.

Station mark: A copper disk set in a drill hole in the ledge. The letters "C. R. M." are cut in the ledge. Three crosses are cut in rock, respectively, eastward 6.32 meters, southward 2.71 meters, and westward 3.58 meters distant from the station.

**Big Trees** (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the southwest bank of the St. Croix River, 1% miles below the Calais-St. Stephen international bridge and 100 meters below the Calais lower steamboat wharf. The station is near a group of large pine trees, and is about 1 meter from the edge of the bank which descends steeply a couple of meters to the high-tide mark of the river.

Station mark: A small drill hole in friable rock. A bronze disk set in a drill hole in the top of a large solid bowlder, and known as Big Trees Tablet, bears south  $8^{\circ} 26'$  west, 1.10 meters distant. Reference monument 231 is set in the rock beside the tablet. A cross within a triangle is cut in the sloping face of a large ledge south  $56^{\circ} 11'$  west, 9.88 meters from the station, and a like mark cut in the exposed top of a ledge is north  $49^{\circ} 18'$  west, 7.62 meters from the station.

Todd Point (Maine, Washington County; J. E. McGrath, 1909).—On the west bank of the St. Croix River, 2 miles below Calais, on Todd Point. The station is on the bluff in front of the old Todd residence, and is about 5 meters from the edge of the bluff where it descends precipitously 6 meters to a shingly beach.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long set 56 centimeters deep in the ground and resting on solid rock. The letters "U. S. R. M." are cut, one letter in each of the vertical sides of the post. A cross is cut in the rock under the post. A cross in the top of a cement-filled tile set flush with the ground is south 73° 17′ west, 8.80 meters from the station, and another like mark is north 41° 33′ west, 12.11 meters from the station.

Long Point (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the east bank of the St. Croix River, about 2 miles below St. Stephen, at the foot of the bluff on Long Point. The station is on a jagged rock that is slightly submerged at the highest tides.

Station mark: A bronze disk set in a drill hole in the rock. The letters "C. R. M." are stamped in a cement filling placed in a cavity in the rock. Three crosses within triangles are cut in rock, respectively northward

4.09 meters, northeastward 1.19 meters, and eastward 2.11 meters from the station. A small iron bolt is fixed in a drill hole in a rock 1.42 meters from the station.

Mound (Maine, Washington County; J. E. McGrath, 1909).—On the west bank of the St. Croix River, about 2 miles below Calais. The station is between the river and the Calais-Eastport Road, abreast of the second milestone out of Calais, and on the summit of a little mound 18 meters riverward from the northeast line of the road. The old Jewett wharf is a few meters upstream from the station.

Station mark: A bronze disk set in the top of a granite post 15 centimeters square and 60 centimeters long set nearly flush with the ground. The subsurface mark is a cement-filled tile placed beneath the bottom of the granite post. A cross within a triangle cut in a large bowlder inside the line of telegraph poles bears north  $47^{\circ} 28'$  west, 29.76 meters distant from the station, and a cross in the top of a cement-filled tile set flush with the ground near the corner of a small barn bears south  $35^{\circ} 56'$  east, 13.36 meters distant from the station.

**Hybrown** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the east bank of the St. Croix River, about 2¼ miles below St. Stephen. The station is on the first rounded point of shore line below Long Point, on the flat bench 4 or 5 meters above the shore line and about 6 meters back from the edge of the bench.

Station mark: A copper disk set in a drill hole in the top of a rock. The letters "C. R. M." are stamped in a cement filling placed in a cavity in the rock. A cross within a triangle is cut in each of three rocks, respectively, northward 2.87 meters, eastward 6.56 meters, and southeastward 6.98 meters from the station.

Meadow (Maine, Washington County; J. E. McGrath, 1909.)—On the west bank of the St. Croix River, 2½ miles below Calais, on the upper corner of the first point of shore above Knights Point, and a little more than one-fourth mile distant therefrom.

Station mark: A bronze disk set in a drill hole in a ledge of trap rock near the edge of the high bank. A cross in the top of a cement-filled tile is set flush with the ground south  $49^{\circ}$  09' west, 12.77 meters from the station, and a cross within a triangle is cut on an exposed ledge level with the grass north 76° 16' west, 23.12 meters from the station.

**Donald** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the east bank of the St. Croix River, 3 miles below St. Stephen, just above The Narrows, and on the first point above Hills Point. Bog Brook Church is directly opposite on the United States side of the river.

Station mark: A copper disk set in a drill hole in a rock. The letters "C. R. M." are cut in the rock. Three crosses within triangles are cut in rock, respectively, northward 3.68 meters, southeastward 2.05 meters, and southward 1.00 meter from the station.

Knights Point (Maine, Washington County; J. E. McGrath, 1909).—On the south bank of the St. Croix River, 234 miles below Calais on Knights Point. The station is on the flat top of the point about 7 meters from the eastern edge of the bank, and about 55 meters from the extreme end of the point. A large bowlder on the beach just off the point has a copper bolt set in it. The significance of this mark is not known, but it is said to have been there many years.

Station mark: A bronze disk set in a drill hole in the flat top of a black granite rock nearly flush with the ground. A cross within a triangle is cut on a large black granite bowlder 15 meters inland from the river bank and south  $0^{\circ}$  58' west, 14.68 meters from the station. A cross within a triangle cut on the largest bowlder in the vicinity bears north  $6^{\circ}$  19' west, 3.02 meters distant from the station.

**Hills** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—About 3¼ miles below St. Stephen on the north bank of the St. Croix River near the southern extremity of Hills Point. The station is about 50 meters north by west from the southern tip of the small point which extends toward The Narrows.

Station mark: A copper bolt set in a drill hole in a rock flush with the ground. A cross is cut in a rock 3.73 meters southeastward from the station. A cross within a triangle is cut in a rock 3.58 meters southward from the station, and a like mark is cut in a rock 2.74 meters westward from the station. Reference monument 232 bears north 24° 11′ east, 1.10 meters distant from the station.

**Bog Brook Church Spire** (Maine, Washington County; J. E. McGrath, 1909).—On the south side of the St. Croix River beside the Calais-Eastport Road, about 3 miles below Calais.

Station mark: The spire of the church.

Narrows, 1909 (Maine, Washington County; J. E. McGrath, 1909).—On the south bank of the St. Croix River, about 3½ miles below Calais, on that portion of the river known as The Narrows. The station is about 120 meters downstream from Whitlocks Mill Lighthouse, on the top of the bank about 3 meters from the ledge.

Station mark: A bronze disk set in a drill hole in the top of a pyramidal-topped stone. The letters "U. S. R. M." are cut in the stone. A cross within a triangle is cut in a stone south  $6^{\circ}$  30' east, 19.20 meters from the station, and a like mark is cut in a stone south  $29^{\circ}$  58' west, 16.70 meters from the station.

**Pine Point** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the north bank of the St. Croix River, about 4 miles below St. Stephen on Pine Point, at the upper side of a little bay one-fourth mile above Mark Point Lighthouse.

Station mark: A copper bolt set in a drill hole in a rock. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in each of three rocks, respectively, northward 9.56 meters, southeastward 2.82 meters, and westward 3.75 meters from the station. Reference monument 234 is north 15° 12′ east, 13.21 meters distant from the station.

**Pirington** (Maine, Washington County; J. E. McGrath, 1909).—On the south bank of the St. Croix River, about 4¼ miles below Calais, across The Narrows from and opposite Pine Point. The station is on a rocky point at the end of an open field that slopes steeply upward to the Calais-Eastport Road, is about 3 meters outside the foot of the earthen river bank which is about 5 meters high, and is on a narrow ledge of black trap rock.

Station mark: A bronze disk set in a drill hole in the ledge. A cross within a triangle cut in the sloping top of a black granite bowlder projecting from the earthen bank bears south  $87^{\circ}$  36' east, 15.49 meters distant, and a like mark on a trap ledge about 1.6 meters outside the earthen bank bears south  $61^{\circ}$  04' west, 11.64 meters distant from the station.

Mark Point (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the north bank of the St. Croix River, about 4½ miles below St. Stephen. This station is at Mark Point Lighthouse and is 8.53 meters upstream and riverward from the outer upper corner of its outer upper pier.

Station mark: A copper bolt set in a drill hole in a rock nearly flush with the ground. The letters "C. R. M." are cut in the rock, and reference monument 236 is set beside it in the same rock. A cross within a triangle is cut in each of three rocks, respectively northward 4.38 meters, northeastward 3.70 meters, and eastward 2.24 meters distant from the station.

Quarantine (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the south bank of the St. Croix River, about 4½ miles below Calais, on the prominent wooded point directly opposite Mark Point Lighthouse and just above the great beacon marking the upper end of the extensive ledge which makes out from the United States shore. The station is on a bare ledge of black granite 1 meter inside ordinary high-water line.

Station mark: A bronze disk set in a drill hole in the ledge. The letters "U. S. R. M." are cut in the ledge. A cross within a triangle is cut on top of a sloping ledge south 85° 13' east, 6.87 meters from the station, and a like mark is cut on the sloping top of a black granite ledge south 46° 35' west, 16.35 meters from the station. Reference monument 235 bears south 44° 30' east, 16.37 meters distant. In 1922 the head of the bronze disk was found broken off, the shank remaining in the hole. The shank of a broken reference post is set in a hole 29 centimeters south of the station mark.

Ledge (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the north bank of the St. Croix River, about 4¾ miles below St. Stephen, at The Ledge. The road from St. Stephen to The Ledge runs south nearly to the river, and then turns sharply to the west paralleling the river. The station is 9 meters westward of the center line produced of the north and south portion of the road and is 18 meters south of Le Roy Hill's cottage.

Station mark: A copper bolt set in a drill hole in a rock which projects about 40 centimeters out of the ground. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in each of three rocks, respectively northward 3.84 meters, eastward 3.25 meters, and southward 2.70 meters from the station.

**Brown** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the north bank of the St. Croix River, about 5¼ miles below St. Stephen and about one-half mile upstream from Spruce Point. The station is about 250 meters upstream from the sharp point that forms the upper side of the bay above Spruce Point, and is about 5 meters east of the eastern of two heaps of rock lying about 30 meters apart on the beach.

Station mark: A copper bolt set in a drill hole in a ledge of rock a little below high-tide mark. The letters "C. R. M." are cut in the ledge. A cross within a triangle is cut on each of three rocks, respectively eastward 5.59 meters, southward 3.22 meters, and westward 8.79 meters from the station.

**Hymurch** (Maine, Washington County; J. E. McGrath, 1909).—On the south shore of the St. Croix River, about 5¼ miles below Calais, on a prominent point three-fourths mile below Mark Point Light. The station is about 2 meters inside of the grass line, on a black granite ledge covered at high water. About 15 meters upstream is a very large gray granite bowlder, and a short distance downstream is the summer cottage of Henry Murchie.

Station mark: A bronze disk set in a drill hole in the ledge. A cross within a triangle is cut on the sloping top of an exposed ledge south  $45^{\circ} 52'$  east, 8.95 meters from the station, and a like mark is cut on top of a large triangular piece of black granite north  $57^{\circ} 08'$  west, 8.75 meters from the station.

**Spruce Point** (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the north shore of the St. Croix River a little more than 5 miles below St. Stephen, on Spruce Point, in front of the Spruce Point Lighthouse. The station is 5.79 meters from a point 91 centimeters below the sill on the outer lower corner of the upper front pier of the lighthouse and 3.96 meters from a point 76 centimeters below the sill on the outer upper corner of the lower pier of the lighthouse.

Station mark: A copper bolt set in a drill hole in the ledge. The letters "C. R. M." are cut in the ledge. Three crosses within triangles are cut in the ledge, respectively eastward 4.50 meters, southwestward 1.98 meters, and westward 0.85 meter from the station. Reference monument 238 is set in the ledge beside the station.

Miller (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the south bank of the St. Croix River, about 5¾ miles below Calais, on the heavily wooded point opposite Spruce Point Lighthouse. The station is on a large sloping ledge about 60 centimeters outside the line of vegetation. About 6 meters upstream is a small cove formed by the removal of a portion of the ledge; about 30 meters farther on, the ledge appears again with a similar slope to that at the station.

Station mark: A bronze disk set in a drill hole in the ledge. The letters "U. S. R. M." are cut in the ledge. A cross within a triangle is cut in the ledge south  $65^{\circ}$  48' east, 6.05 meters from the station, and a like mark is cut in the sloping face of a large stone south  $26^{\circ}$  15' west, 9.94 meters from the station. Reference monument 237 is set in the ledge beside the station mark.

**Bluff Head** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the north shore of the St. Croix River, about 6¼ miles below St. Stephen, on Bluff Head Point just below the steep bluff of Bluff Head, about three-fourths mile upstream from Oak Point at the entrance to Oak Bay. Sixty meters east of the station the shore line jogs from east to north making a pronounced point. The station is on the shore somewhat below high-tide mark on a large flat rock.

Station mark: A copper bolt set in a drill hole in the rock. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in each of three rocks, respectively northward 4.36 meters, northwestward 5.43 meters, and southwestward 2.49 meters from the station.

**De Monts** (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the south side of the St. Croix River, a few meters upstream from De Monts Point where the river turns sharply from an easterly to a southerly course, and directly opposite Oak Point which is at the western side of the entrance to Oak Bay. The station is on a smooth rocky ledge, 2.63 meters outside of the line of vegetation and near the line of extreme high water.

Station mark: A bronze disk set in a drill hole in the ledge. The letters "U. S. R. M." are cut in the ledge The letters "R. H. T." have been well cut in the ledge by some unknown person, the letter "R" being upstream 2.76 meters from the station. Reference monument 239 is set beside the station mark. A cross within a triangle is cut on the ledge south 41° 56′ east, 5.20 meters distant from the station, and a like mark is cut on the ledge due west 5.07 meters from the station.

Oak Point (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the north shore of the St. Croix River on Oak Point at the west side of the entrance to Oak Bay. The station is on the ledge running southwest from the cut clay bank at the southwest end of the Todd Farm, and is about 45 meters southwest of the clay bank. The ledge is broad and is covered with water at high tide.

Station mark: A copper bolt set in a drill hole in the ledge. The letters "C. R. M." are cut in the ledge. Reference monument 240 is set in the ledge beside the station mark. There are also three ringbolts set in the ledge. Three crosses are cut in the ledge, respectively eastward 4.43 meters, westward 4.07 meters, and southwestward 3.58 meters from the station.

Wiley (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On a little point on the east shore of the St. Croix River, about 1 mile below Oak Bay and about 1¾ miles above Dochet Island.

Station mark: A copper bolt set in a drill hole in a rock ledge. The letters "C. R. M." are cut in the ledge. Three crosses within triangles are cut in the ledge, respectively northward 2.32 meters, eastward 2.42 meters, and southward 2.52 meters distant from the station. Reference monument 241 is set in the ledge beside the station.

Warwig (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the east shore of the St. Croix River on a little point of the small peninsula just below the mouth of Warwig Creek at the entrance to Oak Bay.

Station mark: A copper bolt set in a drill hole in the rough ledge. The letters "C. R. M." are cut in the ledge. Three crosses within triangles are cut in the ledge, respectively northward 3.29 meters, eastward 2.86 meters, and southward 3.50 meters distant from the station.

Eaton (Maine, Washington County; J. E. McGrath, 1909).—On the west bank of the St. Croix River, about 15% miles above Dochet Island. The station is a little more than a meter inside of the river edge of a bluff of coarse red stone, on the land of H. W. Eaton, and almost directly in front of his house.

Station mark: A bronze disk set in a drill hole in the ledge. The letters "U. S. R. M." are cut in the ledge. A cross within a triangle is cut in the ledge south  $60^{\circ}$  33' west, 5.04 meters from the station, and a like mark is cut in the ledge north  $51^{\circ}$  24' west, 5.33 meters from the station.

Sand Point (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the east shore of the St. Croix River, three-fourths mile north of Dochet Island, on the flat, grassy, and sandy point called Sand Point. The station is 35 meters from the foot of the bluff, and just inside the grass line, on a rock 60 centimeters long and 28 by 38 centimeters in cross section, sunk flush with the ground.

Station mark: A bronze disk set in a drill hole in the top of the rock. The letters "C. R. M." are cut in the rock. A cross within a triangle is cut in each of three rocks sunk flush with the ground, respectively northeastward 3.85 meters, southwestward 3.89 meters, and eastward 2.26 meters from the station.

Wilson (Maine, Washington County; J. E. McGrath, 1909).—On the west shore of the St. Croix River, opposite and one-half mile west of Dochet Island, on a point extending some 200 meters into the river from the general shore line, and terminating in a grassy knoll which is surrounded by water at high tide. The station is at the north end of the knoll and a little more than a meter south of the outer grass line.

Station mark: A bronze disk set in a drill hole in a rock. The letters "U. S. R. M." are cut in the rock. A cross within a triangle is cut in a rock south 23° 54′ east, 3.08 meters from the station, and a like mark is cut in a ledge south 85° 32′ west, 8.56 meters from the station.

**Dochet Island** (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the island of the same name in the lower St. Croix River, near the summit of the knoll south of the lighthouse and the keeper's dwelling.

Station mark: A bronze disk set in a drill hole in the ledge. The letters "U. S. R. M." are cut in the ledge near the mark, and reference monument 242 is set in the ledge beside it. The finial of the lighthouse lantern bears north  $13^{\circ}$  west, 13.2 meters distant. A cross within a triangle cut in the ledge bears north  $59^{\circ}$  42' east, 2.34 meters, and a like mark cut in the ledge bears north  $78^{\circ}$  02' west, 3.87 meters distant.

Lowe Point (Maine, Washington County; J. E. McGrath, 1909).—On the prominent point of the same name located on the west shore of the St. Croix River, three-fourths mile below Dochet Island, and one-half mile below Red Beach village. The station is on an exposed ledge at the tip of the point about 2 meters outside of the line of vegetation.

Station mark: A bronze disk set in a drill hole in the ledge. The letters "U. S. R. M." are cut in the ledge at the station. A cross within a triangle is cut in the ledge north  $22^{\circ}$  03' east, 3.32 meters from the station, and a like mark is cut in the ledge south 76° 41' west, 4.89 meters distant from the station.

Dochet Island Lighthouse Finial (Maine, Washington County; J. E. McGrath, 1909; 1922).—On Dochet Island in the St. Croix River.

Station mark: The finial of the lantern on the lighthouse.

Little Dochet (Maine, Washington County; J. E. McGrath, 1909; 1922).—On the small island of the same name 1 mile below Dochet Island in the St. Croix River. The station is in an open space about 5 meters from the highest point of the bluff on the southeast point of the island.

Station mark: A bronze disk set in a drill hole in the rock. Reference monument 244 is set in the rock 0.3 meter northwest of the station. A nail in the center of a cross cut in the top of a cement-filled tile set flush with the ground bears south  $50^{\circ}$  12' west, 10.72 meters from the station. A ringbolt set in a drill hole in the rock bears north  $89^{\circ}$  27' west, 2.77 meters from the station, and a ringbolt set in a drill hole in the rock bears north  $28^{\circ}$  39' east, 2.30 meters from the station.

Lambs Bluff (Maine, Washington County; J. E. McGrath, 1909).—On the west bank of the St. Croix River, about 2 miles above Joes Point, about 1 mile above the village of Robbinston, on the prominent bluff point just above Brooks Cove. This point is known as Lambs Bluff and Hilchin Point. The station is in the grass land about 6 meters back from the edge of the bluff on the property of James Lamb.

Station mark: A bronze disk set in a drill hole in the top of a granite post 15 centimeters square and 70 centimeters long, set with its top flush with the ground. A pint bottle filled with ashes is placed beneath the post for a subsurface mark. A cross cut on a small bowlder placed slightly below the level of the ground 1.5 meters from the fence between Lamb's and Harvell's land bears north 87° 01' west, 32.14 meters distant from the station; and a cross within a triangle cut on a double birch tree 25 centimeters in diameter and marked with nails driven in the points of the triangle and the center of the cross bears north 34° 32' west, 19.60 meters distant from the station.

Apple Point (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1922).—On the east bank of the St. Croix River, 15% miles above Joes Point on the projection of the shore line known as Apple Point. The station is 1.8 meters back from the edge of the bluff which drops almost vertically 12 meters to the water.

Station mark: A bronze disk set in concrete in an excavation in the rock. The letters "C. R. M." are stamped in the concrete. Reference monument 245 is set beside the station mark. A nail in a blaze on a birch stump 23 centimeters in diameter is 9.69 meters south of the station; a nail in a blaze on a birch stump 20 centimeters in diameter is 2.15 meters west of the station; and a nail in a blaze on a spruce stump 25 centimeters in diameter is 5.94 meters north of the station.

**Pike** (Maine, Washington County; J. E. McGrath, 1909).—On the west bank of the St. Croix River, about one-fourth mile north of the Robbinston Church, on a bluff point just above the small cove that lies in front of the old "Sheppard Pike" mansion. In the center of the entrance to this cove there is at high water a small island of red rock, which at low water appears as the end of a small peninsula. The station is about 160 meters

north of this island on a rocky bluff which rises almost vertically about 5 meters above the river. The station is about 2 meters inside the edge of this bluff. Farther inland, the bluff rises 5 meters higher.

Station mark: A bronze disk set in a drill hole in the rock. A cross cut in the rock bears north  $63^{\circ} 31'$  west, 3.62 meters distant, and a like mark bears south  $75^{\circ} 31'$  east, 4.90 meters distant.

**Holey Rock** (New Brunswick, Charlotte County; A. J. Brabazon, 1909).—On the east bank of the St. Croix River 1 mile above Joes Point, on a point through which the action of the water has eroded a tunnel from which it is known as Holey Point. The station is just over the tunnel.

Station mark: A bronze disk set in concrete in an excavation in the soft rock. The letters "C. R. M." are stamped in the concrete. Three copper bolts marked with a cross cut in their tops are fixed in the rock, respectively northward 4.30 meters, southward 2.80 meters, and westward 3.94 meters distant from the station.

Joes Point (New Brunswick, Charlotte County; A. J. Brabazon, 1909; 1919).—On the east side of the mouth of the St. Croix River on Joes Point.

Station mark: A bronze disk set in a drill hole in a large rock flush with the ground. The letters "C. R. M." are cut in the rock. Range mark 1 is north 75° 13' east, 15.6 meters from the station, and range mark 2 is in the same azimuth, 129.8 meters distant from the station.

**Robbinston** (Maine, Washington County; J. E. McGrath, 1909).—On the west bank of the St. Croix River, about three-fourths mile above Liberty Point and 90 meters north of the old Robbinston wharf. The station is near the highest point of a bare granite-topped knoll overlooking the river, from which it rises precipitously about 3 meters above mean tide.

Station mark: A hole 3 centimeters in diameter and 8 centimeters deep drilled in the rock just outside the grass line. The letters "U. S. R. M." are cut in the rock near the mark. A cross within a triangle cut in the rock near a large iron eyebolt bears south 42° 34′ east, 9.54 meters from the station, and a like mark cut in the rock bears south 87° 38′ west, 9.67 meters distant.

**Pleasant Point** (Maine, Washington County; A. J. Brabazon, 1913; 1919).—On the west shore of Passamaquoddy Bay on Pleasant Point. The station is on top of the highest hill on the point, one-fourth mile northwest of the Indian village of Pleasant Point, and about 75 meters northeast of the main road where it crosses the top of the ridge.

Station mark: A bronze disk marked "U. S. & C. B. R. M." set in a drill hole in the rock.

Clam Reference Mark (New Brunswick, Charlotte County; A. J. Brabazon, 1913; 1919).—On Deer Island on the east shore of Passamaquoddy Bay, on the point at the west side of the entrance to Clam Cove. The station is on the summit of the knoll about 50 meters inland on the extreme southeastern tip of the point. The point is timbered.

Station mark: A bronze disk set in a drill hole in solid rock.

**Eastport Reference Mark** (Maine, Washington County; A. J. Brabazon, 1913; 1919).—On Moose Island in Passamaquoddy Bay in the northern outskirts of Eastport, about 650 meters southwest of Dog Island, about 200 meters north of the north line of the large cemetery that lies on both sides of the travelled road, and on high ground about 30 meters north of the angle where the road turns to the westward.

Station mark: A bronze disk set in a drill hole in a flat solid rock in a field.

**Deer Island Reference Mark** (New Brunswick, Charlotte County; A. J. Brabazon, 1913; 1919).—On Deer Island, Passamaquoddy Bay. The station is on the summit of the prominent knoll on Deer Point at the extreme southern end of the island.

Station mark: A bronze disk set in a drill hole in a jagged rock. In 1919 the disk was reported missing; the drill hole was recovered.

Cherry Island Tower (New Brunswick, Charlotte County; Jesse Hill, 1919).—On the southern end of Cherry Island in Passamaquoddy Bay, about 1 mile northeast of Eastport, Me., and about 300 meters south of Indian Island. The station is a white tower about 8 meters in height, constructed by the Canadian Lighthouse Service in 1914 as an aid to navigation, and is on the same site as Cherry Island bell tower, the United States Coast and Geodetic Survey's station of 1910. Range mark 17 is 16 meters to the northwest of the station. There is a fog bell on a wooden frame beside the tower. (See Cherry Island bell.)

Station mark: The pinnacle of the tower.

Cherry Island Bell (New Brunswick, Charlotte County; Jesse Hill, 1919).—On Cherry Island, Passamaquoddy Bay. (See Cherry Island Tower.)

Station mark: The center of the fog bell beside the Cherry Island tower.

Kendall Head Reference Mark (Maine, Washington County; Jesse Hill, 1919).—On Kendall Head on the northeast point of Moose Island, Passamaquoddy Bay. The station is on the reef just off the shore of the headland, and is on the range line from turning point 2 of the boundary to range marks 7 and 8.

Station mark: A bronze disk set in a drill hole in the rock. There is an iron bolt set in the rock 13 centimeters north of the mark.

Cherry Island Reference Mark (New Brunswick, Charlotte County; A. J. Brabazon, 1913; 1919).— On Cherry Island, Passamaquoddy Bay, near Cherry Island tower and range mark 17. (See Cherry Island Tower.) The station is 23.23 meters southeast of range mark 17.

Station mark: A bronze disk set in a drill hole in exposed rock.

**Chambers** (New Brunswick, Charlotte County; J. E. McGrath, 1913; 1919).—On the west coast of Campobello Island, Passamaquoddy Bay, on a point one-fourth mile north of Mulholland Point Lighthouse, and about one-third mile northeast of Lubec, Me. The station is on a bare ledge south 18° 40′ west, 57.1 meters from range mark 25.

Station mark: A bronze disk set in a drill hole in the rock.

**Pope** (Maine, Washington County; J. E. McGrath, 1913; 1919).—On Pope's Folly Island, Passamaquoddy Bay, three-eighths mile north of Lubec, Me. The station is on a rocky ledge near the north end of the island, just outside the tree line, and is north 72° 57′ east, 13.0 meters from range mark 23.

Station mark: A bronze disk set in a drill hole in the ledge. In 1919 the disk was gone, but the drill hole was recovered.

Sculpin (Maine, Washington County; J. E. McGrath, 1913; 1919).—On the south end of Treat Island, Passamaquoddy Bay, 1 mile north of Lubec, Me. The station is on a high flat ledge 1.8 meters from its precipitous side, 2 meters high, which faces the southwest. It is north 67° 24′ east, 43.5 meters from range mark 31.

Station mark: A bronze disk set in a drill hole in the ledge. Three holes are drilled in the rock around the mark to hold guy wires for the signal pole.

Dudley (Maine, Washington County; Jesse Hill, 1919).—On Dudley Island, Passamaquoddy Bay, threefourths mile north of Lubec, Me. The station is a little northeast of the highest part of the island.

Station mark: A small cross cut in solid rock.

Folly (Maine, Washington County; J. E. McGrath, 1913; 1919).—On Pope's Folly Island, Passamaquoddy Bay, three-eighths mile northeast of Lubec, Me. The station is 6.5 meters inland from the precipitous face of the southeast end of the island.

Station mark: A nail head set in the top of a cement-filled drain tile placed flush with the ground and set in a mass of concrete.

**Charley** (New Brunswick, Charlotte County; J. E. McGrath, 1913; 1919).—On the west coast of Campobello Island, Passamaquoddy Bay, on Charley's Point opposite Lubec, Me. The station is 3 or 4 meters back from the edge of the bluff, and is north 86° 15′ west, 7.6 meters from range mark 33.

Station mark: A nail head set in the top of a concrete-filled tile set flush with the ground in a mass of concrete.

**Breakwater 2** (Maine, Washington County; J. E. McGrath, 1913; 1919).—Passamaquoddy Bay, on the Lubec breakwater, near the center of the top surface of the fifth granite block from the outer end, and south 52° 53' east, 3.4 meters from range mark 27. This mark has been moved by floating ice, is likely to move again, and should not be depended on for position.

Station mark: A bronze disk set in a drill hole in the rock.

**Head** (Maine, Washington County; J. E. McGrath, 1913; 1919).—Passamaquoddy Bay, on Buckman Head in the southern part of Eastport, Me. The station is 3 meters from the rocky point of the top of the headland from which the descent to the beach is almost vertical. Range mark 29 is north 51° 26' west, 24.1 meters from the station.

Station mark: A bronze disk set in a drill hole in the ledge.

**Gull** (Maine, Washington County; Jesse Hill, 1919).—On the small rock island called Gull Rock that lies 300 meters west of Treat Island in Passamaquoddy Bay. The station is on the pinnacle of the island. Station mark: A shallow drill hole in the solid rock.

**Round Rock** (New Brunswick, Charlotte County; J. E. McGrath, 1913; 1919).—In the mouth of Passamaquoddy Bay about one-fourth mile west of Liberty Point on the south end of Campobello Island. The station is on a large rock about one-fourth mile off shore locally known as Round Rock or Black Rock. High tides may sometimes cover the rock.

Station mark: A bronze disk set in a drill hole in the rock.

Larrabee (Maine, Washington County; J. E. McGrath, 1913; 1919).—On the north shore of West Quoddy Head just inside the entrance to Passamaquoddy Bay, on the first point inside the "head." It is at the west side of the first small cove about one-half mile northwest of West Quoddy Light and about 190 meters northwest of range mark 41. The station is about 3 meters below the top of the bluff on the smooth granite rock protruding from beneath the soil, and is about 2.4 meters outside the toe of the earthen bank.

Station mark: A bronze disk set in a drill hole in the rock.

**Bello** (New Brunswick, Charlotte County; J. E. McGrath, 1913; 1919).—On the south end of Campobello Island at the entrance to Passamaquoddy Bay, on the point of shore about 300 meters west of Liberty Point. The station is on the flat top of a pyramidal ledge of granite and is south 11° 22′ west, 6.2 meters from range mark 47.

Station mark: A bronze disk set in a drill hole in the ledge.

**Pond** (New Brunswick, Charlotte County; J. E. McGrath, 1913; 1919).—On the south coast of Campobello Island, about one-third mile to the eastward of Duck Point and just east of a little rounded point on the north shore of Great Duck Pond. The station is 5 meters outside the grass line on the top of a very irregular mass of igneous rock, 9.3 meters from a large white granite bowlder protruding from the sand.

Station mark: A bronze disk set in a drill hole in the rock. Three drill holes in the rock in which ringbolts were placed are, respectively, 1.99 meters, 1.66 meters, and 2.14 meters distant from the station.

Mam (Maine, Washington County; J. E. McGrath, 1913; 1919).—On the west shore of Passamaquoddy Bay about 2 miles below Lubec, Me., and about one-fourth mile below Woodward Point. The station is on a ledge of black igneous rock which projects about 6 meters from the earthen bank, and is about 100 meters north of range mark 43.

Station mark: A bronze disk set in a drill hole in the rock.

**Duck** (New Brunswick, Charlotte County; J. E. McGrath, 1913; 1919).—In Passamaquoddy Bay, 134 miles southeast of Lubec, Me., on the innermost and largest of the Duck Islands, lying off the southwest coast of Campobello Island and abreast of the mouth of Little Duck Pond. The station is nearly in the center of the face of the island directed toward the United States shore, on a large granite ledge, a little above high water, and 3 meters outside the line of vegetation.

Station mark: A bronze disk set in a drill hole in the ledge.

Lubec Channel Lighthouse Finial (Maine, Washington County; United States Coast and Geodetic Survey, 1893; 1919).—In Lubec Channel, 114 miles south of Lubec, Me.

Station mark: The finial of the structure.

Life-Saving Station Lookout Tower (Maine, Washington County; Jesse Hill, 1919).—At the entrance to Passamaquoddy Bay on the highest part of the peninsula that terminates in West Quoddy Head. This is the lookout tower built by the United States Coast Guard Service in 1918, and is about 300 meters southeast of their station on the north shore of the peninsula.

Station mark: The apex of the roof.

Sail Rock (Maine, Washington County; J. E. McGrath, 1913).—On the islet called Sail Rock, which is a mass of rocks lying about one-fourth mile south-southeast of West Quoddy Head Light. The station is on the westernmost and lower of two high points of the islet, about 25 or 30 meters apart, the only points showing above high water.

Station mark: A bronze disk set in a hole drilled in the rock.

**East Campobello** (New Brunswick, Charlotte County; Geodetic Survey of Canada, 1918).—On a high, wooded point of Scott Head, Campobello Island, about three-fourths mile northeast of Schooner Cove. A road branching off from the Welshpool-Wilson Beach road about 2 miles below Wilson Beach, ends near the eastern shore of the island about four-fifths mile south of the station. A trail from a steep cove east of the station has been cut to the station; the sea end of this trail is marked by a conspicuous blaze. The timber was cleared to the south and southeast of the station.

Station mark: A bronze disk set in rock, at the bottom of a hole 3 feet square and 1 foot deep. A tripod with targets was built over the station.

West Campobello (New Brunswick, Charlotte County; Geodetic Survey of Canada, 1918).—On Owen Head on the southeast end of Campobello Island, about 5 miles by water from Lubec, Me. The point on which the station is located has been fairly well cleared of timber to the south and east, making the station visible from the sea. A well-marked trail leads to the point, following the edge of the cliff from a small cove with beach about 360 meters to the north.

Station mark: A bronze disk set in a large bowlder embedded in soft ground. A tripod signal with high pole and targets was built over the station. Station is referenced by nails in four stumps bearing, respectively, south 15° 38' east, 4.76 meters distant; south 58° 56' west, 3.41 meters distant; north 42° 41' west, 2.53 meters distant; and north 10° 40' west, 5.12 meters distant from the station.



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TRIANGULATION, SOURCE OF THE ST. CROIX RIVER TO THE ATLANTIC OCEAN, MAJOR SCHEME

## TRIANGULATION AND TRAVERSE SKETCHES



TRIANGULATION AND TRAVERSE, SOURCE OF THE ST. CROIX RIVER TO NORTH LAKE, MINOR SCHEMES 47378°-34-20



APPENDIX IV

TRIANGULATION AND TRAVERSE SKETCHES



TRIANGULATION, LOWER PART OF GRAND LAKE, MINOR SCHEMES

APPENDIX IV



TRIANGULATION, MUD LAKE AND UPPER PART OF SPEDNIK LAKE, MINOR SCHEMES



TRIANGULATION AND TRAVERSE SKETCHES

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TRIANGULATION AND TRAVERSE, LOWER PART OF SPEDNIK LAKE AND UPPER PART OF ST. CROIX RIVER; FROM THE NARROWS TO LITTLE FALLS; MINOR SCHEMES

# TRIANGULATION AND TRAVERSE SKETCHES



TRIANGULATION AND TRAVERSE, ST. CROIX RIVER; LITTLE FALLS TO MOUTH OF CANOOSE RIVER; MINOR SCHEMES

APPENDIX IV



TRIANGULATION AND TRAVERSE, ST. CROIX RIVER; MOUTH OF CANOOSE RIVER TO GRAND FALLS, MINOR SCHEMES


TRIANGULATION AND TRAVERSE, ST. CROIX RIVER; GRAND FALLS TO WOODLAND, ME., MINOR SCHEMES









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